New Technologies, Education for Sustainable Development and Critical Pedagogy

Vassilios Makrakis & Nelly Kostoulas-Makrakis (Eds.)

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Education and Culture DG

Lifelong Learning Programme

PREFACE

Information and communication technologies (ICTs) are developing rapidly, and being infused into every domain of our societies. Education is also being affected by ICTs: the way one can access and construct knowledge is changed, the roles of schools and the roles of the teacher are changing, and new pedagogical and ethical questions are raised. The link between ICTs and sustainable development is being addressed by extensive debate and research which recognize the challenge new technologies bring to the reorientation of education towards learning to live sustainably. ICTs play an important role in advancing sustainable education in three ways: a) by increasing access to educational materials about sustainability (e.g., via distance learning, educational networks and databases); b) by helping to promote new ways of interactive learning addressing sustainable development issues and 3) by opening access to information and knowledge. While ICTs can provide interactive mind/cognitive tools to support learning and develop new understandings and knowledge in areas of teaching and learning for sustainability, ESD themes integrated into the school curricula could provide a worthwhile context for ICTs in education. For example, social, economic and environmental issues can provide meaningful and challenging contexts for developing a wide range of ICT skills.

In general, ICTs can provide opportunities for learners to construct meaningful learning environments which can be applied to ESD such as: 1) engaging and challenging learners; 2) stimulating dialogue and social negotiation through new modes of social interaction; 3) learning by exploring, discovering, doing and reflecting; 4) constructing personal and collective representations of meaning; 5) supporting discourse in dealing with real-life problems; 6) representing dynamic relationships needed for knowledge construction; and 7) developing pupils' understanding of the implications of ICT for working life, society and the environment. There are key sustainable development areas such as cultural diversity and intercultural understanding, health, HIV/AIDS, governance, natural resources, climate change, rural development, sustainable urbanisation, disaster prevention and mitigation, poverty reduction, corporate responsibility and accountability, and the market economy, where there is potential to assess the impact of ICTs.

In the context of an evolving paradigm in pedagogy enabled by ICTs, teachers have to see themselves functioning as facilitators and mentors, as resources and as curriculum developers as well as transformative intellectuals. Each of these roles is associated with specific activities. Teachers as "facilitators and mentors" will guide and facilitate learners' critical and creative thinking in a collaborative learning environment enabled by new technology. Teachers as "resources" will have to develop learners' capacities for active citizenship and to contribute to their fellow teachers' professional development enabled by new technology. As "curriculum developers", teachers critically assess school knowledge, reorder and enrich curriculum according to the principles of new pedagogy enabled by new technology. Teachers as "transformative intellectuals" are involved in developing a discourse that, as Giroux and other critical pedagogues state, unites the language of critique with the language of possibility that leads to praxis and social transformation.

Teachers functioning as "transformative intellectuals" are giving students an active voice, making the political more pedagogical and the latter more political. In other words, teachers are able and committed to function as change agents of reorienting what they teach and how they teach for promoting a key goal for 21st education that is, learning to transform oneself and society. In these two volumes, there are contributions, which in one or another way tackle the infusion of sustainability issues across all education levels. In a wide number of these contributions, there is evidence that ICTs, can enable education for sustainable development. These contributions can be used as a useful resource to teachers' professional development from early childhood education to higher education.

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PART II

PART I

Course Curriculum Design and Development of the M.Sc. Programme in the Field of ICT in Education for Sustainable Development

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Abstract

This paper presents the design and development of a VLE for a M.Sc. programme on ICT in Education for Sustainable Development driven by a learning paradigm that merges three theories of learning, namely: experiential learning, constructivist learning and transformative learning (ExConTra) funded by the European Commission. Learning activities were designed to offer the chance for students to interact asynchronously and synchronously, negotiate meaning and reflect on their learning and viewpoints through collaborative problem solving. The ExConTra learning process is also based on an interdisciplinary approach addressing the four pillars (environment, society, culture and economy) of sustainable development and makes use of an online course design methodology that uses four phases: needs analysis, curriculum design, development and formative evaluation. The VLE that encompasses both the curriculum programme and the online platform with its tools and online technologies merges ICTs with ESD in three ways: a) providing opportunities to target groups for reflective practice; b) using open source ICT tools and ESD-related learning objects available in the Web; and c) using ICTs to develop interactive, interdisciplinary and cross-disciplinary ESD learning activities.

Key-words: Curriculum, ICT, Online Learning, Education for Sustainable Development, Masters programme

The Challenges of ICTs in Education for Sustainable Development

The increasing rate of Information and Communication Technologies (ICTs) development and their widespread implementation across all sectors of the economic and social life brings about radical changes in the way we work, think, learn and communicate. There is not, however, a universally accepted definition of ICTs due to the fact that concepts, methods and applications related to ICT are constantly evolving and can be contextually interpreted and applied. A broad definition of ICT is concerned with the distinction between "old or traditional technologies" (radio, television, video, DVD, telephone, computers) and "new or modern technologies" (video conferencing, e-mail, cellular telephones, weblogs, Web 2, and other social networking software). An "old or traditional technology" might be a driving force for transformative change in its right context as a "new or modern technology" could be a driving force in another context. No matter of technology development, educational systems, worldwide, face the challenge of preparing citizens who need to be equipped with the necessary skills and competencies to transform current unsustainable practices. In this context, teachers are increasingly called upon to switch from roles of being knowledge transmitters towards taking an active role as curriculum developers, knowledge constructors and transformative learning agents.

To prepare teachers to function within these roles, they have to receive an appropriate take off training and be prepared to on-the-job self-professional development. They should also be committed to play a leading role in promoting other teachers' professional development in their own schools, acting as resources and facilitators for service learning (Makrakis, 2006). Shifting from content-centred curricula to competence-based and life-skills curricula goes in parallel with shifts from teacher-centred teaching to student-centred learning enabled by ICTs. A competence is often associated with an individual's knowledge, skills, and attributes in an effort to differentiate

high performers from average performers and to develop their potential (Garvin, 2000; Daley, 1991). Drawing on the OECD DeSeCo work, Rychen and Salganik (2003:43) defined competence "as the ability to successfully meet complex demands in a particular context through the mobilisation of psychosocial prerequisites (including cognitive and non-cognitive aspects" and as the "internal mental structures in the sense of abilities, dispositions or resources embedded in the individual' in interaction with a 'specific real world task or demand". Another widespread classification refers to key or generic competences and disciplinary or specific competences.

In relation to sustainable development, there is extensive literature on what should be taught and learned in terms of knowledge, skills and values associated with sustainable development (Makrakis et al. 2012; De Haan, 2006; IAU, 2006; Seitz & Schreiber, 2005). The classical Brundland (WCED, 1997) definition for sustainable development "allows current generations to satisfy basic needs without depriving future generations of the same right". In a panel review of 37 experts, sustainable development was consensually defined as "to making informed, contextual and conscious decisions driven by the principles of solidarity, justice, accountability, equity and transparency for the good of present and future generations, locally and globally and to act upon those decisions for advancing social, economic and environmental wellbeing" (Makrakis, 2011b). Sustainable development is viewed as as a dynamic, evolving and contested concept and practice for and within education, but as Vare & Scott (2007:1) suggest, "whether we view sustainable development as our greatest challenge or a subversive litany, every phase of our education system is being urged to declare its support for education for sustainable development". Education for sustainable development (ESD) or education for sustainability (EfS), used interchangeably, was also defined by the 37 panelists "as the learning needed to maintain and improve our quality of life and the quality of life of generations to come. It is about equipping individuals, communities, groups, businesses and government to live and act sustainably, as well as giving them an understanding of the environmental, social and economic issues involved" (Makrakis, 2011b). ESD/EfS represents a new vision of teaching and learning, a vision that helps people reconnect with nature, by addressing the complexity and interconnectedness of sustainability issues such as poverty, peace and international understanding, sustainable consumption and production, environmental degradation, climate change, water protection and health (UNESCO, 2005). This vision of education emphasizes a holistic, interdisciplinary and cross-disciplinary approach to developing the competences needed for building a sustainable future. However, ESD, as a cross-curricula theme, is often marginalised in national curricula, which in turn reproduces and perpetuates academic divisions of knowledge that separate the natural and social sciences and the humanities, and fails to acknowledge lay and tacit knowledge (Huckle, 2008).

An ESD student competence framework was developed, validated and implemented among 3.760 higher education students in 11 European and Middle East Universities within the framework of a European Tempus initiative entitled "Reorient University Curricula to address Sustainability" (RUCAS) (Makrakis et al., 2012). The ESD student competence framework based on generic and disciplinary competences structured along five clusters (Figure 1) was also used as a guide for curriculum design and development.

Figure 1: The five ESD clusters of competences.

Learning and behavioural change are essential for achieving sustainable thinking and living (learning to live sustainably), which is inextricably connected to transformative perceptions of learning (Makrakis, 2012). Transformative learning focuses on learning-based change that involves 'learning to know', 'learning to do', 'learning to live together' and 'learning to be' (UNESCO, 1996). It is a shift of consciousness that alters: our way of being in the world (learning to be), our way for discovering others by discovering ourselves (learning to live together), our way of learning how to learn as well as acquiring, constructing, disseminating and managing knowledge (learning to know) and our way of putting knowledge into action (learning to do). It is above all learning that "transforms problematic frames of references– sets of fixed assumptions and expectations – to make them more inclusive, discriminating, open reflective and emotionally able to change" (Mezirow, 2003: 57–58). Learning to transform oneself and society has been added by UNESCO as a fifth pillar of learning along with the previous four pillars advocated through the Delors report.

These five clusters of ESD competences applied in Higher Education supported by developments in ICTs, and Learning Management Systems, can open many more opportunities for course developers to introduce innovative teaching and learning methods enabling students to study in their own time and space. The Internet and especially the WWW is increasingly being used as a vehicle for open and flexible learning without geographical and time constraints, reaching greater numbers of socially, culturally and economically diverse students. Taking into consideration the unprecedented expansion of ICT-enabled distance education, it is a great challenge for promoting education for sustainability anywhere, anytime and any place.

The link between ICTs in education and sustainable development is being addressed by extensive debates and research which recognize the challenge ICTs bring to the reorientation of education towards learning to live sustainably (Makrakis, 2011a; Makrakis, 2008; Paas, 2008; Makrakis, 2006). ICTs can help learners explore concepts, engage in problem-based and authentic learning, enhance meta-cognitive skills and present information using multiple media (Makrakis, 2011b). All these are closely related to the goals, themes and learning objectives addressed by education for sustainability (UNESCO, 2010, 2005; Wals & Corcoran, 2006; Summers & Kruger, 2003; Fien & Tilbury, 1996; Huckle, 1996). Indeed, three of the major forces shaping and driving the 21st century education are: 1) the development and diffusion of Information and Communication Technologies (ICTs); 2) the increasing demand for new educational approaches and pedagogies that foster transformative and lifelong learning and 3) the reorientation of educational curricula to address sustainable development (Makrakis, 2011b).

Although the use of ICT can offer exciting new possibilities to promote the changes called for developing knowledge and skills needed for a sustainable future along with changes in values, behaviour, and lifestyles (UNESCO, 2003), simply merging ICT to the transmissive teaching and learning practices will not work to achieve sustainability. Such a teaching model is principally based upon an objectivist approach that is seeing knowledge as something stable to be replicated in learners' minds, decontextualized from social reality and perceived as existing independently from learners' personal experiences. In decontextualized learning, school curricula and teaching methodology are mainly used in the context of instrumental rationality and technical interest in knowledge, which does little to develop human self-realization and critical discourse (Makrakis & Kostoulas-Makrakis, 2005). Instruction that is confined to a limited range of contexts leads also to inert knowledge in which facts and procedures remain isolated and are not activated in different problem-solving situations (Hasselbring & Moore, 1996).

Previous research (Makrakis, 2006) shows that despite technological progress and infusion of ICT in schools, the teachers' involvement with ICTs falls between prospective and occasional users. It is estimated that a 'take off 'towards an innovative user stage, will take place when 40 to 50 percent of teachers will have reached the stage of engaged ICT users. Teachers' ICT uses seem to focus more on surface techno-centric skills associated with applications that do not integrate deep learning and reflective thinking. In general, teachers tend to use more frequently computers for low level uses, such as preparing student tests, demonstrating information for a lesson and less on more cognitive level uses related to creative thinking and problem solving. These results largely reflect the kind of training these teachers have received, as well as the ways in which new technologies are perceived and implemented in schools.

Summing up, the following are major challenges that need to be addressed when attempting to merge ICTs in ESD.

- Education sectors are lagging behind to capitalize on ICTs potential in promoting ESD.
- ICTs can empower and help to facilitate greater access to ESD learning by disadvantaged people, marginalized groups and communities. However, the "digital divide" still remains a major challenge.
- ESD planning with new pedagogy is an essential part of building a whole school approach to ICT-enabled ESD.
- Dissemination and communication of information on innovative ICT-enabled ESD examples and practices may provide opportunities for embedding ESD in the curriculum supported by ICT.

A vision that facilitates an education model responsive to the development of ICT-enabled ESD is often missing among education planners and policy makers.

While many nations around the world have embraced the need for education to achieve sustainability, only limited progress has been made so far. Some of the more prevalent challenges are: a lack of or inadequately trained professionals to provide inspired ESD; disciplinary boundaries between subject areas persist as well as lack of educational leadership to support transformative pedagogies to address sustainability. Our state-of-the-art reviews on Master degree programmes in the field of ESD show that the great majority:

1. focus on the environmental pillar of sustainable development, neglecting the other three pillars (social, cultural and economic);
2. do not exploit the potential of ICTs in addressing sustainability issues, especially Web 2 technologies and use of open education resources (learning objects) available in the Web; and
3. employ techno-centric approaches, meaning that curriculum is developed by experts without the end-users' inputs.

There is thus need of Master Degree programmes that are participatory, holistic, interdisciplinary and contextual, making use of ICTs both as learning pedagogies and means of delivering at a distance or through a blended mode. As a response to these challenges, seven European Universities, namely: University of Crete, Dublin City University, Daugavpils University, Frederick University, Open University of Cyprus, University of Graz and Uppsala University with

considerable experiences in the fields of ICT and ESD formed a Consortium to propose a project entitled "ICT-enabled Education for Sustainable Development." This project aimed to develop a joint Master degree (deployed on an advanced virtual platform) in ICT in ESD which will be offered in English. The course targets experienced practitioners in schools, community education, NGOs, government bodies and development agencies, who want to play a key role in moving forward the issue of ESD in their working environments. The specific objectives were to:

1. Develop a joint Master on ESD supported by ICTs consisting of interdisciplinary modules amounting to 120 ECTS. A Diploma Supplement will also be issued with the joint degree.
2. Develop course modules addressing the environmental, social, cultural and economic pillars of sustainable development supported by social software tools and infused by open source learning objects.
3. Develop a virtual learning platform for uploading course content, enrolment and maintenance of student records, academic profiles, scheduling of units, course monitoring, liaison etc. combining two open source platforms (Moodle & Mahara).
4. Develop an online training toolkit addressed to university staff who, want to infuse ESD into their teaching and courses and/or apply virtual tutoring modalities.
5. Implement the training toolkit with 25 university staff from partner institutions to support the running of the joint Master.

The place of ESD in higher education is not one of integration as a stand-alone subject, but rather one of innovation that will generate deeper changes in all practices and structures of higher education institutions. Addressing and promoting ESD in higher education institutions would require a new conception of the triangle ICT, curriculum and pedagogy.

Conceptions of ICT, Curriculum and ESD Pedagogy

It is often said that education plays a dual role. On the one hand, it reproduces certain aspects of current society and, on the other hand, it prepares students to transform oneself and society. Although, these roles are not necessarily mutually exclusive, curricula tended in the past to reproduce an unsustainable culture rather than empowering citizens to think critically and learn to transform oneself and society. This is largely due to that many still equate a curriculum with a body of knowledge-content to be transmitted to students by applying the most effective teaching methods (curriculum as product). The product model of curriculum can be traced to the work of the writings of Tyler (1949; cited in O'Neill, 2010) who greatly influenced curriculum development worldwide. In a product model, behavioural objectives are pre-specified in a way that can be objectively measured. This leads to a focus on the parts rather than the whole; overlooking learning that is occurring as a result of the peoples' interactions with their environments. Behavioural objectives that can be measured provide the foundations on which the curriculum as a product is built. The intended outcome of a learning experience is thus prescribed or pre-specified in advance. The idea of curriculum as a product has been contrasted to two other types: curriculum as process and curriculum as praxis (Grundy, 1987).

The curriculum as process is being considered more open-ended than the product curriculum. In a process model, instead of prescribed and measurable learning objectives, intentions or more flexibly formulated objectives, mostly negotiated with learners are set. Curriculum as praxis is, in many respects, a development of the process model. However, while the process model is driven by general constructivist principles and places an emphasis on interpretation, judgment and meaning making, it does not make explicit statements about the interests it serves. Grundy describes that to understand the terminology of curriculum, it is important to pay attention to the theory of 'knowledge-constitutive interest' or 'action-constitutive interest' developed by Habermas (1971). Habermas's distinction goes back to the classical Aristotelian contrast between techne and praxis. For Aristotle, praxis is guided by a moral disposition to act truly and rightly (phronesis - practical wisdom); a concern to further human well-being and the good life (Aristotle 2004: 209). The Aristotelian conception of praxis, referring as poiesis is about acting upon something that does not entail conceptions of empowerment and emancipation, that praxis aims to. Technical interest is

an interest to control, predict and manage the environment deeply-rooted on modes of inquiry, curriculum and pedagogy in the "empirical-analytic" or positivist sciences. Practical interest rooted in the interpretive-hermeneutic sciences is an interest of mutual and self-understanding in the conduct of life driven by modes of action-orienting (inter)personal understanding. Finally, the emancipatory interest is an interest of critical self-reflection, leading to empowerment, praxis and emancipation that aim to free science from its positivist illusions. It may, for example, be used in such a way that does not make continual reference to collective human well-being and to the emancipation of the human spirit (Makrakis, 2012; Smith, 2000; Grundy, 1987). In this approach the curriculum itself develops through the dynamic interaction of experience, action and reflection. "That is, the curriculum is not simply a set of plans to be implemented, but rather is constituted through an active process in which planning, acting and evaluating are all reciprocally related and integrated into the process" (Grundy 1987: 115).

When relating Grundy's curriculum typology and the three Habermasian knowledge-constitutive interests to ICTs in education, several points may arise. First, the emergence of ICTs as learning technologies have coincided with a growing awareness and recognition of alternative theories for learning that go beyond pedagogies rooted in the empirical-analytic paradigm, driven by a technical interest. ICTs driven by constructivist learning theories have contributed to shifting curriculum as a product to curriculum as a process. Through ICTs-enabled and enriched learning settings students take responsibility for their own learning instead of being consumers of a prescribed curriculum. Constructivist principles posit that learning is achieved by the active construction of knowledge supported by various perspectives and social interactions that play a critical role in the processes of learning and cognition. ICTs enable people to undertake education anywhere, anytime and any place and in this way fill various gaps and satisfy special needs, despite the fact that the so-called digital divide is still present. However, although ICTs give people the power to freeing themselves of routine works, be engaged with more cognitively demanded tasks, they cannot be seen as emancipatory tools unless an explicit statement about the interests ICTs serve is made. The praxis model of curriculum theory and practice applied to ICTs makes an explicit commitment to their true emancipatory potential. Thus, the concept of praxis is not simply using ICTs to freeing people from lower cognitive demanded works, but a commitment to use ICTs as enabling tools to turn people able to act as agents of change (Makrakis & Kostoulas-Makrakis, 2012ab). This kind of agency enabled by ICTs can be seen in various levels and directions.

ICTs enable instructors to transform their teaching practices by facilitating student-student and student-teacher interactions and collaboration in meaningful or authentic learning settings. Transformative learning is a process whereby "we transform our taken-for-granted frames of reference to make them more inclusive, discriminating, open, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide action" (Mezirow, 2000:214). In other words, "Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Such a shift involves our understanding of ourselves and our self-locations; our relationships with other humans and with the natural world" (O'Sullivan, 2003:327). Freire's (1993) emphasis on praxis- action and reflection- is pedagogically illuminated by Kolb's (1984) active learning cognition theory that gives due emphasis on experiential learning. Different online communication tools and learning environments enabled through Web 2.0 technologies offer the potential for new forms of experiential, constructivist and transformative modes of learning. Such learning "would develop sustainability literacy (their ability to read the symptoms and causes of unsustainable development and write more sustainable futures) whilst also contributing to political literacy and the development of identity" (Huckle, 2012). This approach to the theory of curriculum, because it places meaning-making and thinking at its core and treats learners as subjects rather than objects, if coupled with the human agency perspective, can lead to curriculum constructions that facilitate learning to transform oneself and society. ICTs can be used to transform learning experiences but that this depends to a considerable extent on the way the curriculum is conceived and how it is enacted through the processes of teaching and learning. The focus on linear pedagogies and pre-

specified curriculum goals may lead both educators and learners to overlook learning that is occurring as a result of their dynamic interactions enabled by ICTs. Learning and curriculum in this sense must not only be planned and structured by a participatory design approach, but also by the tasks and learning situations and the interaction with the social environment in which learning takes place. Thus, the conception of curriculum as context should be also added to the three previous curriculum conceptions, if the content of the knowledge produced and disseminated is sufficiently responsive to the problems and needs of the targeted populations and their societies. ICTs can thus be a context for ESD as well as ESD can be a context for ICT. More specifically:

- ESD themes integrated into the school curricula could provide a worthwhile context for ICTs in education. For example, social, economic and environmental issues can provide meaningful and challenging contexts for developing a wide range of ICT skills.
- ESD methods are conducive with constructivist and transformative learning theories, which can provide a context and rationale for using ICT-based learning tools such as concept mapping, modelling, social networking.
- When considering areas such as cultural diversity and intercultural understanding, health, HIV/AIDS, governance, natural resources, climate change, rural development, sustainable urbanisation, poverty alleviation, corporate responsibility and accountability, there is potential to assess the impact of ICTs in these key sustainable development areas.
- However, the so-called digital divide, especially for women and other disadvantaged groups, is still a problem that challenges educators and policy makers.

The question which arises is: what curriculum type to choose for developing the M.Sc. program? Our standpoint is that in practice, there is a continuum between the three curriculum types, despite their fundamental differences in ontological, epistemological, methodological and axiological level. The complementarity of the three approaches, in terms of their methodological dimension, does not degrade the important differences and the entailed consequences for the design and the use of curricula enabled by ICT tools. In other words, the questions of "what to teach?", "what to learn?" and even "how to learn?" should not be put in practice in an early stage of the curricular development process, which would exclude at a starting point the targeted students and the main actors to be involved in its implementation. The curriculum "is not simply a set of plans to be implemented, but rather is constituted through an active process in which planning, acting and evaluating are all reciprocally related and integrated into the process" (Grundy 1987:115). Our major assumptions on ICTs, curriculum and ESD pedagogy that provided guidance to the process of curriculum design were:

- We do not see curriculum as a simplification of a linear process that dictates what is to be learned and how it will be learned without taking into consideration those concerned.
- The environment or context in which learning will take place is a critical component of the course curriculum design process.
- Emphasis should be placed on reflective problem-based learning enabled through tools and services that facilitate "social networking" for virtual collaboration and virtual peer mentoring amongst learners and e-tutors.
- Knowledge is seen as a process of making meaning through interaction. In this sense, the curriculum is viewed as a process shaped by the interactions of those involved, whose needs and interests matters.
- Putting strong emphasis on transformative pedagogies and a commitment to promote the values and principles of education for sustainability is a condition for building a sustainable society.
- While we are committed to a critical and transformative learning paradigm, we assume the complementarity of the opposite paradigms, in cases that their contribution adds value to our philosophical and methodological commitments.
- Course curriculum design integrates actions for: embedding critical literacies and learning in complex, realistic and relevant environments; applying social negotiation as an integral part of learning; integrating multiple perspectives and the use of multiple modes of representation; encouraging ownership in learning; providing adequate time for problem-based and inquiry-based learning.

The Underpinning Learning Philosophy for Designing the M. Sc. Program

Teaching and learning that underpins the design of a course programme is not free of values. Especially, to design teaching and learning that aims to turn learners able to transform themselves and society, it implies that designers must not only adhere to certain values, but also to articulate them and reflect on them and the choices for actions that necessitate. After, presenting our major theoretical standpoints with respect to curriculum theory, it is necessary now to expose the learning theory, that explicitly or implicitly, has been guiding us in the design and development of the M.Sc. program on ICT in education for Sustainable Development.

Despite variations of learning theories within specific learning paradigms, there are three basic categories of learning theory that are driving instructional and learning design models: 1) instructive; 2) constructive and 3) transformative. The first is based on behaviourism and partly on cognitivism (labelled also as objectivism); the second on interpretivism and partly on cognitivism and the third on critical constructivism and critical pedagogy. The main goal of instruction for behaviorism and congnitivism is to prescribe learning goals and observable/measurable outcomes and to transfer or banking knowledge to students, taking thus a teacher-centred and mechanistic/ deterministic approach to human learning. Freire (1993) refers to this as a "banking model" of education and criticizes it for its view of learners as objects of learning. However, the cognitivists stress the acquisition of knowledge and internal mental processes and structures, while behaviorists focus on external environmental conditions through the organisation of stimuli-response-reinforcement association to modify behaviour in the desired learning direction. In other words, cognitivism defines learning more broadly to include the role of mind as a schematic network and memory in storing and retrieving knowledge as well as a change in thinking, beliefs, attitudes, and values, while behaviourism defines learning more narrowly to include mastering of prescribed learning outcomes.

In contrast, to instructive learning, constructive learning environments are characterised as being open and flexible, learner-centred, less prescriptive. The teacher is viewed as facilitator/mentor and learners are actively involved in making meaning and constructing knowledge. In other words, learning is deemed as social (negotiated) active, contextual (real-world based), authentic and meaningful. According to Cey (2001), authentic learning occurs when instruction is designed to facilitate, simulate and recreate real-life complexities and occurrences. Squires (1999) refers to "cognitive authenticity" through the articulation of ideas, experimentation and engagement in complex environments as well as 'contextual authenticity' through the relation of tasks to the real world. Meaningful learning occurs when students develop effective ways to resolve problematic situations that require knowledge to be constructed by the learner, not transmitted from the teacher to the student. According to Jonassen, et al. (1999), meaningful learning is:

- **Active (manipulative):** Learners interact with the environment manipulate the objects within it and observe the effects of their manipulations.
- **Constructive and reflective:** Learners reflect on their activities and observations, and interpret them to create a meaningful learning experience.
- **Intentional:** To experience meaningful learning, learners must be able to articulate their own learning goals and monitor their own progress.
- **Authentic (complex and contextual):** Learning is meaningful, better understood and more likely to transfer to new situations when it occurs by engaging with real-life, complex problems.
- **Cooperative (collaborative and conversational):** Meaningful learning requires conversations and group experiences.

Constructivism gives less emphasis on the sequence of instruction and more emphasis on the design of the learning environment and constructing knowledge through social negotiation and cognitive conflict as the stimulus for learning (Savery & Duffy, 1996; Jonassen, 1994). Philosophically, the strengths of constructivism lie in its emphasis on learning as a process of individual understanding and meaning making rather than the memorisation of facts (Jonassen & Reeves, 1996). In particular, the social constructivists based on Vygotsy argue that the structured and linear process offered by the objectivistic conceptions of learning is problematic (Kanuka &

Anderson, 1999). As learners have different social experiences and levels of understanding, it implies that there is no one reality as objectivists assume, but there exist multiple realities of how the world works and multiple ways of interpreting these realities (Jonassen, 1991). Thus, constructing is a sociolinguistic process where there is gradual advancement of understandings built upon previous knowledge resulting in multiple dimensions of the truth (Spiro et al. 1992). Constructivist learning environments can be enabled by an abundance of ICT tools that can enhance communication, access to real-world examples, reflective thinking, multiple perspectives, modelling or problem solving by experts in a situated context domain. Situated learning as introduced by Lave and Wenger (1991) states the importance of knowledge acquisition in a socio-cultural context and that the integration in communities of practice enabled by ICTs may lead to active construction and reflection about knowledge. The idea of situated learning is also closely related to the ideas of "blended learning" and "learning on demand" especially in programmes targeting adults at their workplace (Oppermann & Specht, 2006). This notion of "learning on demand" coined also as "embedded learning" (Straub, 2005, cited in Schmidt, 2008), "work-integrated learning" (Lindstaedt, 2006, cited in Schmidt, 2008) or "context-aware workplace learning support" (Schmidt & Braun, 2006) opens a space for contextualizing learning in the workplace, especially through the support of ICTs. What we actually need is learning on demand, embedded into work processes, responding to both requirements from the work situation and from employee interests, a form of learning crossing boundaries of e-learning, knowledge management and performance support (Schmidt, 2005). The contextualization of the learning on demand can not only be seen from the point of view of an actual problem or learning situation but also in a longer lasting process of learning activities that are integrated (ibid.).

Marsick & Mezirow (2002) and Mezirow (2000) extend the assumptions made by constructivists by incorporating the transformative and political dimension in their views of teaching and learning. The questions of "what should be learned?" or to put it alternatively "what is the most valuable knowledge?", "how should it be produced?" and by "what teaching and learning methods would it be used?, all fall in the sphere of politics and ethics in education. Transformative learning originated as an adult education based theory that suggests ways in which adults make meaning of their personal experiences. Mezirow (2000) defines transformative learning as a process by which our taken-for-granted frames of references are transformed by making them more inclusive, discriminating, open, emotionally capable of change. Tilbury et al. (2004) are stressing the 'conceptual congruence' between ESD and transformative learning as the goals and objectives of both apparently coincide. The congruence between the aims of ESD and transformative education has also been highlighted by Walls & Corcoran (2006) and Svanstrom et al. (2008). Mezirow (2000) argued that transformations often follow some variation of the following phases:

- A disorienting dilemma
- A self examination with feelings of guilt or shame
- A critical assessment of epistemic, sociocultural, or psychic assumptions
- Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change
- Exploration of options for new roles, relationships, and actions
- Planning a course of action
- Acquisition of knowledge and skills for implementing one's plan
- Provision trying of new roles
- Building of competence and self-confidence in new roles and relationships

Thus, transformative learning is, in a sense, the deconstruction of learners' prior assumptions or frames of reference (points of view, habits of mind, worldviews) through critical reflection (praxis) as well as the reconstruction of their assumptions through meaning making. For Tilbury et al, (2004), it is the emphasis on processes of critical and personal reflection, the focus on change and shifting of values and behaviours that are common features of both ESD and transformative learning. The emancipatory domain inherent in the transformative paradigm is the place where learners can free themselves from any restrictions and actively question their assumptions through critical reflection and praxis. Elliot (2010) found that the key transformative shifts in ESD learning involve learning to value sustainable development and learning how to make it happen. McLaren

(1994:190) defined praxis as "informed actions" and stated that "actions and knowledge must be directed at eliminating pain, oppression, and inequality, and at promoting justice and freedom". Darder et al. (2003:15) considered praxis as "all human activity… understood as emerging from an ongoing interaction of reflection, dialogue and action". Cranton (1994:48) concisely listed three types of reflection that involves movement toward the emancipatory domain: content, process and premise reflection. Content reflection is an examination of the content or description of a problem; process reflection involves checking on the problem; premise reflection happens when the problem itself is questioned.

Critical pedagogues perceive teachers as "transformative intellectuals" who are involved in developing a discourse that unites the language of critique with the language of possibility (Giroux, 1988). Teachers functioning as "transformative intellectuals" are giving students an active voice, making the political more pedagogical and the latter more political (Giroux, n.d.). McLaren (1994:168) argued that "teachers must understand the role that schooling plays in joining knowledge and power, in order to use that role for the development of critical and active citizens". Huckle (2012) suggests that teachers should be introduced to critical social theory that seeks to explain the role of Web 2 technologies in the recent wave of capitalist development that precipitated economic and ecological crisis, and their potential to bring about more sustainable alternatives. He argues that such alternatives will be based on more radical and deliberative forms of democracy and citizenship enabled by the new technologies. In this context, Huckle assumes that teacher education for sustainability should equip teachers to explore these through appropriate forms of citizenship education and model them in their classrooms via new forms of critical pedagogy. Besides creating a learning environment that encourages students' active participation in the learning process, critical pedagogy extends participation to the co-construction of curriculum. In this way, it is believed that learners' needs, interests and learning styles are meaningfully integrated into what they learn and how they learn it. Through this process and practice, the learning environment adopts distributed or shared responsibilities between teacher and students, which may facilitate the process of negotiating the curriculum structure, content and assessing criteria.

In trying to bring together the main principles of the constructivist and critical pedagogy theories, assuming that experiential learning is crossing the two (e.g. Kolb & Kolb, 2005), we have conceptualised a construct abbreviated as ExConTra, that corresponds to Experiential learning, Constructivist learning and Transformative learning depicted in Figure 2 (Makrakis & Kostoulas-Makrakis, 2012a).
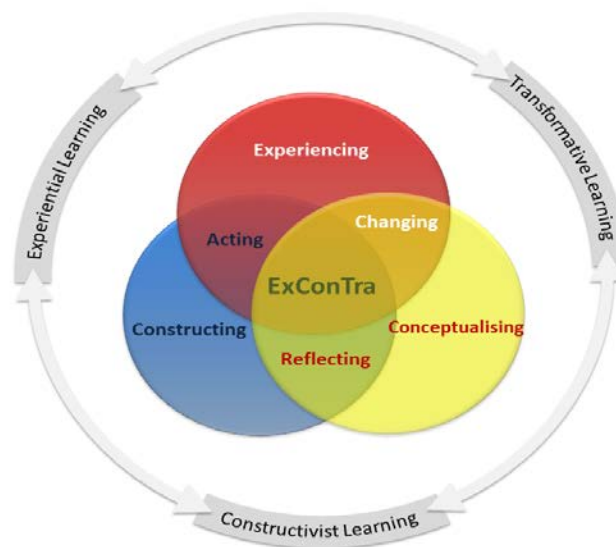
Figure 2. The ExConTra learning model.

Beginning with experiencing, learners identify a realistic and authentic task associated with a sustainable development issue, and start collecting the information needed for their analyses, using various inquiry-based methods. Through reflecting, self and/or social, as well as through further reading and observing, learners organize and examine the collected data for the new experience from a variety of perspectives in order to find and make meaning. For learners to make meaning, either individually and/or shared, they need to reflect on their own experiences, leading them to develop more abstract understandings of their experiences (conceptualizing). Arriving at individual and shared meaning (constructing), learners need to get involved in a meaningful learning and shared inquiry enriched through continuous reflection, re-conceptualization and active experimentation. Constructed knowledge and meaning is meaningful when it opens up opportunities for action. Merging knowledge and meaning with action (acting) leads to a change agency and active citizenship. Acting as change agents, learners are empowered to transforming experience through critical reflection and active experimentation. When critical reflection is transformed into an action it becomes praxis that turns learners able to transform oneself and society (transforming).

These processes can be enriched by ICTs as they provide many opportunities for experiential, constructivist and transformative learning experiences, especially by enabling learning to be related to context and to practice. ICTs provide an array of powerful tools that may transform teaching and learning processes and turn learners able to take greater responsibility for their own learning and constructing their own knowledge. The development of social media and networks has also led to a blurring between the public and private spheres, which has provided opportunities for communication, but also has brought dangers to some when private information has become public or when the virtual world has enabled people to practise deceit and deception (Wade, 2012). ICTs create the potential for new modes of dialogic communication, empowerment and critical reflection that could enhance social learning for sustainability. Wals (2007) states that sustainability addressed as a social learning process is rooted in the life-worlds of people and the encounters they have with each other. Social learning theory is gaining prominence as a critical theory and research approach to studying ecosystems management, climate change and education for sustainability (Wals, 2007; Glasser, 2007; Wals & Heymann, 2004). Online collaborative discussions are increasingly notable for their role in social construction of knowledge by providing shared virtual workspaces for brainstorming, debating, discussing, or reflecting on issues of learning among learners, instructors or even invited guest speakers (Lim, 2007:45). Using social networking and video-conferencing programs in conjunction with online courses offered through Learning Management Systems, such as Moodle is a means to expand student-student and student-tutor colloabarative learning. Students' social learning for sustainability can be also enhanced through asynchronous discussion, which provides students the opportunity to post ideas and thoughts, read and comment other students' ideas. Both synchronous and asynchronous online discussions can foster critical reflection and create a foundation for transformative learning.

New approaches to content distribution, particularly the OpenCourseWare (OCW) and Open Educational Resource (OER) movements, promise to make a vast array of content open to instructors and students to reuse, revise, remix, and redistribute (Bush & Mott, 2009). OCW and OER can be labelled as learning objects (LOs) indexed and catalogued in digital repositories. The LOs either simple (e.g., pictures, documents, video, audio clips) or complex (e.g., Learning Management Systems, portals, chat software, blogs, wikis, discussion boards) that can be easily transferred for re-use and adaptation in another place. The concept of LO was borrowed from Object Oriented Programming to address the issues of learning resources deconstruction and their subsequent reuse to compose larger courses or learning units (Hudak, 2007; Lim, 2007). LOs should not be viewed as merely "containers" of content, but as distinctive attributes of learning that can be "granular, reusable, searchable and interoperable" across different systems" to support knowledge construction and application in learning (Lim, 2007: 45).

Course Curriculum Instructional/Learning Design

The designing of online courses requires a radical change in thinking in the way the instruction is designed and presented to the student. Much of the instructional design that has been applied to Web-based learning environments has been guided by the principles of instructional systems design (ISD) that is driven by objectivist conceptions of design (Roblyer, 2003; Duffy & Jonassen, 1992). Indeed, two of the dominant instructional design models that derive mostly from objectivist theories of learning are the Dick and Carey's (2005) ISD and the ADDIE (Analysis, Design, Develop, Implement, and Evaluate) model. The components of Dick and Carey's ISD approach are to: Identify Instructional Goals, Conduct Instructional Analysis, Analyze Learners and Contexts, Write Performance Objectives, Develop Assessment Instruments, Develop Instructional Strategy, Select Instructional Materials, Design and Conduct Formative Evaluation of Instruction, and Revise Instruction. It is thus similar to the ADDIE Model in that it incorporates all of its phases of the ADDIE Design model. Vrasidas (2001) has described the objectivist-rooted ID products as prescriptive, formalistic, restrictive, and reductionist. A number of alternative to objectivist tradition instructional designs were proposed that were more open and flexible, placing less emphasis on the linear direction of the ID processes advanced by objectivists (e.g., Kenny et al. 2005; Austin, 2002; Willis, 2000; Hannafin et al. 1999; Jonassen, 1999; Mayer, 1999). As pointed earlier, open and flexible learning inherent in constructivist and transformative learning paradigm is a set of educational philosophies and systems, concerned with providing learners with increased choice, convenience, and personalisation to suit their interests and needs. In particular, flexible learning provides learners with choices about where, when, and how learning occurs (Makrakis, 2012; Shurville et al. 2008). Current research findings show that integrating open-ended and flexible assessment activities that were relevant to real-world applications created a contextualized learning environment that facilitated learner autonomy and active cognitive engagement (Gikandi, 2011).

Pliner and Johnson (2004) and Scott et al. (2003) provide an overview of Universal Instructional Design (UID) as an approach for addressing the diverse learning needs of students enrolled in institutions of higher education. The concept of UID is conceptually related to the principles and practices of multicultural education and social justice education. From a critical pedagogy perspective, Campbell et al. (2005) propose a view of ID practice in which the instructional designer is an agent of social change at the personal, relational, and institutional levels. In this view instructional designers are not directed by managerial issues, but act in purposeful, value-based ways with ethical knowledge, in social relationships and contexts that have consequences in and for action. Shifting away from the decontextualised conceptions of objectivist IDs and the neglect of praxis from the constructivist conceptions of IDs, ExConTra IDs place due emphasis on values, ethics and change agency.

The instructional design for online learning we developed is driven by the ExConTra learning paradigm and partly adapted from Nam & Smith-Jackson (2007). As seen in Figure 3, this model consists of five design phases – needs analysis, curriculum design, development, formative evaluation and implementation– each of which has its own design processes. These phases, although, placed sequentially, in practice, there is much interaction among them. For developing the M.Sc. programme as a system, we have integrated some characteristics of objectivist ISDs in order to respond to adults' preferences for a goal-oriented curriculum. The developing of course curriculum, however, is based on critical adult education (e.g., critical reflection, experiential, situated learning, praxis) that is in alignment with the ExConTra learning paradigm. Critical adult education, as a learning approach, is well situated to influence instructional design and instructional methods, that can further serve foundational principles of ExConTra learning and create space for promoting education for sustainability enabled by ICTs. Abdullah, et al. (2008) summarizing from other studies state that: 1) Adults are autonomous and self-directed; 2) have accumulated a foundation of life experiences and knowledge; 3) are goal-oriented and practice oriented. Thus, their perspectives about what to be trained should be taken into consideration; recognize the value of experience in learning; know what will be able to do after training; acknowledge the wealth of experiences that they bring to the learning process. They also need to

be engaged in learning by doing, problem-solving tasks and activities, and critical reflection during and after their activities (Frey, & Alman, 2003).
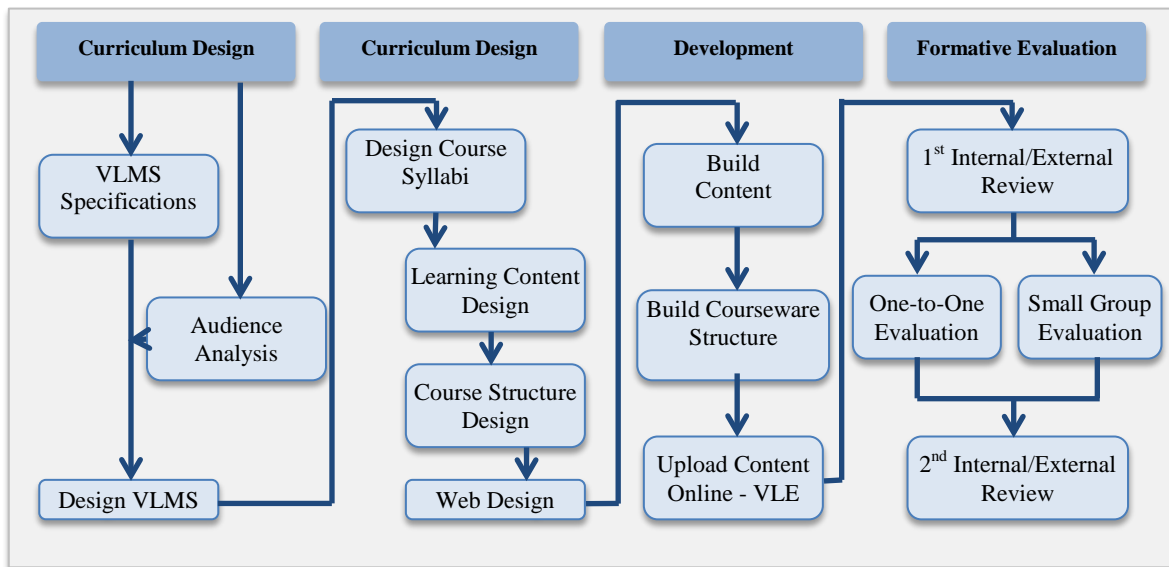
Figure 3: A model for designing course design and development.

We have also identified a number of key elements related to the ExConTra learning model or paradigm and the online course design process, as exemplified in the following figure.
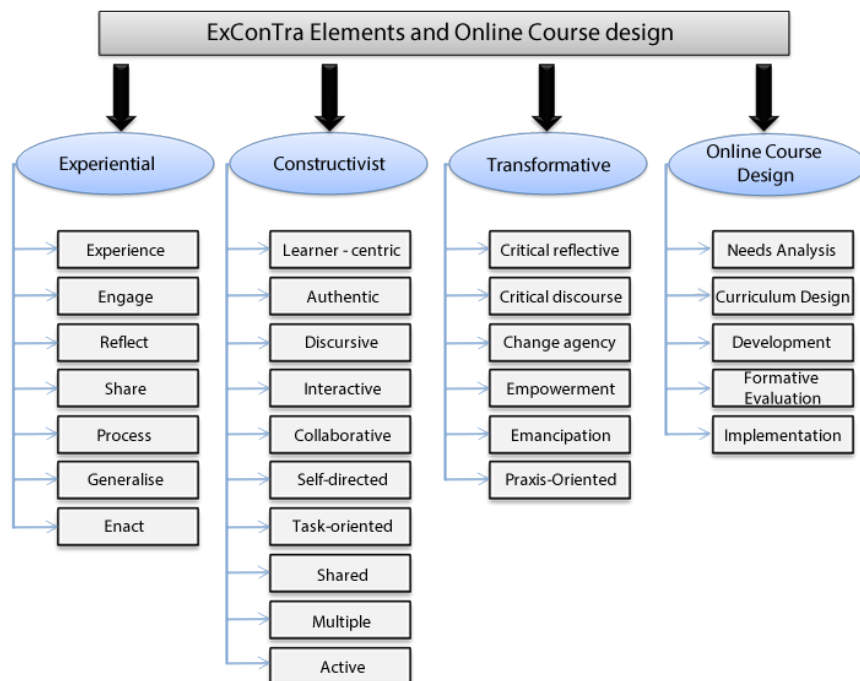
Figure 4: The ExConTra learning and online course design processes.

Examples of how ExConTra learning paradigm can be implemented in online course design include the following:

- Using Web-based authoring tools and scripting languages to develop learner-centred and self-instructional modules.
- Providing Web-based resources using hypermedia and multimedia links to support students' experiential, constructivist and transformative learning activities.
- Providing links to online databases, experts, virtual laboratories and knowledge repositories dealing with sustainable development issues.
- Providing web-based distributed learning activities that allow learners to brainstorm ideas, negotiate, reflect, peer critique, debate, construct knowledge, and develop action competence.
- Providing synchronous and asynchronous communication tools that help the knowledge construction process through self/group critical reflection.
- Incorporating learning principles and strategies that include active learning, collaboration and cooperation.
- Engaging students in the application of knowledge through: inquiry-based learning; problem-based learning; higher order thinking; inter/cross disciplinary learning and authentic learning.
- Identifying the learning domains and complex problems or cases to be explored within the identified learning domains;
- Acknowledging learners' thoughts, experiences, ideologies and biases, and encouraging them to get involved in dialogue and meaning-making, especially through student-led online discussions;
- Encouraging learners in integrating LOs in the course while working with it, thus taking into consideration their needs and interests as well as their various learning styles.

In this context, a number of questions need to be posed and taken into consideration in the design process, such as: What tasks will the e-tutor complete prior to starting the learning activity? What will students have to do to prepare for the learning activity? What administrative steps will be necessary for e-tutors to take in order to manage the online learning process? What responsibilities and modes of behaviour students need to have in online learning?

Applying the ExConTra instructional/learning design model

Phase 1: Needs analysis

Needs identification is strongly linked to an analysis of a set of tasks carried out in order to respond to the needs of the targeted audience. Needs analysis was concerned with gathering, analyzing, and summarizing information necessary to build the Virtual Learning Management System (VLMS). This phase is consisted of three design processes: VLMS specifications; audience analysis and VLMS design. Comparative analysis of the most common virtual platforms was carried out to identify strengths and weaknesses in terms of the needs and priorities of the ICTeESD project. We decided that Moodle is the most suitable online platform. Moodle is one of the most user-friendly and flexible open source courseware products available. It has excellent documentation, strong support for security and administration, and is evolving towards Instructional Management Systems/Shareable Content Object Reference Model (IMS/SCORM) standards with platform (Apache, PHP, and MySQL). The key to Moodle is that it is developed with both pedagogy and technology in mind. Moodle can also be supported by Mahara, which was found to be suitable as an e-portfolio.

Figure 5: Introductory information screen of the Virtual Learning Environment.

A semi-structured questionnaire was also delivered to a purposeful sample (N=37) prospective students to elicit various types of information such as learning styles and profiles, previous experiences with e-learning tools, learning needs, ICT literacy, technology use, etc. Small group discussions were also carried out to enable people to talk and share ideas and experiences. The information gleaned from the needs analysis helped us to define educational goals, which were stated as specific learning outcomes in the phase of curriculum design and development. In other words, this phase functioned as the foundation on which we developed course syllabi and course modules.

Phase 2: Course curriculum design

In our case, curriculum was designed and interpreted in a four-stage process: 1) design of course syllabi; 2) learning content design; 3) course structure design and 4) web design. These processes provided the foundation for the course modules development exemplified in the development phase. The first stage of the process of course curriculum design and development consisted on an extensive literature review that led to an exhaustive, as much as possible, identification of a group of themes, concepts, technologies, analysis methodologies linked to ICT and ESD. In order to ensure that the literature review would cover the main themes, an extensive review of Master courses related to the field of ESD was carried out in each country and region of the partner universities. A similar review was also carried in other regions worldwide. After that, another literature review was made, this time taking into consideration more specific works that allowed for a more in-depth analysis of themes and subjects identified in the previous stage.

A critical decision was made for the structure of the course curriculum. It is structured by merging vertical and horizontal modes of course curriculum design. The vertical integration represents continuity and structures the content in sequence from core to more complex and specialised or directed to specified streams. This provides a clear picture to learning, as students are able to understand how the knowledge is developed and organised in the course. In addition, it can help students to learn concepts and principles, to develop cognitive skills, to make choices and to develop attitudes and values that will be important to them in the working world. The vertical integration also assumed that there were discrete courses which combined content from two or more subject domains.

The horizontal integration brings about more breadth of curricular contents of different disciplinary areas and knowledge domains, especially through an interdisciplinary approach within the course areas. In this sense transformative learning cut across all the five competences (learning to be, learning to know, learning to live together, learning to do and learning to transform oneself and society) and thus it requires infusion among the disciplines, the university and the wider

community, in order to function as agents of change. An interdisciplinary approach always consciously combines two or more subjects, while it keeps them distinct and in focus. Horizontally, the courses were built conceptually upon five main themes: Sustainability Theory; Educational Research; ESD pedagogy; Educational Policy and Leadership; and Information & Communication Technology (ICT). The emphases were on: 1) inter/cross-disciplinary content by merging concepts from the main themes and 2) multidisciplinary content by integrating multiple teaching methods and learning technologies. In this context, ICTs and ESD form the integrating "backbone" across all course contents. The design of the online curriculum components departed from the students' needs that were contingent on the needs analysis processes. Twelve course syllabi were developed using a template for designing online course syllabi.

PROGRAMME OF STUDY	ECTS
Year 1 Semester 1	30
Sustainability Theory, Systems Thinking and Transformative Change	10
Approaches to Educational Research for Sustainable Development	10
ESD Pedagogy and ICT	10
Year 1 Semester 2	30
Appropriate Technology, Active Citizenship and Education for Sustainable Development	10
Action Research and Participatory Action Research for Sustainable Development	10
ICT, Instructional/Learning Design and Education for Sustainable Development	10
Year 2 Semester 1 (to be chosen 3 out of 6)	60
Educational Policy and Planning for Sustainable Schooling	10
ICT, Climate Change and Geo-spatial Tools	10
Bio-cultural Diversity and Education for Sustainable Development	10
e-Learning, Virtual Worlds and Education for Sustainable Development	10
Teaching to Live Sustainably through the Earth Charter	10
Sustainable Leadership, Inter/Cross Cultural Communication and Planning for Sustainability	10
Year 2 Semester 2	30
Dissertation	30
Total for the Master degree	150
Total for the Master degree needed	120

Table 1: The course structure of the Master Programme.

Phase 3: Development
Learning content was based on an instructional design process for curriculum development which involved a systematic approach to establishing course modules' goals and objectives, selecting educational strategies to meet goals and objectives, the use of media and technology as well as designing learning activities for the online environment. Course structure process was based on breaking-up the course into manageable and meaningful modules and units, taking into consideration the weekly topics designed in the corresponding course syllabus. An example of a course modules template is provided in Figure 6. To achieve this purpose, first, the course was logically divided into modules, each module containing units, learning outcomes and learning

activities that open space for learners to control their learning and enrich the content of the course enabled by appropriate online technologies.

Course	TITLE	
Key Concepts		
Overview		
Aim		
Learning Outcomes		
Units		
Readings		
Activities	**Overview**	
	Explanation	
	Module 1	Time-load
	Directed Learning Online ❑	
	Dynamic Interaction online ❑	
	Assessment ❑ [Note: Time allowed for preparing Assessment work can vary from 1-7 hours on average per module]	
	Independent Learning ❑ [Note: Time available to spend on Independent learning can vary from 1-7 hours on average per module]	
	Total Time for Module 1	

Figure 6: The template for the course modules design.

As pointed earlier, some aspects of the objectivist instructional design were adopted that were merged with ExConTra learning design principles. In particular, learning objectives for course modules were pre-specified, taking into consideration the needs analyses and group expertise from course modules' writers and designers. In consistency with the ExConTra learning, activities were largely designed based on the choice of ill-structured problems that require the integration of several content domains. Asynchronous discussions are integrated within learning activities that can allow students time to read, think, reflect and reply. Indeed, peer discussion is one of the essential elements in ExConTra learning, especially in collaborative tasks.

The learning activities provide students with the capacity to explore, inquire and reflect on their thoughts, believes, values and practices enabled through synchronous and asynchronous communication tools. Such tools could be used to foster interaction and the sense of belonging in a learning community and minimise the sense that students are isolated from each other. Synchronous chat discussion groups are used for brainstorming, debating, clarifying values while the e-tutor functions as a coach and facilitator encouraging teams to reflect on their beliefs and to consider alternative interpretations of the issues and problems studied. Particular emphasis was

placed on integrating technologies (virtual worlds/games, blog, stream media) to encourage students create like-real situations. Students are also involved in reading and analyzing team members' responses and providing appropriate feedback. Peer–to–peer interactions and dialogue about challenging ESD concepts and problem solving is the focus of learning activities design enabled by ICTs. Students are encouraged to construct part of their knowledge via interaction with each other and this knowledge to be considered part of the course content. In this way, students are turned into co-constructors of what to be learned and how it would be learned. In order to provide proper scaffolding and coaching, the e-tutor is monitoring student-led team conversations as an equal partner in the learning process.

In order to prompt learners to investigate the problem, a list of focusing questions and information resources (e.g, suggested readings, links to related Internet sites and other information resources) are provided. As indicated in the ExConTra learning model, one of the key principle is collaboration and shared knowledge. In learning activities, the problem or case is presented as a collaborative team activity in which students are asked to set up teams, divide roles, share responsibilities and tasks in identifying alternatives, clarifying alternatives, comparing and contrasting alternatives before reaching a consensus for a decision. They are also presented with a complex or real-life problem by using learning objects as problem statements or scenarios. Simple and complex digital learning objects provided as open education resources and open source software are integrated in learning activities to activate ExConTra learning. Another powerful knowledge construction strategy integrated into learning activities is encouraging learners to construct their own learning objects enabled through various tools and online technologies. This generative strategy enables students to design and link interrelated content and ideas in the form of meaningful content structures. This gives more opportunities for: 1) integrating varied examples of how different disciplines can be merged within a single subject; 2) interacting during problem solving activities; 3) engaging in a reflective conversation and 4) selecting, re-using and adapting digitised learning objects identified in the Internet. The strategy to involve also students in team-based learning activities from different socio-cultural contexts, despite empowering them to reflect on their thoughts and practices and analyze their own lives, this involvement may break down the stereotypes that others may have of them.

e-Tutors' Toolkit
With a growing number of courses and degrees offered through the Internet, there is a considerable interest in preparing instructors to teach online. A pedagogically meaningful and replicable toolkit for virtual training has been also developed and applied in training teaching staff to function as e-tutors for the joint Master degree programme. Building content included the development of learning activities, learners' assessment, types of learners' communication and interaction. Much of the course materials are based on learning objects which represent either autonomous learning and/or modified or newly developed. The ICTeESD e-tutors toolkit targets prospective e-tutors nominated by the partner universities to support the ICTeESD M.Sc. programme on ICT in Education for Sustainable Development.

The e-tutors toolkit is a self-development manual based on ICTeESD materials/tools and Open Education Resources supported by facilitators and designed to assist participants make the shift from face-to-face forms of teaching and learning to online learning. The toolkit has the following six modules, which are integrated into the main themes of the dedicated website.

Module 1: Getting started with the ICTeESD VLE
Module 2: Becoming an e-tutor
Module 3: Orientation to online teaching & learning
Module 4: Building a community of online learners
Module 5: Developing online activities
Module 6: Wrapping up all

Modules 1 and 2 provide participants with the competences needed to become comfortable with the ICTeESD Moodle-based Virtual Learning Environment and an exploration of the characteristics, roles and competences of being an e-tutor. Module 3 provides an orientation to the characteristics, pedagogies and technologies for online teaching and learning. Modules 4 and 5

integrated into the "Practicing e-tutoring" theme engage participants in designing, organising, scaffolding, communicating and assessing online learning. Finally, module 6 wraps up all, with an assessment of the whole training process.
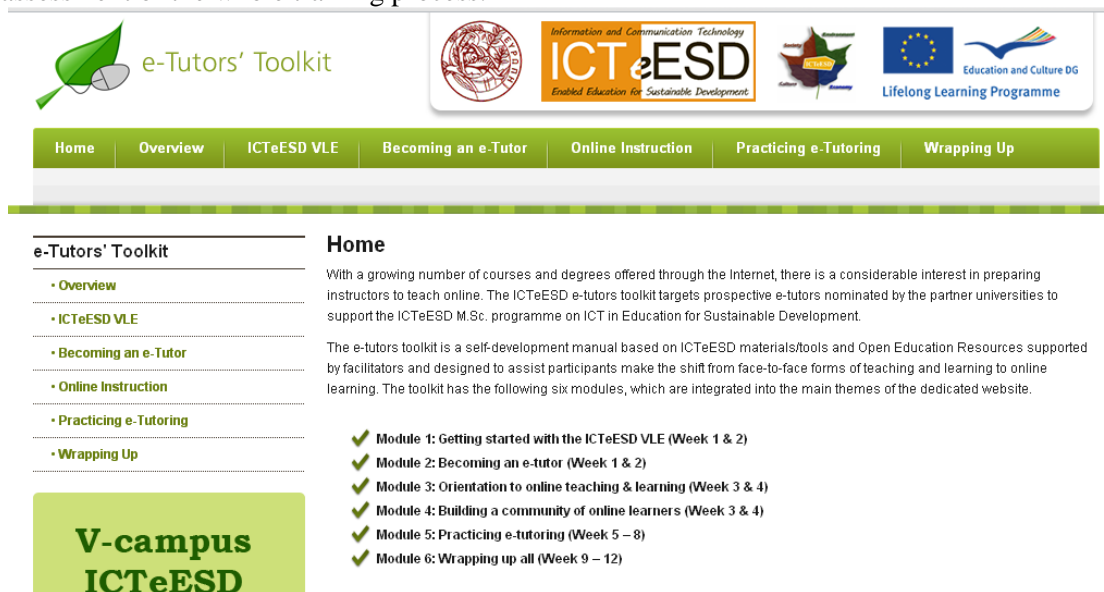
Figure 7: The introductory screen of the e-tutors toolkit.

Phase 4: Formative evaluation

Formative evaluation refers to a process that provides a judgment of the strengths and weaknesses of all the activities involved in the online course across all design and developing stages to improve its effectiveness and appeal. The concept of formative assessment is underpinned by three defining processes: "establishing where the learners are in their learning [in relation to the expected learning outcomes]; establishing where they are going; and establishing what needs to be done to get them there" (Black & Wiliam, 2009:7). Effective integration of online formative assessment has the potential to facilitate and sustain meaningful interactions among learners and the teacher, and in turn foster development of effective learning communities to support meaningful learning and its assessment (Sorensen & Takle, 2005). Moreover, this can provide a systematic structure for effective support and learning scaffold through ongoing monitoring of learning and provision of adequate formative feedback.

Our purpose was to provide evidence to be used in making decisions about how to review and revise the programme while it is being developed. It is worth pointing out that our literature review that was carried in the need analysis phase in this field barely revealed any course curriculum design that has holistically integrated online formative assessment, especially from the perspectives of supporting meaningful learning. The formative evaluation process advanced in the ICTeESD project consisted of four processes: 1) 1st internal/external review; 2) one-to-ne evaluation; 3) small group evaluation; and 4) 2nd internal/external evaluation. The 1st internal/external review is designed to take place up to the third phase, covering all processes involved. The one-to-one and small group evaluation processes make use of prospective students as subjects. It includes a series of usability tests, peer reviews or expert reviews in any of the previous phases and processes.

Quality Assurance

Quality assurance in the ICTeESD project has two directions. The first direction concerns the strategies to be adopted in order to ensure quality and the second direction concerns the process of accreditation and recognition of the Master programme. Both of these directions are not mutually exclusive, as the first is a condition for the second. One of the main concerns revealed in EUA

(2006) Joint Masters Project (2002-2004) is the often weak anchoring of Joint Masters programmes within their network institutions. This is explained by the fact that such programmes are mostly initiated and linked to committed individuals, while the institution as an "outsider" has often provided difficulties to endorse the programme. Another important finding in EUA's Joint Masters Project was the incompatibility of the national mandate of Quality Assurance agencies with the transnational nature of joint degrees. In addition, with regard to internal quality processes, the nature, maturity and standards of the institutions involved on which they are based vary across Europe. However, as the proposal for the joint degree is endorsed by all partner institutions, recognition of the degree may be made contingent on all member institutions or programmes of the group or consortium.

It was thus important to assure that the ICT in ESD Master programme led by the ICTeESD project coordinated by the University of Crete meets the qualities needed to gain recognition outside of those involved in its conception and development. A major effort was exerted in systematizing and organizing curricular contents in order to ensure that the curricular components are aligned with the learning activities, the curriculum global objectives and competencies to promote. This systematizing and organization process of the curricular contents is not an easy task for various reasons. To this end a Quality Assurance Framework has been developed that illustrates a comprehensive coverage of key components of online course quality assurance depicted in Figure 8 (Makrakis & Kostoulas-Makrakis, 2012b).
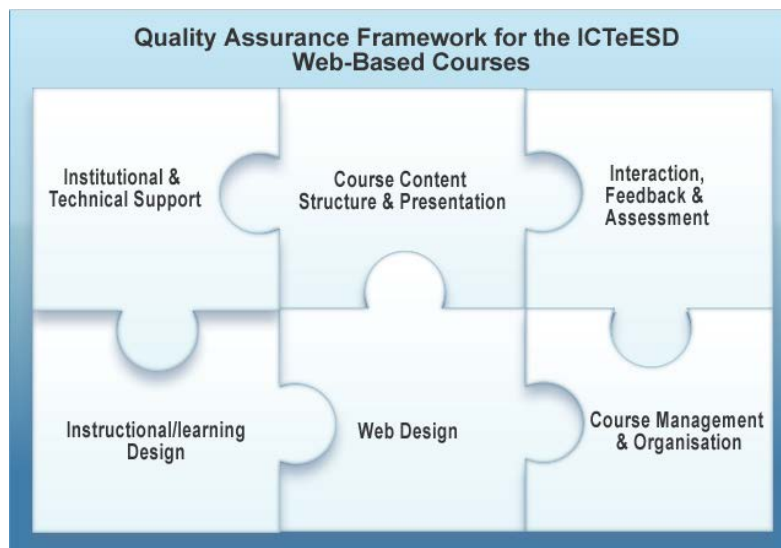
Figure 8: Quality assurance framework.

It serves as a blueprint for addressing the issues for online course design. The framework consists of six independent but interconnected components, which are further divided into relevant sub-components. Missing one piece means missing part of the puzzle that, when complete, provides an overview of quality issues in online courses.

Each sub-component includes a number of benchmarks that can be used as reference points for assessing the quality of every key component (Table 2). It should be born in mind, however, that the development of quality standards is a complex and not an easy task as the developments in the area of online education have still not reached maturity (Galloway, 2005). The need for standards that could guide online higher education and the design and delivery of online courses continue to be one of the most critical factors for open distance and flexible learning enabled through web-based and other advanced technologies (Allen & Seaman, 2005). There is clear agreement that online education has specific characteristics which should be considered in designing any Quality Assurance (QA) instrument for online course design and development.

Instructional/Learning Design	Course Content Structure and Presentation
Students' readiness Course & module goals & objectives Learning activities Learning Strategies	Structuring the course Functionality and consistency Text structure and formatting Providing adequate feedback
Interaction, Feedback & Assessment	**Institutional Policies and Technical Support.**
Interaction among learners Interaction between learners and instructor Interaction between learners and instructional materials Feedback and assessment	Accessibility Authentication and security Copyright, netiquette
Web Design	**Course Management and Organisation**
Understanding user needs Navigation Visual appearance	Time Requirements Progression through course Providing adequate feedback

Table 2: The subcomponents of the Quality Assurance framework.

Concluding Remarks

Our focus in this paper was the design and development of a VLE for a M.Sc. programme on ICT in Education for Sustainable Development driven by a learning paradigm that merges three theories of learning, namely: experiential learning, constructivist learning and transformative learning (ExConTra). While, for example, ICTs can provide interactive mind/cognitive tools to support learning and develop new understandings and knowledge in areas of teaching and learning for sustainability, ESD themes integrated into the school curricula could provide a worthwhile context for ICTs in education (Makrakis, 2010abc). Such themes may include cultural diversity and intercultural/interfaith understanding, health, HIV/AIDS, governance, natural resources, climate change, rural development, sustainable urbanisation, disaster prevention and mitigation, poverty reduction, corporate responsibility and accountability, and so forth. In this sense, social, economic and environmental issues can provide meaningful and challenging contexts for developing a wide range of ICT skills. Activities were designed to meet students' various learning styles and encourage them to experience personal change towards learning to live sustainably. The questions asked of online tutors encourage students to express their thoughts, take the learning control, allows them to share their thoughts and ideas, listen to the perspectives of others, and critically reflect on their own viewpoints.

Using a participatory curriculum development approach ensures that all the groups and individuals who have a real interest in the programme are actively involved in some way in the project during various stages. In this way, prospective students, instructional designers, content experts, critical readers and prospective e-tutors were involved in the course curriculum development. Through this approach contextualised teaching and learning becomes more feasible, as those involved bring their own experiences to the learning process. Such an approach is also conducive to the 'process' and 'praxis' curriculum approach that is characterized by the recognition of empowerment, emancipation, knowledge construction, meaning making and negotiation. A participatory and negotiated curriculum, however, does not necessarily imply that every facet of the curriculum is open to participation and negotiation.

This learning paradigm used allows both online students and facilitators to take advantage of ICT tools and the World Wide Web on making connections and making meaning in the learning process. Online students can collaborate by sharing their individual perspectives, ideas, and personal experiences, thereby deepening their understanding with increasing higher order thinking and greater personal satisfaction (Snyder, 2009; Engstrom, et al., 2008). When used in conjunction with instructional methods that promote inquiry and collaboration, technological solutions become important components to facilitating experiential learning (Meyers, 2008). A rich learning environment encourages shared meaning and shared inquiry (Novak, 1998) as well as multiple learning styles and multiple representations of knowledge (Kafai & Resnik, 1996). Pre-specified learning activities combined and enriched with those created materials by students cater for several learning styles, and interactions (student-teacher; student-student; student-content). The ExConTra learning process is also based on an interdisciplinary approach addressing the four pillars (environment, society, culture and economy) of sustainable development and makes use of an online course design methodology that uses four phases: needs analysis, curriculum design, development and formative evaluation. The VLE that encompasses both the curriculum programme and the online platform with its tools and online technologies merges ICTs with ESD in three ways: a) providing opportunities to target groups for reflective practice; b) using open source ICT tools and ESD-related learning objects available in the Web; and c) using ICTs to develop interactive, interdisciplinary and cross-disciplinary ESD learning activities.

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Ethical Values Pedagogical Model

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Abstract

This paper presents an ethical-values pedagogical model that emerged during the design of an online Masters programme, developed with the support of funding from the Erasmus multilateral programme. The authors are experienced in both the development and implementation of online learning, particularly values-based learning approaches in higher education, and are deeply committed to building alternate theoretical models that stimulate thinking about values-based learning within an online context. This Ethical-values pedagogical model thus represents an alternative theoretical resource for thinking about the role of ethical-values in learning. Garrison, Anderson and Archer's (2000) Community of Inquiry framework has been re-conceptualised and a new pedagogical model, titled the Ethical-values Pedagogical Model, has emerged. This model posits that a positive ethical-values presence is critical to sustaining teaching, social and cognitive presences, and thus the lynchpin for the enablement of appropriate and meaningful cognitive experiences. The ethical-values bases of learners and educators effectively filters the way in which the cognitive experience is created and the manner in which the individual learner makes sense and/or constructs meaning within the learning environment. As such, the ethical-values bases impacts significantly on the teaching, social and cognitive presences within the learning environment. The Ethical-values pedagogical model centres on the negotiation of an ethical-values basis as the initiator and driver of meaningful and appropriate learning experiences for the individual learner, communities of learners and educators. Therefore, the ethical-values presence is recognised as critical to the sustainability of appropriate, safer and meaningful learning particularly within the online context.

Introduction

The nature and processes of teaching and learning have changed in many ways in the past century. More recently the so-called era of globalization, in which our traditional concepts of learning and education have been turned on their head and neatly packaged ideologies and communities have been undone, has brought about a re-evaluation of the traditional concepts of teacher, learner and the learning context. There is a renewed focus on learner-centric approaches to teaching and learning, with an emphasis on facilitating situated, distributed, mediated, collaborative and democratic learning experiences. These require a re-examination of the role of values, identities and ethical bases in the process of learning, particularly within online contexts. Despite the availability of many different teaching and learning frameworks for online learning, the literature review undertaken in this study found no evidence of an online pedagogic framework or model that explicitly addressed ethical-values dimensions within a learning context. Furthermore, the literature review revealed that the constantly changing technological landscapes underpinning online learning environments can act as a double-edged sword. Thus, online technological advancement can provide new ways for learners to create, connect, communicate and collaborate (as highlighted by Redecker, Ala-Mutka, & Punie, 2010) but its prevailing culture of 'openness' and 'informality' also exposes learners to issues of safety and privacy and even the possibility of litigation. In the discussion that ensues, Holland, Mulcahy, Besong and Judge present their online pedagogical model that posits an ethical-values perspective and presence as central to the creation of meaningful and safer learning experiences for learners in the 21st century.

Background to the evolution of the Ethical-values Pedagogical Model

The Ethical-values pedagogical model evolved from a critical review of the literature on the design and facilitation of online learning environments, and discourse with colleagues engaged in the design of an online Masters programme in technology-enabled Education for Sustainable Development, (which was developed with the support of funding from the Erasmus multilateral programme, between 2010 and 2012). The authors are experienced in both the development and implementation of online learning, particularly values-based learning approaches in higher education, and are deeply committed to building alternate theoretical models that stimulate thinking about values-based learning within an online context. This model thus represents an alternative theoretical resource for thinking about the role of ethical-values in learning, and as such represents a series of "ideas for practice, rather than ideas in practice" (Thomson, Lingard, & Wrigley, 2012, p.2).

In the review of the literature on pedagogical models used within online learning, Garrison, Anderson and Archer's (2000) Community of Inquiry framework and Salmon's (2000, 2004) Model of e-moderating came to the fore as the pedagogical tools of choice in the design and facilitation of many online learning environments. Neither of these, however, explicitly addressed ethical-values dimensions within learning. Through an iterative process of dialogue with colleagues and critical engagement with the literature, Garrison et al (2000) framework emerged as the most suitable basis for explicating the role of ethical-values in the process of learning. The discussion that ensues describes Garrison et al (2000) Community of Inquiry framework and explains its relationship to, and the emergence of, the Ethical-values Pedagogical Model, which posits an ethical-values presence as the lynchpin for the enablement of appropriate and meaningful cognitive experiences. It is important to note here that ethical-values are implicitly assumed to guide learners towards positive actions.

Garrison et al (2000) Community of Inquiry framework

In 2000, Garrison, Anderson and Archer presented the Community of Inquiry framework, which was based on a constructivist and collaborative approach to teaching and learning. This popular framework comprises three elements: teaching presence, cognitive presence and social presence, as shown in Figure 1. At the centre of this model is the cognitive experience, where participants interact with the cognitive content and processes.
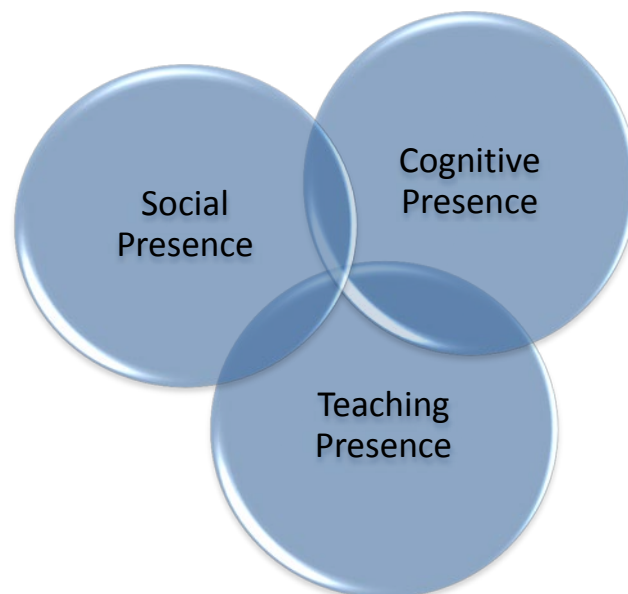
Figure 1: Garrison, Anderson and Archer (2000) Community of Inquiry framework.

The teaching presence is described as the "design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes." (Anderson, Rourke, Garrison & Archer, 2001, as cited in Garrison, Cleveland-Innes & Fung, 2010, p.32). The teaching presence involves the development of curriculum, teaching strategies and learning activities; and focusing the community and the individual learner and learners towards meeting the learning outcomes. The social presence can be considered as the level of awareness of other/s in an interaction and/ or the degree to which learners can project their "personal characteristics" (Garrison et al, 2000, p.89) into the community. Social presence within a community of learners may involve the development of, and appreciation for, meaningful interpersonal communication and relationships within the learning community. The social presence impacts on the cognitive and teaching presence, particularly with regard to the degree of cognition that occurs and opportunities. The cognitive presence is the process through which learners within a community of inquiry "constructs meaning through sustained communication" (Garrison et al, 2000, p. 89). In this regard, the cognitive presence may comprise learners engaging with a learning problem, exploring or challenging relevant information/ knowledge, making sense and integrating ideas, resolving the problem and reflecting on process.

Identities and Ethical-values in an online learning context
Garrison et al (2000) framework has been useful in terms of understanding some of the elements that are pivotal to enhancing the educational experience. However, as mentioned earlier, it does not explicitly address the role of ethical values in influencing the teaching presence and in shaping the learning experience for the individual learner and communities of learner.
Values and identities in the past were located in a specific context and social milieu, but, in the age of online learning, are subject to multiple discourses, multiple agendas and interest groups. According to Zembylas and Vrasidas (2005) the capacity of the Web to facilitate learning environments that are populated by multiple relationships and hybrid identities poses the dilemma for online educators to provide an ethical pedagogy. In common with Ward and Prosser (2011) and Gomez (2009), Zembylas and Vrasidas (2005) turn to the work of the French philosopher, Levinas, to create a theoretical and philosophical underpinning to support the study of ethical values in online learning. Levinas postulated the importance of Face in understanding the Other. By Face, he was referring to face-to-face communication. In designing this model for online learning, the authors identified the importance of an ethical values base to overcome the limitations of the lack of face-to-face communication. Viewed in isolation, the inclusion of an ethical value base does not resolve the ontological or ethical challenges posed by online learning environments but viewed in relation to the other components of the model, it creates a fresh opportunity to design curricula that challenge and demand a reflective approach to learning from all concerned. The building of Levinas' concept of a relational approach to knowing, needs the participants to focus on the other partners in the learning process and attempt to understand their diverse identities and approaches.
While there is general agreement on the need to include ethical values in the learning environment and while individually much has been written on both elements of this equation, very little work has been conducted on the actuality of ethical values bases and their impact on education and learning. Socratic approaches would suggest that as humans we all want and seek the good but we do not always succeed. If we accept Hill's (1991) assertion that a value is more than a belief and more than a feeling, then in designing online curricula it may be timely to consider the articulation of an agreed number of core values that will underpin this process. In addition subject specific values may be additional to the core set. For example work in the area of Education for Sustainability could include a particular set of ethical values related to sustainability.
Finally, the online learning environment does create a number of specific ethical risks. These have been well documented elsewhere and relate to issues such as plagiarism, identity theft, unsuitable posts, the use of unsuitable internet sites and gender and race bias. Through the use of the ethical

values pedagogical model such ethical risks can be identified, named and highlighted as part of the forward planning for the curriculum.

Ethical Values Pedagogical Model
In light of the issues identified above, Holland, Mulcahy, Besong and Judge (2011) re-conceptualised Garrison et al (2000) Community of Inquiry framework and now present a new pedagogical model, titled Ethical-values Pedagogical Model, which posits a positive ethical-values presence as critical to sustaining teaching, social and cognitive presences, and thus the lynchpin for the enablement of appropriate and meaningful cognitive experiences. This section begins with an explanation of what an ethical-values presence is and then attempts to explain the interactions between the four presences and importantly how an ethical-values basis and presence is critical to the sustainability of appropriate, safer and meaningful learning within the online context.

The ethical-values presence is the values-bases and prioritised goods that direct the teaching, social and cognitive presences, and by default the cognitive experience. These are the ethics and/ or values that promote respect, equity, fairness, solidarity, and democratic actions and behaviours within the learning environment. For the individual learner, an ethical-values basis results in the development of learner's self–esteem and self-expression. For the educator/s, an ethical values-basis is critical to the creation of a democratic, collaborative and safe learning environment. For the community of learners, the ethical-values basis and presence denotes a community who value respect, mutual understanding and consensus building. The ethical-values pedagogical model, as illustrated within an online context in Figure 2 is guided by the ethical-values presence, which mediates the manner in which the three other presences (teaching, cognitive and social presence) outlined by Garrison et al (2000) are manifested within the learning environment.
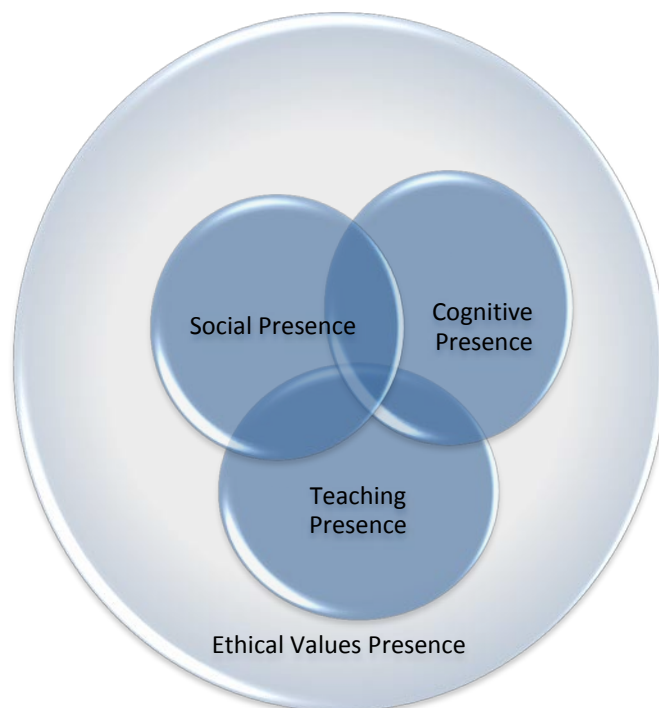
Figure 2: Ethical-values Pedagogical Model.

The extent to which higher-level learning occurs for the individual learner is impacted by the quality of cognitive, social and teaching presences, which is evidenced by the degree to which the individual learner, community of learners and educator/s prioritises notions of what is of personal, community and learning value. These prioritised goods and values-bases constitute the ethical-values presence, and are to a great extent the driver for decisions by the individual learner,

community of learners and educator/s on how to engage in learning and to what extent learning will take-place.

The ethical-values presence impacts on the social presence, by promoting consensus building within communities of learners, respect for difference and fostering a safe and inclusive learning environment. It impacts on the teaching presence, by the prioritisation of inclusive teaching and learning strategies and the recognition of the importance of negotiated, collaborative and democratic learning opportunities. Furthermore, it impacts on the cognitive presence by giving the learner the confidence to interact and reason with the cognitive content and processes in a more critical manner. Figure 3 describes the interactions that occur within the Ethical-values Pedagogical model.
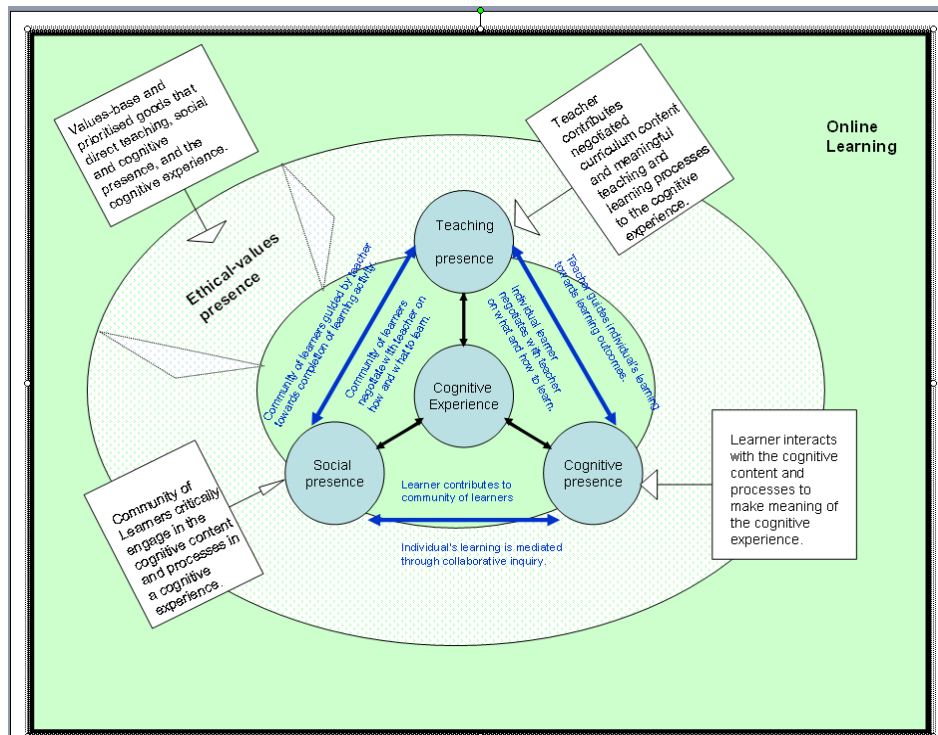
Figure 3: Interactions within the Ethical-values pedagogical framework.

The cognitive experience can be perceived as a fluid concept, where the individual learner, community of learners and educators engage in the co-construction of knowledge. The individual learner, community of learners and the educators are recipients and creators of information and actively engage in the dynamic construction and transformation of knowledge into learning. The ethical-values presence impacts on the cognitive experience by allowing both learners and educators to reach consensus on prioritised values and good practice necessary to the fulfilment of a democratic, participatory and safe teaching and learning environment.

Translating the Model into practice in an online Context

From the outset, the Ethical Values pedagogical model has been presented as a theoretical resource for thinking about the role of ethical-values in learning, or more simply, as a guide for practice. This section describes how the Ethical-values pedagogical model can be translated into practice by online course designers, educators and learners. It is important to note that fostering a positive ethical-values presence is critical to the success of this model, and as such the discussion opens with an exploration of this aspect. The discussion ensues with clarification on how to enhance the teaching, social and cognitive presences within an online context.

Enhancing the online ethical-values presence

Online learning environments must accommodate multiple identities, complex discourse and multiple learner relations (Zembylas and Vrasidas, 2005). One of the key challenges in online learning is to design courses where learners and educators prioritise, actively promote and are responsive to an agreed core of positive ethical-values. An ethical-value expresses the appropriateness of specific ethical principles and practices, with the aim of determining which principles or practices are best to guide our actions. In the context of learning, it essentially involves learners and educators prioritising a series of positive values and actions necessary for participatory and democratic learning. These positive actions may take the form of valuing 'others perspectives' or 'solidarity' or 'otherness' and are central to the creation of a participatory, democratic ethos and culture, that underpins transformative learning environments.

It is important for the learner, community of learners and educators to reflect on how their ethical values bases enhances the cognitive experience of all within a learning environment. Figure 4 identifies a number of considerations that should be made by the learner, community of learners and educators to enhance the ethical-values presence within an online context.

Learner
- be aware of own values-base
- challenge one's own values and belief systems
- encourage and support mutual understanding, solidarity and cooperation
- respect the strengths and weaknesses of other learners
- seek out others 'perspectives'
- value 'otherness'
- be open to listening to other opinions, attitudes and values-base
- respect equality, inclusion and diversity within the learning environment
- value the process of 'becoming'

Community of Learners
- promote the meaningful participation of learners and educators in decision making
- protect learners' rights to freedom of opinion, expression, association and dissent within the learning community
- encourage and support mutual understanding, solidarity and cooperation
- reach consensus on a core set of values and prioritised goods for the learning community
- recognise the educator as a co-learner within the learner community
- actively engage in negotiated and democratic learning

Educator
- provide learners with opportunities to realise full potential
- be aware of impact of own values-base on learners
- continually reflect and challenge one's own values and belief systems
- encourage and support mutual understanding, solidarity and cooperation amongst learners
- respect the strengths and weaknesses of learners
- be open to listening to learners opinions, attitudes and values-base
- value equality, inclusion and diversity within the learning environment
- actively promote and engage in negotiated and democratic learning
- actively reflect on own role as a reflective and reflexive practitioner and co-learner within the learning environment
- encourage learners to be caring, active and responsive within the learning environment (and beyond)
- promote the concept of ownership and self-sustainability within the learning environment
- embrace ongoing professional development opportunities and apply this in practice
- actively engage in the development of learning communities

Figure 4: Guide to promoting a positive online ethical-values presence.

A positive ethical-values orientation in learning calls for the awareness of the existence of the 'other' by the learners and the educators. Consequently, such awareness enables the learners and educators to respond ethically to the others' experiences. The starting point for the learner in understanding ethical-values is to examine his/ her own thoughts, feelings, attitudes, beliefs and values-base. The learner needs to challenge own perceptions and assumptions, and actively seek others perspectives. From a philosophical perspective, the learner needs to understand that learning is a process of 'becoming' and that the ethical-values base shapes this process of 'becoming'. Zembylas and Vrasidas (2005:62) argue that 'knowing who we are does not necessarily assume that we know how to relate to others in an ethical manner'. The learner needs to be open to listening to others' opinions, attitudes and values-bases; in this sense, the learner needs to value 'otherness'. This exploration of the value of otherness is facilitated through engagement with communities of learners and educators. For the community of learners, reaching a consensus and actively promoting an ethical-values base is necessary for the promotion of a safe, inclusive learning environment. For the educators, reflective and reflexive practice is critical to understanding own ethical-values base and how this shapes the learning content, processes, interactions and ultimately, the learning of learners.

The ethical-values presence is evidenced in online learning through the choices, interactions and decisions made by the learner, community of learners and educators. In terms of the learner, the indicators for an ethical-values presence include learner's expressions of solidarity and willingness to actively seek out, listen to and challenge others perspectives. In terms of the community of learners, the indicators for an ethical-values presence include a self-sustaining community of learners that actively engage in negotiated, collaborative and democratic learning. In terms of the educator/s, an ethical-values presence would reflect in the creation of inclusive, participatory, negotiated, collaborative, transformative learning opportunities, transparency in learning and recognition of the educator/s as a co-learner in the learning process.

Enhancing the online teaching presence

The rapid change of technology (and in particular the integration of social media in the learning environment) offers new online (and off-line) pedagogical possibilities. There are a variety of approaches and basic principles in online pedagogy that impact on the teaching presence. These include the design of learning activities and choice of teaching strategies, each of which can impact for better or worse the learning experience. Good practice in online pedagogy promotes: learner centred approaches; active learning strategies; self-directed learning; interactivity, cooperative and collaborative learning; intercultural communication; and authentic situated learning. Thus, there is a need to allow a good degree of flexibility for learners in terms of the cognitive content and the teaching and learning strategies used to mediate learning.

The educator essentially sets the tone and visibility of teaching presence. The role of the educator is to guide, negotiate and advise learners towards the fulfilment of learning outcomes. The educator guides learning, develops learning strategies and organises the learning environment such that it enhances learners' critical thinking skills, self- organisation and self-directed learning. The educator also guides learners' activities towards cooperation, collaboration and interaction with the learning community, learning environment and the learning resources. The educator should use methods that build upon learners' experiences and knowledge base and provide opportunities for learners to connect prior knowledge with current learning.

Figure 5 provides guidelines on enhancing the teaching presence, particularly in relation to the aesthetic design, pedagogic design and the cognitive content of the online course. The aesthetic design refers to the 'look and feel' of the online course, and impacts on how the 'teaching presence' is perceived. The pedagogic design refers to the teaching, learning and assessment strategies that are promoted within the online course. The cognitive content comprises the learning content, activities and resources.

Aesthetic Design	Pedagogic Design	Cognitive Content
• use standardized formats for content presentation • ensure the content is accessible and usable by learners • use local language where possible and necessary • use translations where possible • highlight important points • use images and/ or multi-media elements to add interest or to pose a question • use colour for headings or bands to break up content. • use clear and concise information in the navigation structure • use text, graphics or images, simulations, audio or video segments to enhance interactivity and visual display. • avoid putting in too many resources as this may confuse students • avoid a monologue writing style as this may discourage the students from engaging in the learning process • work within the bandwidth constraints of the web. • distribute online evaluation forms to gauge learner responses to aesthetic aspects of the course	• provide opportunities for multiple forms of learning: case-study learning, inquiry-based learning, problem-based learning, interdisciplinary learning, service learning, discovery learning and ICT-enabled learning • encourage interactivity in the form of one-on-one interaction with a partner; with the teacher; in small groups; with the entire class; • design collaborative tasks • use online presentation tools like slide shows • Use online communication tools/ social mediadesign authentic situated tasks • take into account student prior knowledge, skills and aptitudes • allow opportunities for intercultural actions • encourage note making from online material using annotation tools • encourage group discussions, debates • provide interactive online assessment activities • guide the learners through the learning content • provide challenging learning activities to stimulate debate and critical thinking • use 'reflections' in order to situate learning • provide netiquette and interaction guidelines • provide prompt and motivating feedback. • use online surveys to elicit feedback on pedagogic aspects of course	• Content needs to be goal-oriented, focusing particularly on meeting the learning outcomes • Select and sequence the content into discrete learning modules and clearly define the learning outcomes • Select content that is authentic, reliable and current • Select content that meets the needs of learners with different learning styles and preferences • Structure content so that learners can build on prior knowledge and experience, and move towards an understanding of an entire system • Integrate multicultural and multi-disciplinary perspectives in content • Re-use existing learning materials suitable within the online context • Provide links to journal articles and scanned readings for downloading • Check accuracy of content • Update materials and check if links are active • assign case studies to analyse • Provide a forum for gathering and sharing community resources • Provide interactive online assessment activities • Organise thematic content around content issues and materials and tools, with activities such as: action research projects and case studies

Figure 5: Guide to enhancing the online teaching presence.

Enhancing the online social presence

The social presence in online learning is critical. There are a variety of factors that impact on the social presence. These include the creation and fostering of a community of learners, the role of the educator, the contributions from the individual learner and most importantly, the interaction of the learner, educator and the community of learners. Online courses can be perceived as 'cold' or 'distant'. It is very important to design an online system that promotes communication and interactivity of all participants in the learning process. Figure 6 provides guidelines on enhancing the social presence.

Learner
- focus on the learning task and corresponding learning outcome/s
- respect the strengths and weaknesses of other learners
- be open to listening to others opinions, attitudes and values-base
- think carefully about when to contribute and when to allow space for others to contribute within the online community
- become time-conscious when communicating within the community. Lengthy postings on discussion forums should be avoided
- become proactive in engaging in the community of learners.

Community of Learners
- reaching consensus on protocols for: communication, Internet safety, netiquette, masking and flaming
- focusing on the learning task and corresponding learning outcome/s
- reaching agreement on core values or *goods* that are prioritised within the community
- allowing for opportunities to explore multiple perspectives
- valuing multi-cultural perspectives

Educator
- set clear tasks and learning activities for the community of learners
- set learning outcomes for the individual learner
- contribute to fostering a climate of openness, democracy, mutual respect and trust
- design collaborative activities for the community of learners
- moderate learning within the community of learners, giving advice where necessary
- mentor the learner/ community of learners towards the completion of the learning activity and achievement of learning outcomes
- guide the community of learners towards self-sustainability
- provide consistent, clear and constructive communication and feedback to community of learners
- provide timely advice, support and feedback to learner/ community of learners
- encourage interactivity in online forums and activities.
- negotiate with learners on an agreed protocol for: communication, Internet safety, netiquette, masking and flaming
- reflect on own values-base and how this might impact on the learning community
- reflect on own role as a reflective practitioner and co-learner within the community of learners

Figure 6: Guide to enhancing the online social presence.

Enhancing the online cognitive presence

The cognitive presence can be perceived as the manifestation of a process through which the learner makes meaning of the cognitive experience. The degree of cognitive presence can be enhanced through self-reflection and through collaboration with other learners and/ or with educators. Evidence of a cognitive presence can be seen through learner's interaction in the learning activities and processes. This can be in the form of engagement in discussion, peer review and self-reflection and / or in the co-creation of learning artefacts. Figure 7 provides guidelines on enhancing the cognitive presence.

Guide to enhancing the cognitive presence

Learner

- Focus on the learning outcomes
- Pro-actively engage in the learning activity and processes
- Reflect on role of own values base on the learning process
- Critically engage with learning process
- Seek out others perspectives
- Challenge own values base and belief systems
- Develop an understanding of own learning styles and preferences

Community of Learners

- Focus on the learning task and corresponding learning outcomes
- Reach agreement on core values or *actions to be* prioritised within the community
- Provide a safe environment where the learner feels free to contribute own perspective and challenge others' perspectives
- Respect individual perspectives and contributions
- Provide opportunities for individual learner to explore multiple perspectives
- Challenge individual's perspectives and contributions
- Value multi-cultural perspectives and collaborative interactions

Educator

- Set learning outcomes for the individual learner
- Contribute to fostering a climate of openness, democracy, mutual respect and trust
- Mentor the learner towards the completion of the learning activity and achievement of learning outcomes
- Encourage self-paced as well as collaborative learning
- Provide consistent, clear and constructive communication and feedback to learners
- Provide timely advice, support and feedback to learner
- Encourage learner interactivity in online forums and activities.
- Reflect on own values-base and how this might impact on the learning of the individual learner
- Reflect on own role as a reflective practitioner and co-learner within the learning environment

Figure 7: Guide to enhancing the online cognitive presence.

Conclusion

The Ethical-values pedagogical model as explicated, firmly positions an ethical-values basis as the initiator and driver of meaningful and appropriate learning experiences for the individual learner, communities of learners and educators. The ethical-values bases of learners and educators effectively filters the way in which the cognitive experience is created and the manner in which the individual learner makes sense and / or constructs meaning within the learning environment. As such, the ethical-values basis impacts significantly on the teaching, social and cognitive presences

within the learning environment. Therefore, the ethical-values presence is critical to the sustainability of appropriate and meaningful learning within the online context. Research is currently being conducted on indicators for the ethical-values presence within the context of online learning and the outcome of this will be discussed in future publications.

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Acknowledgement:

Transforming the Classroom into a Reflective Community. A Blended Learning Instructional Approach

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Abstract

Critical and reflective thinking is acknowledged as one of the key skills within Education for Sustainable Development (ESD whereas sustainable development requires a shift in the mental models which frame our thinking and inform our decisions and actions. This paper describes the implementation of a blended learning lesson unit which aimed at activating pupils' reflective thinking in order to negotiate the controversial topic of Genetically Modified Food (GMF). It describes a small case study that was implemented in a semi-rural school in Chania, Crete, with the participation of 23 sixth grade pupils. Specific changes in the pedagogical practices were adopted, pertaining to content, time and space conventions, and the use of online learning activities. The instructional design incorporated a five stage instructional session, which started by the introduction of a problematic situation, continued with the infusion of cognitive dissonance procedures and ended with a reflective evaluation activity. The pupils' stances towards the open learning procedure and the integration of online activities were positive, while certain changes in their beliefs about the issue of GMF were observed, due to the design of the learning approach.

Key-words: Blended Learning, Critical Thinking, Reflective Thinking, Education for Sustainability, Problem-based learning

Introduction

As Meyer (1977) points out, schools are organized networks of socializing experiences which prepare students to act in society. Education is a very important component in the public biography of individuals, affecting their life options and paying a crucial role in the formation of their personality. It is also a central element in the general framework of organization of the society, constructing competencies and helping create professions and professionals. Educators, who are accustomed to linear approaches in their pedagogy, often find it difficult to create truly integrated approaches to learning about sustainability issues due to its multi-dimensional complexity. With the expansion of the World Wide Web (www), new paradigms for teaching and learning about such complex issues arise. As a generation of pupils emerges, possessing greater technological knowledge and acceptance, the presence of the Internet in the classroom will probably increase. This transition requires much more than the development of software devices while its effect on the learning process must be closely examined, especially by the teachers.
Teachers, as professionals, are charged with the main responsibility of the learning process which can effectively facilitate students' learning and frame their personality traits. According to their pedagogical and philosophical dispositions, teachers perceive education either as a taken-for-granted concept or as a political act that helps pupils liberate their creativeness and promote critical reflection through democratic procedures in the classroom. Political acts reflect power and authority issues. By giving pupils the opportunity to reflect on their experiences and their prior knowledge and by challenging them to question their pre-assumptions, rather than urge them to take in information without question, teachers give in authority and power, while pupils take part of the responsibility for their own learning. Should we acknowledge the association between education and society, which necessitates the integration of learning procedures that interact with the world in which learners live, we must admit that there is a need for an alternative pedagogy (Cummings, 2000). A pedagogy that is geared towards creating a society, in which humans can

live in harmony with their environment and respect the next generations' needs, taking into consideration the postmodern reality of uncertainty and complex relationships. Therefore, educators have the choice to transform the classroom into a community that a) develops personal and collective consciousness, b) provides the necessary emancipatory tools and c) engages students in personal and social transformative action (Fernandez-Balboa & Marshall, 1994; Fernandez-Balboa, 1998). These approaches have in common a recognition that individuals need to foster their abilities, in order to reach a state whereby they can take personal responsibility for establishing a reflective practice of their own.

The concept of reflection lacks definitional clarity; yet the core areas of agreement among researchers seem to be that reflection: a) is a deliberate action; b) is stimulated by a problematic situation; c) involves an inward examination of personal knowledge with reference to the problem situation and d) leads to new insights (Rogers, 2001; Lim, 2009). Dewey defined reflection as ''*active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends*'' (Dewey, 1997: 6). Mezirow (1997) prefers the term 'transformative learning', referring to a procedure that fosters critically reflective thinking and imaginative problem posing, a structure, in which dialogue is learner-centered, the lesson takes place in participatory and interactive frameworks and involves group deliberation and group problem solving. Mezirow's model (1991) proposes four levels of reflection, the lowest of which is 'Habitual Action', that is, actions done out of routine practice, without having to think about what is done, or questioning the grounds for that action. 'Understanding' is the next step higher up from Habitual Action; at this level, the learner acts to comprehend what has been learned but does so, only within the limits of the given context, without consideration of personal meanings and applications to extend learning. 'Reflection', the third step, involves a re-assessment of an action or an idea, in light of the problem or situation. When engaged in Reflection, learners assess their learning experience, to evaluate their actions for future improvement, as well as consider various possibilities as solutions to problems. However, it is only when learners bring into question the very assumptions and beliefs which underlie their chosen paths of action, or the knowledge and ideas which seem to be widely accepted, that 'Critical Reflection', the final step, is demonstrated.

Critical and reflective thinking is acknowledged as one of the key skills within Education for Sustainable Development (ESD). Sustainable development requires a shift in the mental models which frame our thinking and inform our decisions and actions. Thus, the attainment of sustainable development requires transformative change at social and cultural level; a change that involves experiencing a deep, structural shift in the basic premises of thought, feelings and actions about our being in this world. This requires building the confidence and skills to support engagement among students and the community, in order to improve their own and others' lives, livelihoods and environments (UNESCO, 2011). There is no doubt that achieving sustainable development is essentially a process of learning. Thus, it is important to find out alternative pedagogical frameworks to integrate curriculum, teaching and learning in ways that promote a radical view of ESD that generate economic welfare and social justice within ecological limits (Kostoulas-Makrakis, 2010). Education, therefore, should aim at developing self-paced learning, judgment skills, solidarity, desire for action and critical thinking. Pupils should learn to make judgments and decisions and not simply acquire knowledge in meaningless contexts. They should be given opportunities to test assumptions, juxtapose statements and construct their personal conceptual representations about the world and its relations. It seems likely that this process will have application outside the school and later in their lives (Makrakis & Kostoulas-Makrakis, 2005). According to Chapter 36 of Agenda 21, on Education, Awareness and Training, reorienting education towards sustainable development requires a new vision for education. "*Education, including formal education, public awareness and training, should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. Both formal and non-formal educations are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns*".

During the last decades constructivist approaches have replaced instructional methods as the focus went away from the teacher and has moved to the individual learner. Learning is seen as a social and collaborative activity that is facilitated rather than directly exerted by the teacher (Paavlova & Hakkarainen, 2009). Building on theories, where students are involved in knowledge construction and shape their own cognitive representations, social constructivism adds an interactive dimension (Laurillard, 2008). Many researchers have argued that technology can serve as a catalyst for such changes in the content, roles and the classroom climate that are required for a shift from instructional to constructivist practices (Collins, 1991; Garner & Gillingham, 1996). We are entering a new phase in the use of technologies, particularly with the emergence of Web 2.0, which has been identified as a more interactive, peer-generated and collaborative Internet. "*The new knowledge-based society must be an inclusive society. Here too, the Internet offers tremendous possibilities; anyone who can use a computer can participate in society at the click of a mouse*" (European Commission, 2002: 4). Under these circumstances e-learning is being more rapidly adopted by educational institutions and has a potential to become a larger part of the educational experience of children, as the world moves into a phase that is widely referred to as a knowledge society (Kalantzis, 2004). Web 2.0 tools encompass a variety of different meanings that include an increased emphasis on user generated content, data and content sharing and collaborative effort (Franklin & van Harmelen, 2007). The rapid evolution of blogs, wikis and other social networking applications, offer rich user experiences where the process of knowing is a community-based, collaborative endeavor. Taking into consideration the affordances of these new cutting edge technologies, teachers can organize activities and learning environments that include opportunities for acquiring basic skills, knowledge and conceptual understanding, not isolated in the boundaries of the classroom. Communication channels can be enhanced and pupils are no more seen as individual learners but rather as more effective participants in the meaningful social practices of their learning communities in school and elsewhere in their lives. To glance a learning environment outside the confines of the classroom, in terms of space and time, is to see a social environment undergoing profound change through a tsunami-like flood of innovative tools and services that foster new modes of collaboration and social organization.

This paper presents an e-learning instructional model, which is based on the concept of instructional design. Instructional design is a technology, which incorporates known and verified learning strategies into instructional experiences which make the acquisition of knowledge and skills more efficient, effective, and appealing (Merrill, 1996). Information and Computer Technologies do not promote learning per se. It is not multimedia resources that make a difference in training, it is how they are used (Merrill, 1997). We believe that collaboration is developed when the teacher includes activities, which are designed to create a social environment that acts as a scaffold for collaborative learning and dialectical constructivism (Palloff & Pratt, 1999). Taking advantage of the affordances and opportunities that Learning Management Systems offer, we attempted to put into practice a learning sequence that expands the boundaries of the traditional classroom, in terms of space and time, and transforms the pupils into inquirers and reflective practitioners, taking into account their prior knowledge, perceptions and beliefs about a real life problem such as the proliferation of Genetically Modified Food (GMF). As it is presented more explicitly in the methodology unit, we tried to motivate pupils by challenging them to brainstorm, state their predispositions and search for information and evidence on a dilemmatic issue, by stating, on the one hand the advantages that GMF offer and on the other hand the dangers that they pose, using online activities and reflecting in real time face to face discussion sessions. On the final stage the pupils were asked to contemplate on the facts and information they have found and their personal dispositions, and give their point of view, without trying to suggest a solution. The window of learning was kept half open. The aim of this study was to examine if reflective thinking through bended learning procedures, with the use of Learning Management Systems, can be an effective approach in order to infuse problem-based learning sequences in primary education.

Methodology

In order to involve pupils in reflective action we chose to negotiate the topic of Genetically Modified Food (GMF). The main goal of this project was not to instruct pupils on the issue, but to set the grounds to promote reflection. Over the past half-century, there has been a shift among philosophers and sociologists of science, away from seeing science as a purely empirical process, to seeing it as a social process of knowledge construction in which imagination and argument play an important role (Seethaler & Linn, 2004). It is our belief that reflective thinking can be promoted through controversial issues that pupils encounter in their everyday lives, although we acknowledge that contents pay a crucial role in the procedure, by framing the learning sequence and helping pupils to stay focused. Contents are the vehicles that lead to reflective action; the procedures are the main characteristics that help nurture reflective and critical thinking. Therefore GMF was chosen because a) it is a topic that students encounter in their everyday lives; b) it is a highly controversial issue with ethical, religious and political dimensions; c) it is a topic that shapes a sustainable future in agriculture, health and economy and d) it offers opportunities for dialogue, juxtaposition and reflection. The instructional model proposed, is based on the principles of problem-based learning (PBL). The ability to apply our thinking and draw on a range of resources to solve complex real-life problems is, in our opinion, a basic principle of education. Simons and Ertmer (2006) suggest that PBL designs are characterized by student engagement with ill-structured problems, introduction of the problem prior to acquisition of relevant content knowledge, collaboration, instructional support during the problem-solving process and the facilitation of learner reflection.

Procedure and tools

This small case study was conducted at a primary school at the suburbs of Chania, Crete, with the participation of 23 6th grade pupils, 12 girls and 11 boys. The great majority of the pupils were very well acquainted with the use of internet tools, as 19 of them (10 girls and 9 boys) possessed a computer at home and had broadband internet access, while the others had received instruction at school, during the previous year, since ICT, as a subject, is part of the school's curriculum. The learning procedure lasted approximately four weeks, at the beginning of the school year 2011-2012, from September, 19th to October, 20th 2011. Specifically, we dedicated 8 school hours, 4 two-hour sessions, including an hour to present the learning environment, through which the learning procedure would take place, that is LAMS (Learning Activity Management System).

LAMS is an open source online learning environment for educators, which affords them with means to design, manage and deliver online collaborative learning activities. LAMS development began in 2002 by Macquarie University in Australia and was released as open source software in 2005. It is now supported by a wide learning community (http://lamscommunity.org) and it can be used either as a stand-alone system or in conjunction with other Learning Management Systems such as Moodle, Sakai, Blackboard, etc. It can support a wide range of pedagogical approaches, giving the opportunity to educators to select the activities that match their preferred style. The activities can include a variety of individual tasks, small group work or whole class activities based on both content and collaboration. By using such new generation learning design tools, learners - whatever their preferred learning style – may become actively engaged and challenged. Once a sequence is proved to be effective, it can be redistributed for use in different contexts through an active online community; thereby creating a repository of effective templates. Taking advantage of the shared experience and creativity, instructors can save time and reduce the workload necessary for planning and developing e-learning sequences. LAMS provides three environments in order to a) author learning sequences (Author Environment), b) implement them (Learner Environment) and c) monitor the learners' online activities (Monitor Environment).

The instructional module.

The instructional module, which was implemented, encompasses four consecutive instructional components, followed by an evaluation activity. The four components were:

1. Problem Presentation.

2. Prior knowledge activation.
3. Dilemmatic negotiation.
4. Synthesis.
5. Evaluation.

The learning setting included an online animation character, Sifis the panda, which urged pupils to join him in his quest to unravel the controversies of GMF. Pupils would write down their ideas, prior knowledge, opinions and arguments in online forums, online question and answer activities and vote for or against certain statements related to GMF. Taking the pupils online comments as primary raw material, the teacher would establish an open dialogical framework in the classroom, in order to stimulate the pupils' imagination and high order thinking skills. The teacher was a facilitator, a person who would encourage pupils to brainstorm, to express arguments, to challenge and stimulate heretic points of view, to scaffold and foster metacognition. The online environment helped to give voice to all pupils and create a starting point for face to face dialogue and argumentation, taking advantage of both online and face-to-face practices. The pedagogical framework had the characteristics of blended learning approaches.

Blended learning, a combination of face to face and online procedures.

The Web is increasingly used as a resource in K–12 education. Almost all the schools in Greece are connected to the Internet and the Ministry of Education encourages the use of Internet in education. Yet, the communicative aspect of the web has received little attention among teachers of the Greek Primary and Secondary Education Sectors (Papastergiou & Solomonidou, 2005; Aslanidou & Menexes, 2007). Today, children can browse the internet and search for resources, communicate and share ideas with their schoolmates and teachers, upload assignments and conduct research. Taking advantage of the new Web 2.0 technologies, teachers, on their side, can seize opportunities of transferring part of the learning workload, outside the physical boundaries of the classroom at an online environment. Online learning has its drawbacks, the main of which is the lack of physical and emotional interaction, something that is taken for granted in conventional learning settings. The need for a compromise between the conventional face-to-face settings and online learning, led to blended learning, a new approach to teaching and learning.

Blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment (Dziuban, Hartman & Moskal, 2004). It converges online and face-to-face education providing opportunities to foster reflective thinking, facilitate communication and collaboration, give voice to all the pupils, extend the lesson in space and time, help the construction of knowledge through inquiry-based activities and promote learner control, through open learning environments. For a learning environment to succeed, teachers need to change their traditional role of information delivery to effective scaffolding that supports students in integrating and applying ideas. In this type of learning environment, students also undertake new roles. The main characteristics of blended learning are (Dziuban, Hartman & Moskal, 2004):

- A shift from lecture- to student-centered instruction in which students become active and interactive learners;
- Increases in interaction between student-instructor, student-student, student-content and student-outside resources;
- Integrated formative and summative assessment mechanisms for students and instructor.

The learning journey

The pedagogical framework chosen is in tune with the characteristics of Kostoulas-Makrakis (2011) process for radical sustainability transformation which focuses in procedures that radically revise our view of learning. From a process which acts on individuals' characteristics in order to change the world, to one which challenges individuals' views of the world as a means of influencing their characteristics and hence ways of thinking and living (Huckle, 2006). According

to Kostoulas-Makrakis four interactive stages are entailed in the pedagogical perspective that fosters reflection within the context of radical sustainability transformation (Figure 1):

1. Getting started (reflection, activation, problem identification and problematisation, disorienting dilemma).
2. De(re)construction (reflection, reformulation, reassessment).
3. Getting involved (reflection, knowledge construction, transformation).
4. Learning-based change (learning by action, change).
5. Through this model the learner is viewed as an active agent in a change process.

Participants get engaged in discourse and critical self-reflection, using various activating events and disorienting dilemmas, through which they come to critically examine their personal views and, therefore, open themselves to alternative views and practices.
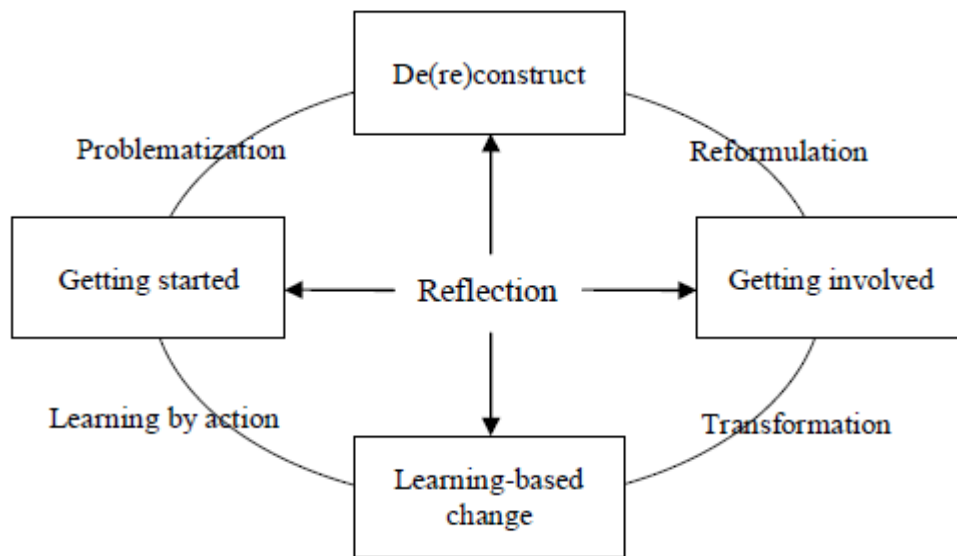
Figure 1: A methodological approach to infuse a radical view to education for sustainability (Kostoulas-Makrakis, 2010).

After dedicating one school hour in order to familiarize pupils with LAMS, each pupil entered the Learner's environment with his or her codes. The first learning component called "Presenting the problem-Motivation" included an introductory narration, which aimed to introduce the topic and motivate pupils to express their ideas. An animation character, a panda, introduced himself and asked pupils to join him in an inquiry and reflective journey about GMF (Figure 2). The animation helped to create a friendly and safe environment, trying to motivate pupils. The educator then asked the pupils to say what they knew about the topic in face-to-face settings, creating a starting point for the procedure.
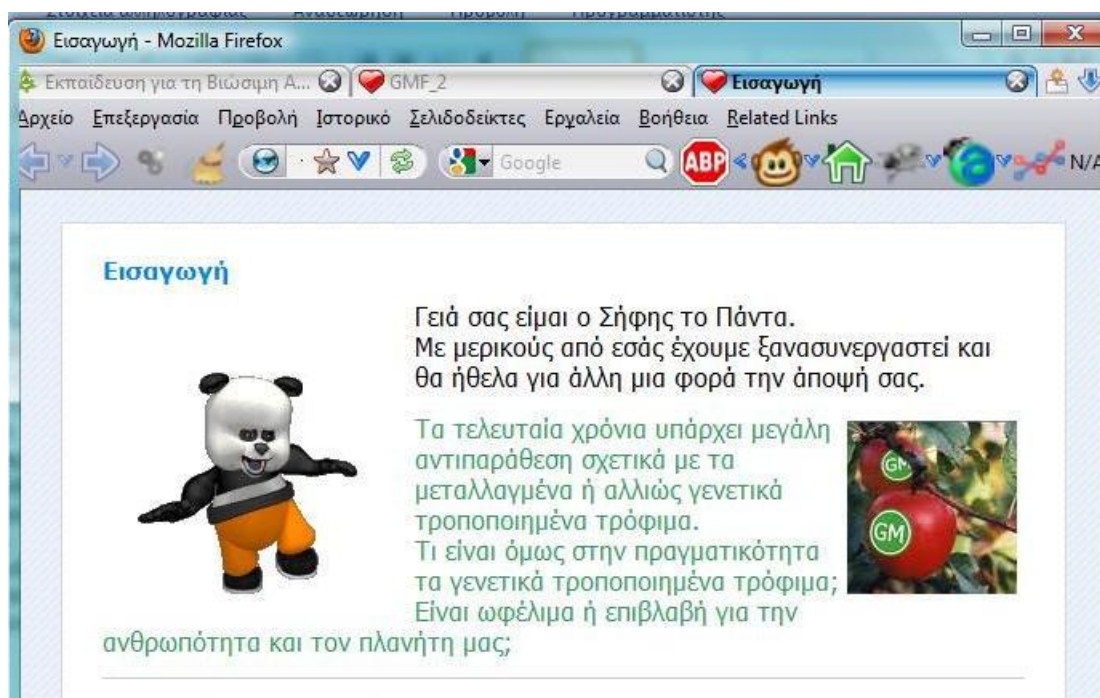
Figure 2: Presenting the problem-Motivation.

The second component called "*Prior Knowledge activation*", integrated an online forum where pupils would share their knowledge about the topic, brainstorm and express their first arguments about GMF. The conventional setting of the classroom doesn't offer enough time so that everyone can contribute to the dialogue. Inevitably, pupils that are introversive or haven't acquired adequate language skills, seldom participate. Forums give the opportunity to pupils to take their time, contemplate on their classmates' comments and voice their points of view. They can answer at a specific comment or express an alternative view in collaborative settings. The online dialogical framework gave a starting point in order to expand the conversation, in the classroom, where the teacher can provoke cognitive dissonance and challenge the pupils to reason and think critically. The teacher didn't, under any circumstance, reveal his dispositions towards the topic, asking the pupils to express, freely, their opinion and encouraging them to search for evidence. Almost all the pupils tried to acquire data from the internet, while some asked their family to enlighten them about the issue. Negative predispositions prevailed, while the alteration of the DNA chain and the negative effect such products have on health, were the main characteristics mentioned.

The third component called "*Dilemmatic negotiation*", on the one hand, offered a scaffold to pupils, by presenting specific core data about GMF while on the other hand asked them to make decisions that are for or against them. It was consisted of four activities, all online:

1. **Resources for GMF:** Presenting basic facts advocating use and proliferation of GMF. The main arguments that advocated them were a) Mankind has been modifying genes for thousands of years in breeding; b) the world can be saved from global famine through greatly improved crops; c) GMF can be pest or disease resistant and reduce or eliminate the need to use pesticides or herbicides.

2. **Voting activity:** After contemplating upon the given facts, pupils vote if they are predisposed for, against or if they are not sure about GMF. The options available were: a) I believe that GMF are unfairly accused and should be seen with an optimistic view; b) I believe that GMF are dangerous for humans' health and the environment therefore should be banned; c) I'm not sure yet, I need more evidence.

3. **Resources against GMF:** Presenting facts that oppose GMF use and proliferation. The main arguments posed against them were: a) They have been proved to be detrimental for human health; b) They could lead to even stronger and resistant pests that would necessitate even stronger pesticides; c) it is unethical to intervene in the nature's function; d) the main motive for GMF development is peoples' arrogance and lust for money.

4. **Voting activity.** Applying the same voting activity in order to challenge pupils' views about the issue, after seeing the opposite point of view. It was interesting to see whether pupils would change their first options.

The aim of this component was to cause cognitive dissonance and push pupils to think and evaluate critically their options. The results of the voting activities are depicted in Figure 3. As we can see there was a shift to the choices of the pupils, from the first voting activity to the second. At first, many pupils, influenced by the facts that advocated GMF, were skeptical about the use of such products. Specifically, 13,04 % (3 pupils) voted for them, 47,82 % (11 pupils) voted that they are dangerous for humanity, while 39,13 % (9 pupils) were reluctant to adopt a clear stance. After reading the arguments that opposed GMF, there was a great shift towards opposing them, as 73,91 % (17 pupils, a rise of 26,09%) voted that they are dangerous for humanity, while only 4 pupils (17,39%, a decline of 21,74%) didn't adopt a clear stance. Most of those that voted for GMF (2 out of 3) still kept their option.
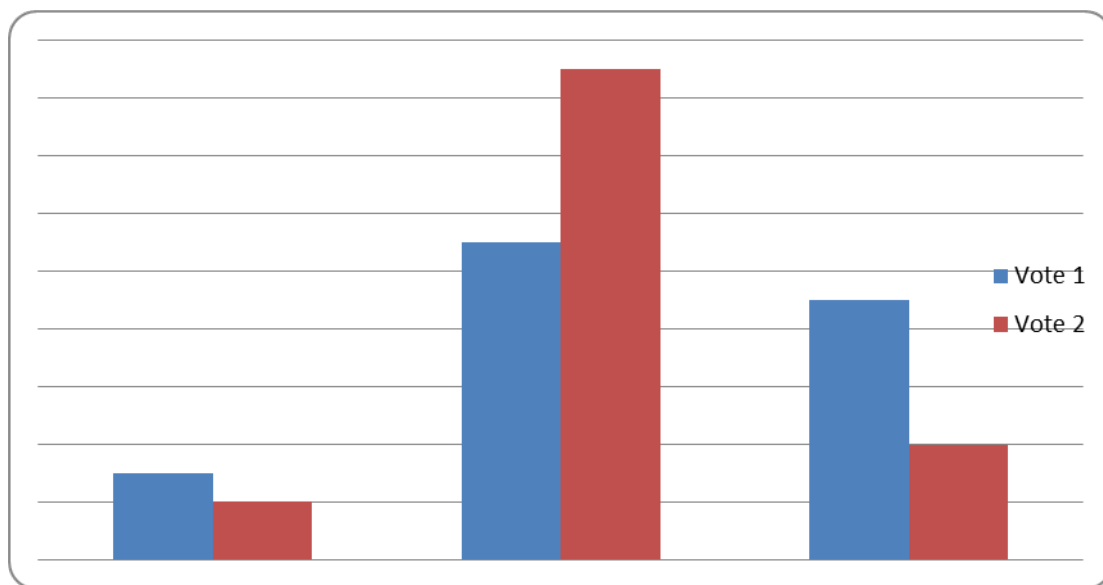
Figure 3: Results of the two voting activities.

The last component called "*Synthesis*" included two online activities followed by a discussion phase in the classroom. Having acquired a first order knowledge about the topic, pupils are fostered now to search for more details through the internet. Pupils were divided in groups of four and fulfilled the two activities within their subgroups. The two activities were:

1. **Searching for resources about GMF.** LAMS offers a "Share Resources" activity, which offers the ability to navigate the internet and propose URLs with digital resources, such as web pages, videos, online documents and blogs that can be shared among the other learners. Pupils act as nascent researchers, practicing searching, elaborating and evaluating data skills.

2. An online **Question and Answer** activity that asks pupils to write down their points of view about GMF after having conducted their own research. The question posed was "Depending on the information you have gathered state your personal opinion, whether GMF are dangerous for humanity and the environment or if there are some advantages that should be taken into consideration". The answers could be viewed from all the members of the subgroups, in order to provoke dialogue and communication.

Pupils proposed a wide range of resources including text, pictures and videos, while their answers denoted the fact that GMF could become a plague for humanity and our planet. Through the final conversation, in the classroom, the common conclusion, which was unanimously accepted, was that although there could be found some arguments that advocate GMF, by weighing the tradeoffs

it is difficult to predict the long-term effects of GMF, which at this time seem to be catastrophic and lead to a road with no way back.

The tools used to evaluate this intervention were a) the teacher's observations, who acted as an insider and b) the e-portfolio of the class, a tool offered by LAMS, which is a compressed folder, with all the online interactions of the e-classroom. We ended the lesson posing a reflective question that asked the pupils to write down their impressions about this innovative form of lesson. Today, despite the web revolution, learning in Greek schools is still pursued inside the walls of the classroom; pupils are rarely challenged to contemplate on what they learn, while communication is basically achieved between those that are in tune with the existing culture and are rather extroversive. And it is not always the teachers' choice to adhere to such approaches, but a 45 minute lesson doesn't offer enough time for pupils with different learning styles to exert communicative abilities and practice reflective skills. Online activities offer time to contemplate on what each pupil wishes to say. They open the lesson outside the classroom walls, while the infusion of face to face activities, through blended procedures, advances the interactive stance of the lesson. The characteristics of our reflective blended learning approach in comparison with the conventional settings of the everyday lesson in the classroom, according to what the author has elicited from the pupils, are depicted in Table 1.

Characteristics	Conventional lesson	E-learning reflective approach
Space and time	The lesson is fulfilled in the classroom, throughout the school hour.	The lesson is fulfilled either in the classroom and home or in the school's lab. Pupils enter the online environment at any convenient time. They can fulfill collaborative activities from home.
Self-paced learning	Learners have to fulfill their assignments in the given time or respond to conversations in the classroom settings.	Pupils take their time, communicate through the asynchronous online tools and fulfill their assignments according to their personal pace.
Dialogue	In classroom, time is not sufficient for every pupil to express his point of view, so introversive individuals usually stay on the fringe.	Dialogue is enhanced through multivariate communicative paths. It is commenced through online forums and conversations and is expanded in face-to-face settings. Every pupil has expressed his opinion in such online tools, so the teacher can make use and encourage introversive individuals, as he has at his disposal the written comments of all pupils.
Contents	Pupils reproduce the given contents. Reproduction is the aim of the typical lesson.	Pupils search for data by themselves; they are challenged to test their validity, construct and give meaning to what they have read. There is no one solution to the problem; the window of knowledge is always kept half-open. Contents are the vehicles for reflection and metacognition.
Articulation	Pupils have to express given facts and knowledge, according to the school book.	Pupils express their own point of views, without fearing to be wrong. Emphasis is given to why they express an idea, how did they reach to a conclusion, how they feel about it and what were the criteria for their choices.

Table 1: A comparison of conventional and the blended-learning reflective classroom settings.

The most common answers pupils gave to the evaluation question at the end of lesson, was that they liked this kind of lesson because it involved computer and internet use. They characterized it as an enjoyable style to do lessons and asked when we are going to do something alike. GMF was a topic that activated them and agitated them, especially when arguments that advocate the use of such products were presented. On the other hand, we should point out some observations that concerned us:

1. Pupils' written contributions to the forums and "question and answer" activities lacked language wealth. They were simple sentences, with not enough arguments that supported their option, although their oral contributions were much more elaborate.
2. Most pupils entered the online environment at school, with the presence of the teacher, rather than do it at home. The reason for this, according to their sayings, was that they felt insecure about doing something wrong.

It seems that the passage from the closed conventional learning settings to a more open environment needs its time. Some pupils even didn't know what to do after completing an activity since they didn't read the instructions given. Self-paced learning has its own logic and requires activating certain skills such as reading instructions.

Conclusion.

The instructional model described in this paper was designed to help pupils come to an integrated understanding of the GMF controversy. The issue had the potential to activate pupils' reflective practices and make them think about issues that relate to their health and the environment in which they are going to act as citizens. By contemplating on their beliefs, juxtaposing statements and reconstructing their dispositions, they acquired the basic skills needed for creative citizens that live in a world that changes. Making sustainable choices necessitates the adoption of certain stances towards the self and the community and this cannot be attained through didactic or lecture practices. Children have to be immersed in learning practices that urges them to search for data, cross-examine their validity, contemplate on the impacts of their choices and take action. This leads to a transformation of the classroom from a place were taken for granted knowledge is transmitted into a place where everything is put in question. And this cannot be achieved inside the four walls of a classroom. Dilemmatic topics such as GMF offer all the preconditions to achieve such skills. The teacher must struggle not to give answers to pupils but leave them to construct their points of view and give meaning to their choices. Scaffolding questions such as "*why do you say that?*", "*How do you feel about this?*" and "*How did you reach that conclusion?*" can trigger their critical skills and keep them focused while supportive data should be given after they have stated their prior knowledge and predispositions. It is important to make the class discuss, juxtapose and respect other opinions. This could be achieved if pupils had time to contemplate and discuss with the community and their family. Learning Management Systems and open e-learning environments can broaden the classroom's settings and give space to such perspectives. Concerning, this small case study, we were given the impression that pupils activated themselves about GMF by involving their families. For at least three months, we were bombarded with questions and comments, which were derived from discussions with their parents, concerning advertisements and journals about GMF, as well as consumption practices.

Transformative and critical constructivist learning is a shift of consciousness that involves an understanding of a) one's self in the world; b) relationships with others and the natural world; c) the relations of power; d) alternative approaches to living and e) the possibilities for social justice, peace and personal joy (Kostoulas-Makrakis, 2011). A critical constructivist perspective of learning incorporates social negotiation, which recognizes that learners learn by challenging their thoughts, beliefs, perceptions and existing knowledge, through interacting with other learners and applying reflective practices in the classroom.

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ICT-enabled Climate Change Education for Sustainable Development across the School Curriculum

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Abstract

A radical shift in pedagogy is necessary for ICT to enhance teaching and learning for sustainability. Climate change takes an inter/cross-disciplinary approach attempting to synthesize diverse ideas and observations concerning global warming. This paper deals with the integration of climate change across the school curriculum through a web-based hypermedia application entitled: «ICT-enabled integration of climate change education" that is used as a resource for the EU-funded project ICT-enabled Education for Sustainable Development. The web-based environment includes interactive activities and supportive material on climate change and is open to all the six grades at the primary school level. The methodological approach used merges ICT, ESD, critical pedagogy and Climate Change Education principles and practices. Drupal (Content Management System) was chosen as the back-end system of our hypermedia learning environment. The main learning content is composed of Learning Objects (LOs) created through the authoring tool Adobe Flash. The combination of Drupal and Flash provides a dynamic and adaptable learning environment. Through this web-based learning environment that integrates six thematic areas supported by various ICT tools, learners are expected to gain insight into how climate change is altering the planet, potential impacts on the future, and how they can intervene to address its effects.

Key-words: Climate Change, Curriculum, Hypermedia Technology, ESD, Theme-based instruction, Education for Sustainable Development

Introduction

In recent years, humankind has faced a profound economic, social and ecological crisis that has its roots in the unsustainable ways people treated their environment for years. Sustainable development is generally perceived as an overlapping of four pillars (Figure 1), namely environment, society, culture and economy (UNESCO, 2008).
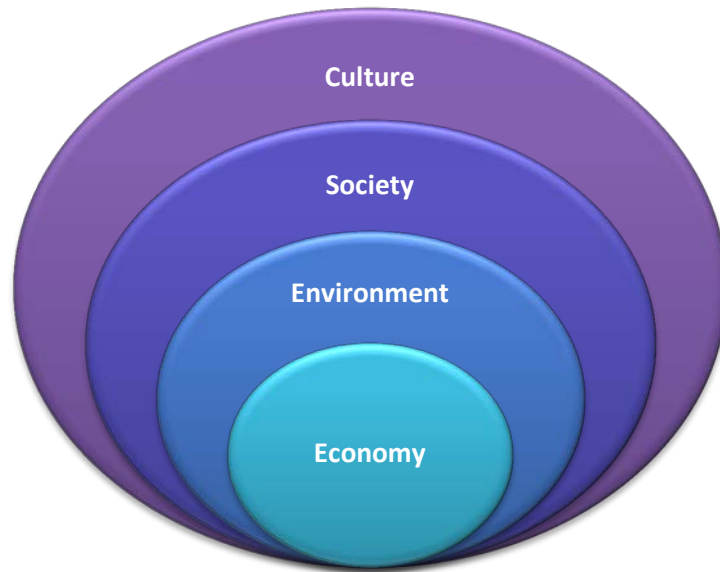
Figure 1: The four pillars of sustainable development.

Climate Change is currently at the centre of our day to day life, as its impacts and consequences are being experienced in all regions of the world. When we talk about climate change it refers to the alterations in the atmosphere that are over and above natural climate variation, and that are a result of human activity- . a situation that can be changed if human beings transform their ways of living to be more sustainable and friendly to the environment (Agostino, 2010). It is considered to be the most threatening global environmental problem of our time and has many repercussions not only in the environment, but also in economy, culture and society (UNESCO, 2010; 2002). It is important to state Article 6 of the United Nations Framework Convention on Climate Change deals with climate change education, training and public awareness. It has great importance for everybody, especially young people, working on climate change education, awareness raising and training. It also has great importance for organisations who want to see more young people being part of official government delegations as representatives of the youth in their countries (YOUNGO, 2011).

Although the effects are uncertain, climate change is thought to have implications for arenas including food and water supplies, energy production and use, ecosystem and species survival, human health, and social and political stability (Paterson, 1996). It is widely recognised that climate change is having a greater effect on vulnerable populations, groups and communities, this vulnerability being the result of different factors such as age, gender, geography, ethnicity, and income group (Agostino, 2010). Despite a large degree of scientific consensus that global warming is occurring, there is less agreement, however, about both the consequences of unchecked global warming and the consequences of strategies to mitigate the negative effects (Houghton et al, 1996). Climate change, in general, has generated considerable scientific and political controversy (Singer & Seitz, 1998). Despite controversy over the issue of global warming and climate change, largely evidenced through natural disasters, caused by anthropogenic activities -- such as burning fossil fuels and deforesting large portions of land, worldwide. Education systems everywhere will need to include a focus on the causes, consequences and solutions to climate change, if we aspire to changes in people's ways of thinking and living sustainably. Addressing the causes and the consequences of climate change requires a shifting paradigm in content and methodologies in order to build the necessary capacity for mitigation, adaptation, and transformation at the personal and societal level. In a study, while there was clear recognition that professional education for climate change adaptation was limited and urgently needed, it was strongly stated by the professional institutions and their members that it should be integrated with education about and for climate change mitigation, as they are complementary and of equal urgency. The study recommends that education about and for climate change adaptation in accredited courses be

addressed in an integrated way with education about and for climate change mitigation (Lyth, Nichols and Tilbury, 2007)

Recently, climate literacy has received widespread recognition among educators, researchers and education planners recognizing the importance of educating children to take positive action on social and environmental issues (Dupigny-Giroux, L-A. 2010; Shafer, James & Giuliano, 2009; Shafer, 2008; Stephens & Graham, 2008). The National Oceanic and Atmospheric Administration, in cooperation with AAAS and the National Science Foundation (NSF) in the U.S. A. defined a climate literate person as able to:

- understand the essential principles of all aspects of the Earth system governing climate patterns;
- know how to assess scientifically credible information about climate;
- communicate about climate change in meaningful ways; and
- make scientifically informed and responsible decisions regarding climate and the impact of personal unsustainable actions on climate change (NOAA, 2011).

A climate literate citizen, in other words, should understand the influence of climate on oneself and society and how on can produce positive changes for a sustainable environment. From a teaching and learning perspective, it involves the competences of inquiry-based and problem-based learning. In response to this, Climate Change Education (CCE) is becoming increasingly relevant and a growing number of schools are seeking to embed CCE for sustainable development principles in curriculum planning (Shepardson, et al., 2009; Johnson et al. 2008; Henderson, Steven & Holman, 1993).

The International Alliance of Leading Educational Institutions (2009) has issued 8 climate change education recommendation, namely:

1. Climate change makes sustainable development an urgent priority. Thus, policies which promote ESD should play a key part in the negotiation of global agreements on climate change policy.
2. Societies need to change radically consumption, production and behaviour patterns to meet the challenges we face.
3. ESD will make demands on all of society but schools will play a critical role, through what they teach and how they model sustainable practices.
4. Whole-school approaches are promising: societies need to re-orient schooling towards a stronger emphasis on interdisciplinary work, participation in authentic sustainability challenges and interaction with others outside school.
5. Universities should offer ESD courses for pre- and in-service teachers.
6. Resources and time for experimentation are provided and the sustainability is integrated into the curriculum.
7. Interaction between researchers, teachers, NGOs, public officers and others in the field of ESD is essential. Regional Centres of Expertise on Education for Sustainable Development, which already exist at some places, may serve as models for this endeavour.
8. ESD research needs to be augmented. It should be focused on (1) documenting the state of practice and identifying promising practices, (2) exploring educational outcomes and their evaluation in respect of ESD, (3) identifying and explaining opportunities and problems of general relevance.

In this paper we present an example of a Web-based application entitled "Climate change and me" that is one of the six thematic areas of a broader web-based learning environment dealing with climate change education across the Greek primary school curriculum. This work has been integrated as a resource in the development of one of the courses in the M.Sc. programme of the ICT-enabled ESD project.

Theoretical Background

The learning paradigm

The activities developed in this application are based on the principle of ExConTra learning paradigm (Makrakis & Kostoulas-Makrakis, 2012). As depicted in Figure 2, this model is based on

three theoretical approaches to learning: experiential learning, constructivist learning and transformative learning.

Figure 2: The ExConTra learning paradigm.

Beginning with experiencing, learners identify a realistic and authentic task associated with a sustainable development issue, such as climate change and start collecting the information needed for their analyses, using various inquiry-based methods. Reducing the production of greenhouse gasses and in preparing societies for adaptability to risk and physical environmental change, climate change education needs to be experienced-based and practice-centred. Learning-centred actions for changing unsustainable practices are needed (e.g. learning to implement energy saving measures), so that learners can experience and reflexively review their values and practices in climate change solutions. Through reflecting, self and/or social, as well as through further reading and observing, learners organize and examine the collected data for the new experience from multiple perspectives in order to find meaning. For learners to make meaning, either individually and/or shared, they need to reflect on their own experiences, leading them to develop more abstract understandings of their experiences (conceptualizing). Arriving at individual and shared meaning (constructing), learners need to get involved in a shared inquiry enriched through continuous reflection, re-conceptualization and active experimentation. In this sense, learning is an active and contextualized process of constructing meaningful knowledge based on ones own experiences, rather than acquiring it from someone else. Constructed knowledge and meaning is meaningful when it opens up opportunities for action. Merging knowledge and meaning with action (acting) implies a change agency and active citizenship. Acting as change agents, learners are empowered to transforming experience through critical reflection and active experimentation. When critical reflection is transformed into an action it becomes praxis that turns learners able to transform oneself and society (transforming).

Central to the climate change processes of mitigation, adaptation and transformation are new values, creative thinking and problem solving skills. These skills require learners to engage in critical analysis of causes and consequences, and construct knowledge that may lead to action. This requires teachers involved in climate change education to integrate into their teaching and learning methodologies experiential, constructivist and transformative learning principles and values. Teachers need to shift from functioning as the sole source of information to becoming co-learners and facilitators using multiple sources of information and provide support and motivation in helping learners in the process of self-directed learning. Similarly, students' roles also need to change from passive recipients of climate change information to active learners who search,

collect, analyze and interpret climate change data and collectively build up knowledge through inquiry and reflection.

The curriculum paradigm

Simply introducing new content about climate change, its causes, consequences and solutions will not be an adequate response to climate change education. A horizontal approach instead of a vertical is needed for curriculum planning. Such an approach to climate change curriculum planning describes how knowledge and skills related to climate change are clustered around areas or sub-themes (Makrakis, 2012). It is assumed that the integrated horizontal approach: 1) cross-fertilises knowledge within and between school subjects and encourages a holistic view of climate change issues; 2) enables students to situate their learning in meaningful contexts; 3) encourages the development of higher-level thinking skills and the exploration of inter/cross-disciplinary questions and issues; and 4) promotes team teaching and collaboration among teachers of different school subjects and collaborative learning among students. Thematic instruction can thus be a critical tool for reintegrating the curriculum and eliminating the reductionist nature of well-structured problems that have convergent solutions in contrast of ill-structured problems that favour divergent modes of thinking. Ill-structured problems are more suitable to thematic instruction and as pointed by Jonassen (1997) learning from ill-structured problems, students engage in a reflective conversation in a dialectical way. They are required to conceptualise the problem, recognize the divergent perspectives and multiple representations of the problem, determine what information and skills are needed to solve the problem, and synthesize their understanding of the problem. In doing this, Jonassen says that they have to: (a) articulate the problem space and contextual constraints, (b) identify and clarify alternative opinions, positions, and perspectives of stakeholders, (c) generate possible solutions, (d) assess the viability of alternative solutions by constructing arguments and articulating personal beliefs, (e) monitor the problem space and solution options, (f) implement and monitor the solution, and (g) adapt the solution.

Cunningham and Billingsley (2003) identified a list of criteria that we think can be used to enable a thematic approach to climate change education curriculum. These criteria include:

- Plan authentic activities – Select activities that are similar to activities that students might encounter in life outside of school.
- Promote self-directed learners – Design activities that encourage learners to manage their own learning by allowing them to make choices about their use of time, topics or subject matter, and possibly criteria for successful learning.
- Go beyond one subject area – Create activities that encourage the exploration of cross disciplinary questions and issues.
- Use multiple approaches – Plan a diverse range of activities and allow students to choose what kind of activity they believe will work best for them.
- Go beyond retelling – Include activities that require the use of higher-level thinking skills such as compilation, solving a mystery, designing a product or plan, building consensus, persuading, seeking self-knowledge, or making judgments.
- Keep it simple – Both teachers and students find simpler curriculum designs easier to use.
- Borrow activity ideas from others – Take advantage of the wonderful educational resources that are available on the web and don't feel like you have to create the materials for every technology-based learning activity yourself.
- Touch imagination – Give students opportunities to use their imaginations for wonder, creativity, or self-expression.
- Build to promote intentionality – Student learning activities should be designed and conducted with clear purposes that will help to achieve learning goals.
- Engage the learner – Design interesting activities that require learner participation and that will challenge the learner's current skills, knowledge, and attitudes.
- Build on controversy – Build learning activities around controversial issues and offer students opportunities for accessing and comparing different views on these topics.

- Use characteristics of the web – Make use of web elements such as hypertext, multimedia, communication tools, and interactivity.
- Build activities around current events – Design activities that include opportunities to learn about current events.
- Use non-web materials, events, and locations – Use the Internet for some things, but not for everything.
- Facilitate spontaneity and discovery – Strive to find the proper balance between teacher control and student freedom.
- Plan for open-ended inquiry – Let students make choices within a set of educationally sound boundaries.

All these criteria point to the notion of a recursive curriculum that finds its foundations in ExConTra learning theories. The rationale for teaching climate change thematically addresses situated–learning within a context that is more meaningful to learners than traditional or linear approaches to instruction. Meaningful learning requires knowledge to be constructed by the learner, not transmitted from the teacher to the student (Jonassen, et al., 1998). The teaching of climate change thematically is aligned to the realm of ExConTra learning because the content is embedded in sub-themes that serve as learning contexts for experiencing, constructing and transforming knowledge with action for change. The following description introduces the function of this Web-based learning platform for each stage of thematic learning (Figure 3).

Figure 3: Steps in designing a theme-based instruction.

Choosing a theme– This stage involves the choice of a large theme related to a compelling real-life issue, such as climate change which has meaningful connections in the broader framework of human experience that may connect family, school, and community. In a recent study, it has found that web-based thematic learning: 1) has positive effects on learners' concept learning; 2) provides learners with a framework from which develop the related concepts, in a more stable learning mode; 3) is suitable for students with different abilities (Liu & Wang, 2010).

Planning the integrated curriculum– In this stage sub-themes, in the form of thematic areas, such as "climate change and me" are planned to integrate concepts, skills and strategies that give meaning and direction to the whole learning process of climate change. The teachers involved organize the climate change core curriculum (both process skills and content knowledge) and sub-themes in an open and flexible way to assure student involvement at a later stage. Inter/cross disciplinary approaches are adopted in planning the integrated curriculum giving more emphasis in the processes involved rather than the outcomes. In web-based settings, particular emphasis is

given to a variety of interaction choices for participants: teacher-to-student, student-to-student, and student-to-resources and content. Additionally, a well-planned curriculum balances three types of activities: individual activities, small group activities, and large group activities. By ensuring multiple channels of communication, engagement, and collaboration within the design of a curriculum, providing a richly textured environment that can accommodate a full range of student needs and learning styles is of critical importance (Boettcher, 2007).

Designing learning and instruction– In a web-based learning environment the learner interacts with the content, teacher, and technology. This stage involves first the design of learning activities enabled by ICTs. Through designing learning activities suitable in web-based learning environments, and driven by the ExConTra learning, the content becomes the means to an end and not an end in itself. In designing thematic learning and instruction, one approach that is consistent with the ExConTra learning principles is that a group of teachers can brainstorm learning activities using existing curriculum materials and be drawing directly from end-users' (teachers and students) ideas, interests, and experiences during the formative evaluation process. In this process involving community experts and other members could add value to designing meaningful and engaging learning activities. Strategies that ensure the reusability, adaptability, and generalisability of teaching and learning materials should be planned.

Implementing the integrated curriculum: As pointed earlier, one of the most effective strategies for an integrated theme-based curriculum approach is to teach the subject climate change in conjunction with other subjects. This allows students to make connections between different areas as they explore a topic in detail and from a variety of approaches. Cross-curriculum projects allow students to see how knowledge and skills are connected in the various school subjects and how knowledge constructed and skills acquired can be transferred to other situations and real-life contexts. This step involves project-based learning as a model for implementing thematic learning activities. It is a shift away from the traditional classroom practices of short, isolated, teacher-centered lessons. Instead, it emphasizes learning activities that are long-term, interdisciplinary, student centered, and integrated with real-world issues and practices in which students plan, implement, and evaluate projects that have real-world applications beyond the classroom. ICTs should be involved in such a curriculum in two ways. First, technology can be used to support the instructional process, and, second, it should be a significant part of the content of the curriculum. The theme should provide a context for learning with ICTs and vice versa. Various ICT tools and Venn diagrams, like concept maps and semantic webs, help show the connection between related concepts and help learners explore meaningful learning experiences. Implementing the integrated curriculum in web-based learning settings with different tools and resources for retrieving content, using the online tools and facilitate interactions among teachers and students as well as other stakeholders, requires new instructional practices, such as peer tutoring, collaborative learning.

Assessing the impact of the integrated curriculum: In this stage, the information collected from evaluating a curriculum forms the basis for making judgements about how successfully has the programme achieved its intended outcomes and the worth or value of the programme. This process can be integrated into three interlinked assessment levels: 1) diagnostic; 2) formative and 3) summative. The term *diagnostic* refers to a process at the initial phase; *formative* refers to a process while developing the curriculum so that revisions to it can be made and *summative* refers to a process at the end/after the curriculum programme is implemented. A critical concept applied to these processes is authentic assessment that is driven by ExConTra learning foundations. Authentic assessment to be incorporated in assessing the impact of the integrated curriculum include an amalgamation of tools and strategies that derive from ExConTra learning but also from objectivist learning theories if such tools contribute to the ExConTra learning principles. Among the most used tools include: multiple choice tests with extended responses to help students become aware of their own thinking processes; observation; checklists; portfolios; concept mapping and Venn diagrams; scenario building; reflection and reflexivity; journalising; simulation; case-study analysis. All the three levels of assessment are interlinked and in a way they provide a holistic framework for assessment. However, we consider formative assessment as the most critical process as it provides effective feedback and gives the opportunity for learners' and other stakeholders' active participation in the design and development of the integrated curriculum.

Within this process, the use of concept maps and other structural knowledge representation techniques are very effective tools (Trumpowe & Shahzad Sarwar, 2010; Aberg, 2004). The process of formative assessment should: 1) enable students to self-monitoring progress; give regular feedback to students; support peer learning and assessment; and design self-assessment practice (Liang & Kim, 2004). Visualization tools such as conceptual maps help students to process the abstract concepts or mental images that they depict and the more they work designing materials, the more they construct their own meaningful realities based to new knowledge (Jonassen, et al., 1998; Jonassen & Reeves, 1996).

A well planned programme of climate change education across and within the curriculum will provide pupils with opportunities to address the causes (mitigation) and the consequences (adaptation) of climate change by adopting a transformative learning approach. As the causes of climate change are basically anthropogenic, causes and consequences need to be identified and changed. Locally relevant solutions and adaptation practices are also needed, alongside efforts to share and transfer knowledge, social strategies, economic models and technologies that provide new solutions across the world. Practically, this necessitates learning processes and methods that turn learners of all ages able to reduce energy consumption, use renewable forms of energy, and change consumption patterns. At a societal and cultural level, this means changes in social, cultural and economy structures that are part of the problem. There is need of a new paradigm in teaching and learning as well as in curriculum that will transform unsustainable values and practices that dominated the 20th century. Climate change education requires people everywhere to understand and respond to the nature, causes and consequences of climate change. This requires Climate Change Education for Sustainable Development (see www.UNESCO.org/desd) programmes that attend to:

- clear distinctions between **different scientific concepts and processes** associated with climate change;
- knowledge of, and abilities to distinguish between, **certainties, uncertainties, projections and risks** associated with climate change;
- knowledge of the **history and interrelated causes** of climate change (which include *technical, scientific, ecological* and *social* dimensions; *economic* dimensions; and *political* dimensions);
- knowledge of **mitigation and adaptation** practices that can contribute to wider social transformation towards sustainability, including abilities to participate in such practices;
- knowledge of **consequences** and what is being learned about mitigation and adaptation to climate change;
- good understanding of **the time-space dynamics** of climate change, including the delayed consequences that current greenhouse gas emissions hold in store for the quality of life, security and development options of future generations;
- understanding of **different interests** that shape different responses to climate change (e.g. business interests, consumer interests, farmers' interests, political interests, future generations' interests, etc.) and abilities to critically judge the validity of these interests in relation to the public good; and
- critical **media literacy** to address the causes of over-consumption and develop capacity to make better lifestyle choices and to participate in climate change solutions.

ICTs as enabling tools for climate change education

The link between ICTs and sustainable development is being addressed by extensive debates and research which recognize the challenge new technologies bring to the reorientation of education towards learning to live sustainably (Makrakis, 2006; Makrakis, 2010a; Makrakis, 2010b; Makrakis, 2010c; Makrakis, 2011). ICT- enabled CCE for sustainable development may help children to understand better climate change and motivate them to get engaged in actions to prevent climate change. ICTs are interlinked with climate change in various ways. They are most obviously used for data analysis and prediction, access to relevant information, and raising

awareness at the grassroots level. ICTs can also facilitate learning and practical knowledge, while empowering the poor and marginalised to raise their voice for their rights. Many educators believe in the immense potential of ICTs as enabling learning tools. However, to realize the potential of ICTs and GEO-spatial technologies as enabling tools for teaching and learning in general and in particular concerning climate change, we have to reconsider what we teach as well as how we teach, but most of all it is necessary to revise our understanding of how people learn. GIS are set of technologies which allow users to view, understand, question, interpret, and visualize spatial data in many ways that reveal relationships, patterns, and trends in various form. It helps enhance spatial reasoning and support problem solving in the classroom. In addition, the proper implementation of GIS instruction may promote climate change literacy and inter/cross disciplinary learning in the classroom. In general, GIS offers a powerful decision-making toolkit that helps students understand content in a variety of disciplines, such as geography, mathematics, social studies, history, language arts, environmental studies, chemistry, biology, civics. The Internet also offers many outstanding resources on climate change that can be assessed and used to support climate change education in the classroom.

In developing the web-based learning for climate change education, Drupal was chosen as the back-end system of our hypermedia learning environment. Drupal is a free open source CMS (Content Management System) written in PHP (Hypertext PreProcessor) and distributed under the GNU General Public License. Some key advantages offered by CMS solutions are low development time along with high reliability and wide variety of useful tools for educators such forums, wikis, blogs, quizzes, polls, sweepstakes and many other robust social networking modules. The main learning content is composed of Learning Objects (LOs). Learning objects are digital pieces of learning content that may comprise text, images, hyperlinks and also audio, video clip or animation as well as web pages. Learning objects can be produced, re-used, modified taking into consideration of copyrights (Wiley, 2000; 2011). Each LO is constructed from various media assets, such as text, video, animation, charts and sound narration all gathered under a simple graphic user interface (Schreurs et al, 2009). The authoring tool that was used to create and modify LOs used and reused in our web-based learning environment is Adobe Flash. The combination of Drupal and Flash provides a dynamic and adaptable learning environment. Moreover, the learning environment is enriched through the integration of various ICT tools, such as concept maps (Text2Mindmap), spreadsheets (Zoho Sheet), presentations, paint tools (Pixlr), word processing (Zoho Writer) and a modern Greek online dictionary. Any supplementary material needed include relative web pages, web articles, case studies, videos, animations, general ideas or advises and help for teachers and students. There is also a glossary including difficult terms. Students search the web and create their own material engaging with the suggested activities and save it through an electronic portfolio. They can also create pages, comments, blogs and forums, send emails and be directly connected with social networks.

Structuring the learning content across the curriculum

As pointed earlier, the "Climate Change and Me" is one of the six key areas of the web-based learning environment targeted to primary school curriculum from grades 1 to 6 (Figure 4).
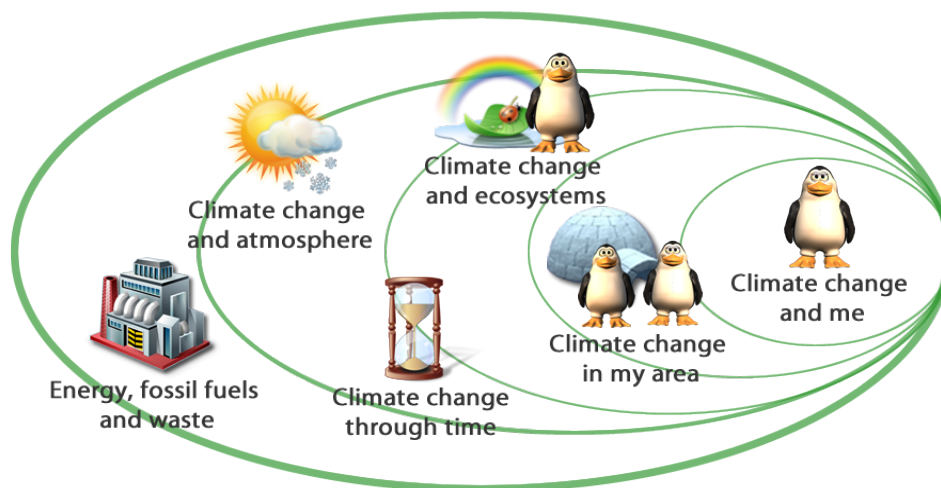
Figure 4: The curriculum areas of the ICT-enabled Climate Change Education.

In the area "Climate change and me" children investigate about what climate change has to do with them (their school, family, nutrition, health, etc.) and what they can do in their everyday life (in school, home, neighbourhood, local area) to face climate change using the media, the internet, arts and sports. Then, children can move to the area "Climate change in my area" and investigate how climate change can affect their local society and economy, the employment, the transportation etc. The next area "Climate change and ecosystems" gives children the opportunity to explore their local and national ecosystem and the repercussions climate change brings upon it. In the next area "Climate change and atmosphere", children learn about the physics of the phenomenon of climate change in the atmosphere. The following area "Climate change through time" gives children the opportunity to learn about climate change in the past, in the present and in the future. They study scenarios and prepare themselves for the future, having the knowledge from the past. Finally, in the area "Energy, fossil fuels and waste", children investigate about what climate change has to do with energy, fossil fuels and waste. They search for ways to make a sustainable future, using renewable sources of energy and new ways to handle waste. Students can choose any of these units to start with and engage to its activities. In these units, children deal with what climate change brings upon them and their local environment and how children can act in order to protect their environment. Alongside the activities conducted in the classroom, many activities outside the classroom are suggested, referring gradually from the local to national and global level (Figure 5).

The learning activities are written with the developmental needs of the learners in mind, recognizing that adaptations will be necessary depending on their characteristics and circumstances. This curriculum is intended to be flexible, allowing the teacher to select some or all of the activities in order to develop together with his/her learners their own learning activities. We also tried to develop learning contents in the form of units that are not dependent on previous units. Thus the units and activities may be implemented either sequentially and/or according to the existing curriculum organization of content and needs.

Curriculum areas	Language	Mathematics	Environmental studies	History	Religion	Geography	Arts	Health Education	Physical education	Citizen's education	Sciences
Climate change and Me	✓	✓	✓		✓		✓	✓	✓	✓	Biology
Climate change in nature	✓	✓	✓	✓	✓	✓	✓			✓	
Climate change and ecosystems	✓	✓	✓	✓	✓	✓	✓				Biology, Metereology, Evolution
Climate change through time	✓	✓	✓	✓	✓	✓	✓				Geology, biology, Metereology, Evolution
Climate change and atmosphere	✓	✓	✓					✓	✓		Physics, Chemistry, Metereology
Energy, fossil fuels	✓	✓	✓					✓	✓		✓	Physics, Chemistry

Figure 5: The cross-disciplinary structure of the ICT-enabled climate change education curriculum.

The structure of the area "Climate change and Me" as in any of the rest areas is based on three levels: 1st-2nd Grade (6-7 year olds), 3rd-4th Grades (8-9 year olds) and 5th-6th Grades (10-11 year olds).

1st-2nd Grade Level Units
1. *Me, the child:* Students discover how climate change can affect children all over the world through a case study and a video. Then, they take action to help children that are affected by climate change either by establishing collaboration with relevant organizations or by acting appropriately in their ordinary lives.
2. *My house and my school:* Children investigate which daily behaviors either in their school or in their house connect with and deteriorate climate change. Then, they act in order to make their school and their house friendly towards environment.
3. *Our nutrition:* Children discover how climate change can affect the quality and quantity of food. They also learn what they should eat according to a healthy diet and which food choices can affect climate change. In the end, they act in order to help children that are hungry because of climate change's repercussions in agriculture.
4. *Sports and health:* Children learn that a healthy organism in good physical shape is more prepared for climate change consequences in health and nutrition. Then, they organize athletic events to promote their fight against climate change.

3rd-4th Grade Level Units
1. *Media, internet and climate change:* Children find out how climate change is presented in the media and the internet. Then, they gather and evaluate information about climate change in the media and the internet. They also learn about the hazards of the use of the internet. In the end, they use the media and the internet in order to promote their actions relating their fight against climate change.
2. *Climate change and arts:* Children learn new ways to express themselves and send messages about climate change through arts. They use recycling materials to create art. Children also post and promote their art in electronic galleries. In the end, they attempt to create a new art wave to move people about climate change.
3. *How to help each other:* Children take action in order to help other children in their country or in other countries fight starvation and poverty. They also create and organize a social group of people that will help one another according to their abilities.

4. *Consumerism and climate change:* Children realize how they decide to buy goods. Then, they learn about fait trade and how to reinforce the local market and the local goods in order to fight climate change. In the end, they seek ways to resist consumerism.

5th-6th Grade Level Units
1. *Social impact of climate change:* Children discover about the social consequences of climate change, such as the lack of food and water, the need to emigrate and the deterioration of human health. Then, they make a relevant presentation for smaller children and generally motivate others to engage in actions against the social consequences of climate change.
2. *Politics, economy and climate change:* Children find out the role of politics and economy in the climate change issue. They learn about the economic repercussions of climate change in their country and abroad. They also discover how politicians make decisions according their economic interest. Then, they investigate how climate change is related to the world financial crisis. In the end, they try to act organizing a school conference where children take decisions about climate change in the future.
3. *Disease and climate change:* Children learn about the diseases that climate change can bring upon humans through articles and case studies. Then, they study how health security systems will be affected in poor and rich countries. In the end, they seek measures to alleviate people affected and ways to inform others about climate change and disease.
4. *Family, emigration and climate change:* Children explore how climate change can make people emigrate. They learn about environmental emigration and environmental refugees. They also seek ways to help emigrants who moved because of climate change.
5. *Climate change caused by human activity:* Children investigate if and how human activity contribute in global warming and cause climate change, studying diagrams, relative articles and interviews by scientists. They also evaluate the opposite view (that climate change is not caused by human activity) and debate about it.

Concluding Remarks

Climate change as pointed is a global issue. Addressing it is a shared responsibility. Yet it is increasingly apparent that failure to act will render the environments of millions of people and their families at a high risk. This paper deals with the integration of climate change in school curriculum through a web-based inter/cross disciplinary hypermedia application entitled: ICT-enabled Climate change Education. In particular, this paper explores the "Climate Change and Me" which is one of the six areas of this application. The web-based environment developed includes interactive activities and supportive material regarding to information, changing attitudes and actions on climate change and is open to all primary school grades. The methodological approach used is based on ExConTra learning paradigm that integrates critical pedagogy, critical constructivism, ESD and hypermedia technology. The activities are based on authentic learning situations, experiences and problems that may be encountered by students in their daily life, about what may happen to them and their family due to climate change and what they can do to change it. The main tools used in the activities are conceptual maps, text editors, spreadsheets, painting tools, discussion forum etc.. Children are engaged in real-life problems, studying stories, case studies, websites, articles or videos and developing activities using various tools and digital learning objects. A critical driver behind this web-based learning environment for climate change education is the availability of open, flexible, e-learning opportunities and affordable ICTs that enable time- and place-independent learning. By providing opportunities for enabling climate change education through ICTs in which learners are allowed and expected to develop their knowledge and understanding, the shift to transformative learning seems to become easier. To conclude, ICTs are used in this web-based environment as cognitive tools and opens students opportunities to merge theory with praxis.

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Acknowledgement:

ICT-enabled Climate Change Education and Children's Rights

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Abstract

This paper deals with a web-based learning environment that introduces primary school learners on the issue of "Children's Rights and Climate Change Education. The methodological approach used is based on critical pedagogy and hypermedia technology. Through open source learning technologies and authentic learning activities that are enriched by open education resources and learning objects largely elicited from the Web, learners are being informed and construct knowledge related to six key areas of children's rights affected by climate change.

Key-words: Children's rights, Climate Change Education, ICT, Education for Sustainable Development

Introduction

There is widespread consensus among researchers that climate change is taking place bringing a number of risks and irreversible impacts on people and nature. Children and adolescents and especially girls are among the most vulnerable social groups of any community, especially in less economic developed countries who will disproportionately suffer the negative effects of climate change (Hodge, 2010). Women are particularly affected because they are the largest percentage of the poor population (it is estimated that women account for 70% of poor people) and they also face gender inequalities, which climate change tends to exacerbate, as highlighted by the 2007/2008 UNDP Human Development Report. Some of these inequalities are: lack of access to resources such as land, credit and training; limited participation in decision making processes; more dependence on natural resources, and; greater caring responsibilities (Agostino, 2010). In general, those most prone to suffer the effects of climate-related hazards are often marginalised geographically (e.g. live in hazardous places such as informal settlements or in remote locations), socially (e.g. lack social protection and health services), economically (e.g. low-income people or resource dependent populations) and politically (e.g. people not giving them a voice and thus excluded from political and decision-making processes) (Gaillard, 2010). This resulted to 54 articles and two optional protocols of the Convention on the Rights of the Child that is the first legally binding international instrument to incorporate the full range of human rights (UNICEF, 2012). It includes: the right to survival; to develop to the fullest; to protection from harmful influences, abuse and exploitation; and to participate fully in family, cultural and social life. UNICEF-IRC (2008), Back & Cameron (2008) and Stone & Lofts (2009) focus on the articles of the Convention of Rights of Children (CRC) that are relevant to child's rights affected by climate change. These are divided by UNICEF-IRC (2008) into 4 categories: 1) child survival and child health; 2) education and equality; 3) emergencies and child protection and 4) empowering children to act. All these issues are seen as closely related to climate change. Child survival and child health are connected with article 6 of the CRC (children's right to live and governmental safeguard of survival and healthy development) and article 24 (children's right to good quality health care, to safe drinking water, nutritious food, a clean and safe environment, information to help them to maintain their health and provision for help from rich countries to poor towards the achievement of the above rights).

By agreeing to undertake the obligations of the Convention, national governments have committed themselves to protecting and ensuring children's rights. In an effort to increase the scale and

effectiveness of EU action, the European Commission came forward with a cross-cutting document including internal and external policies on children's rights (Ruxton, 2005). In its Communication, it outlined seven specific objectives (E.U, 2006):

- Capitalising on existing activities while addressing urgent needs;
- Identifying priorities for future EU action;
- Mainstreaming children's rights in EU actions;
- Establishing efficient coordination and consultation mechanisms;
- Enhancing capacity and expertise on children's rights;
- Designing a communication strategy on children's rights;
- Promoting the rights of the child in external relations.

Through these short and long-term measures, the Commission hopes to promote universal children's rights worldwide, building on its tradition of legal and political commitments with regard to human rights in general and children's rights in particular.

The potential impact on children has been a critical missing element from the debate about climate change, despite the fact that there are several studies showing that the climate change impact on children is of critical importance. UNICEF (2009) identifies several reasons that make children particularly vulnerable to the impact of climate change. These include:

- the high risk of exposure to environmental hazards due to their stage of psychological and cognitive development;
- the fact that vector-borne diseases and under-nutrition (which are the main reasons of child mortality) are highly sensitive to climatic conditions;
- the fact that world's least developed countries, which have the largest proportion of child population and poor means to face extreme climatic events, will be mostly affected by climate change;
- climate change's intersection with social, economic and political strains, which result in children's "psychosocial trauma, recruitment into armed forces, displacement and forced migration, which may in turn lead to family separation and exposure to trafficking and exploitation.

UNESCO (2009) has stressed the need to review and re-orientate the present educational and teaching and learning programs in order to address the causes and consequences of climate change. Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) calls on countries to promote and facilitate education and public awareness of climate change. The International Alliance of Leading Education Institutes (IALEI) (2009) attempted to define Climate Change Education (CCE) pointing to two different positions regarding CCE. The one regards CCE as a natural sciences issue, whereas the other sees climate change as an integral part of sustainable development, defined as: a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and preserving natural resources and ecosystems, on which we and future generations depend (GDRC, 2009). Plantilla (2006) refers to the United Nations Development Program (UNDC) classification of groups of human rights which are most frequently encountered in sustainable human development activities (figure 1). Hence, these rights and issues could be deemed as closely related to Education for Sustainable Development (ESD) and to CCE respectively. These issues include:

1. food and health
2. land, language and culture
3. environment
4. labor and the workplace
5. children's welfare
6. education
7. women
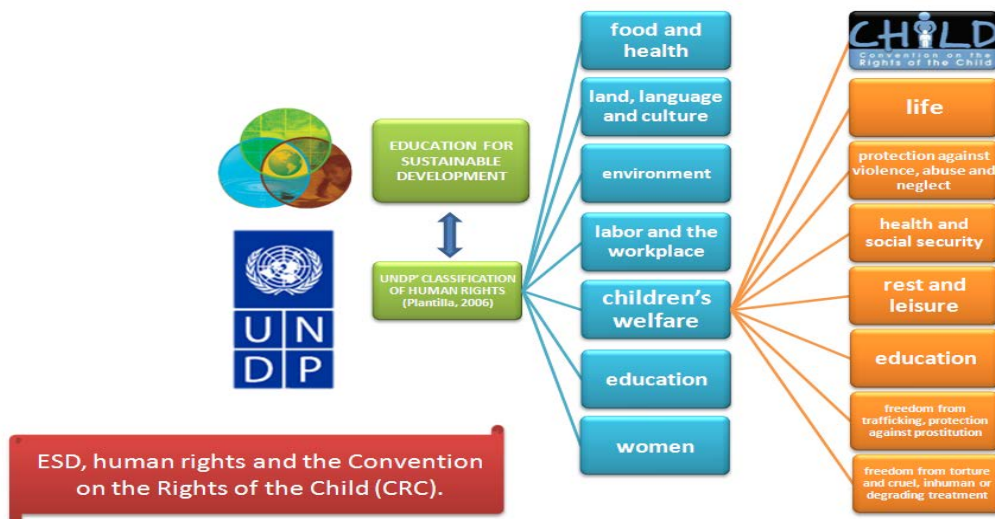
Figure 1: ESD, human rights and the Convention on the Rights of the Child (CRC).

Climate Change Education is also closely related to another United Nations (UN) initiative, the Millennium Development Goals (MDGs). Concerns are raised that climate change threatens the progress made toward meeting the Millennium Development Goals (MDGs). Therefore, investing in quality education to combat climate change is seen as an essential tool in achieving the MDGs. Figure 2 attempts to illustrate UNICEF's (2003) connection between MDGs and the priority areas of action of the "A World Fit for Children" agenda. Todaro & Smith (2009) argue that the MDGs allocate specific responsibilities to the rich countries in an attempt to reduce the gap between them and the developing countries. At this point it would be interesting to mention Sax's (2008) view that "basically all eight MDGs are more or less directly linked to the situation of children"(p.1).
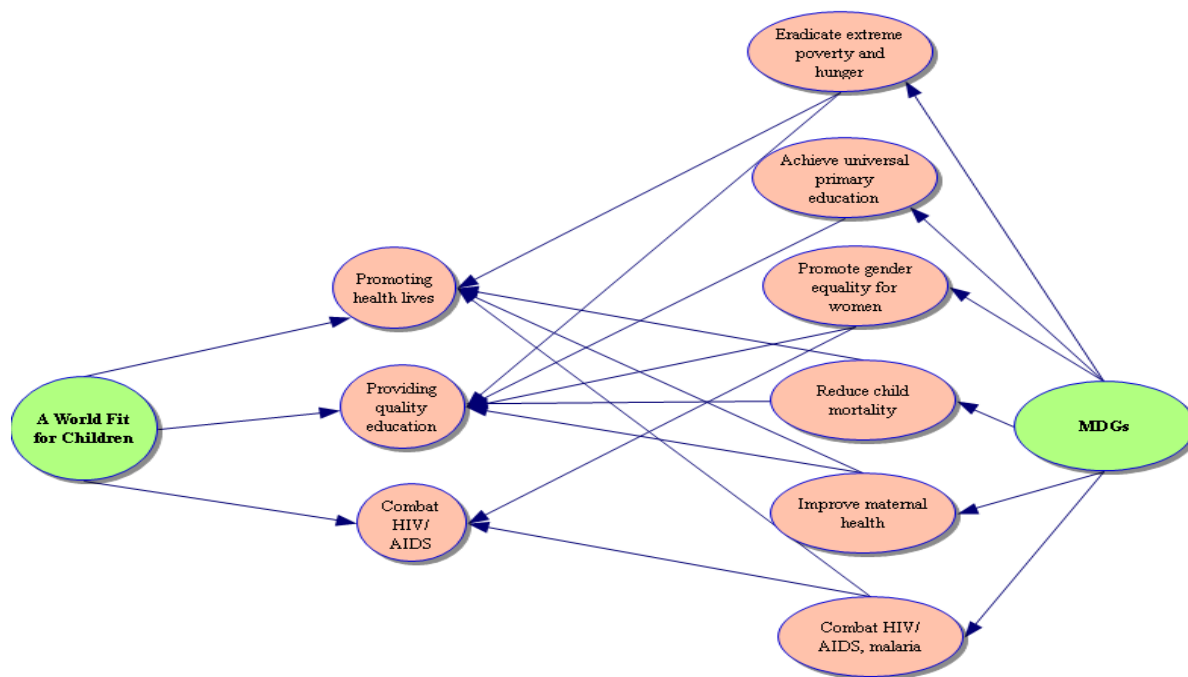
Figure 2: MDGs and "A World Fit for Children".

It can be argued that a child rights-based approach (figure 3) to the integration of climate change into the school curriculum is of high importance. In such a context, CCE programs should not only make children aware of the present environmental situation and its effect on their rights but also actively involve them in child-centered as well as child-led activities (Arts, 2009). The implementation of such an approach could in its turn make children "potentially effective agents of change within communities to foster an appropriate approach to address climate change" (Tanner et al, 2009, p.5). As Putnam (2009) argues climate change is not just an environmental problem, but it is more a human rights issue.
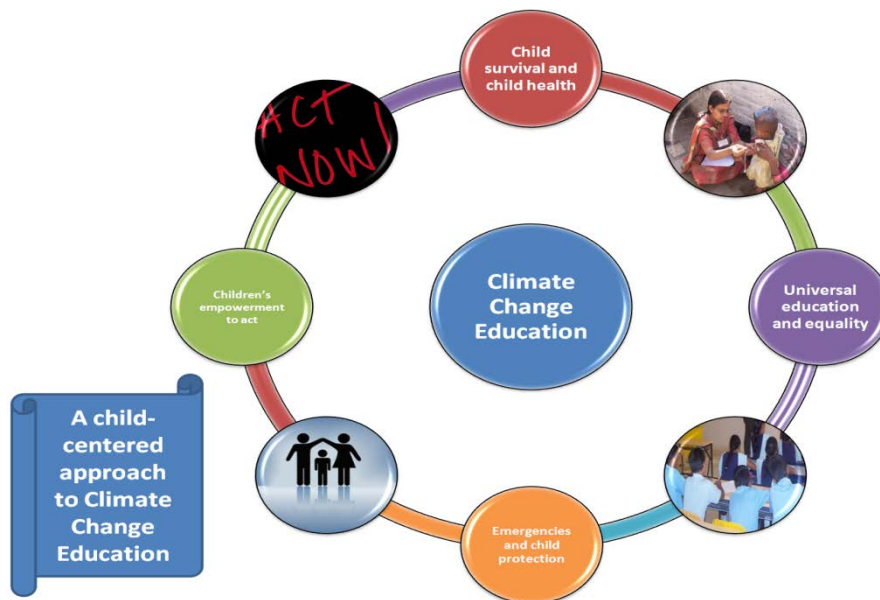
Figure 3: A child-centered approach to CCE.

ICTs as enabling tools for climate change and children's rights

The increasing diffusion of ICTs, from interactive Web portals, Web 2 applications, educational TV, social media, text messages (SMS), community radio, mobile phone-based monitoring systems, GIS, among others, are offering new mechanisms for advocacy, empowerment, and capacity building in tackling issues related to climate change. Emergent experiences, particularly from developing countries, suggest the potential of ICTs in face of the challenges posed by pervasive poverty, environmental degradation and climate change impacts (Ospina. 2012). In a review of the existing literature on ICTs, climate change and development Ospina and Heeks (2010) indicate that the potential of digital technology has not yet been integrated into a systematic understanding of adaptation and resilience, let alone from the perspective of a conceptual framework. However, for ICTs to serve their potential for learning to transform oneself and society there is need to view ICTs both as context to climate change education and the latter as context for integrating ICTs in the teaching and learning process. The recognition of ICTs has been also extended in the Rio+20 World Summit. More specifically, the role of ICTs is explicitly mentioned in regards to **five key areas of action** towards the achievement of sustainable development (Ospina, 2012):

    a) **ICTs and Multi-stakeholder Engagement**
- Article 44 of the outcome document that recognises the role of ICTs facilitating the flow of information between governments and the public, **enabling public engagement** in sustainable development. The document calls for governments to "*work toward improved **access to ICT**, especially broad-band network and*

services, *and bridge the digital divide, recognizing the contribution of international cooperation in this regard*".

  b) **ICTs, Knowledge Exchange and Capacity Building**
   - Article 65 of the outcome document acknowledges the potential of ICTs to promote **knowledge exchange**, technical cooperation and **capacity building** for sustainable development. The article emphasizes the role of these tools in fostering experiences and knowledge sharing in different areas of sustainable development in an "*open and transparent manner*".

  c) **ICTs, Food Security and Sustainable Agriculture**
   - With the aim of improving agricultural productivity and sustainability, Article 114 of the outcome document calls for government action to improve access to "*information, technical knowledge and know-how, including through new ICTs that empower farmers, fishers and foresters to choose among diverse methods of achieving sustainable agricultural production*".

  d) **ICTs and Energy Efficiency**
   - Article 128 of the outcome document recognizes the need to improve energy efficiency and the role of **energy-efficient technologies** in addressing sustainable development and climate change goals, including energy efficiency measures in urban planning, buildings, and transportation, and in the production of goods and services. These constitute areas in which ICTs have proven potential to reduce emissions through '*smart*' applications (e.g. smart motor systems, smart logistics, smart buildings and smart grids).

  e) **ICTs and Youth Education**
   - Recognising the importance of **youth education** and of ensuring that education systems provide the tools to pursue sustainable development, Article 230 of the outcome document calls for a more effective use of ICTs to **enhance learning outcomes**.

ICTs can provide opportunities for learners to construct meaningful learning environments which can be applied to ESD such as: a) engaging and challenging learners; b) stimulating dialogue and social negotiation through new modes of social interaction; c) learning by exploring and discovering, d) doing and reflecting; e) constructing personal and collective representations of meaning; and f) supporting discourse in dealing with real-life problems (Makrakis, 2011). More specifically, ICTs play an important role in advancing CCE and ESD in three ways: a) by increasing access to educational materials about sustainability (e.g. via distance learning, educational networks and databases); b) by helping to promote new ways of interactive learning addressing sustainable development issues and c) by opening access to information and knowledge (Makrakis, 2008; Makrakis, 2010). ICTs can help learners explore concepts, engage in problem-based and authentic learning, enhance meta-cognitive skills and present information using multiple media. All these are closely related to the goals, themes and learning objectives addressed by education for sustainability and CCE. While ICTs can provide interactive mind/cognitive tools to support learning and develop new understandings and knowledge in areas of teaching and learning for sustainability, CCE themes integrated into the school curricula could provide a worthwhile context for ICTs in education.

The back-end system of our ICT-enabled climate change education and children's rights learning environment is based on Drupal- an open source Content Management System (CMS) similar to platforms like Joomla and Moodle that offers a powerful and extensible framework for web-based teaching and learning. Some of the advantages in using a CMS as a back-end are low development time along with high reliability and a wide variety of useful tools for educators such as blog, forum, user groups, privacy options, rich user profiles and easy management. The ICT-enabled climate change education and children's rights learning environment is enriched through the elicitation of learning objects found in the Web, including texts, images, videos organized and classified in a hypertext mode, which involves the existence of nodes linked with various ways and not only linearly. The main learning content is composed of Learning Objects (LO's). The authoring tool that was used to create the LO's is Adobe Flash. Each LO is constructed from

various media assets, such as text, video, animation, charts and sound narration, all gathered under a simple graphic user interface, comprising a dynamic and adaptable learning environment. It is also supported through the integration of various ICT tools, such as concept maps (Text2Mindmap), spreadsheets (Zoho Sheet), presentations (280slides), paint tools (Pixlr), word processing (Zoho Writer), venn diagrams (classtools.net). In developing this hypermedia learning environment we used both ESD-based instructional design principles and software engineering methods.

The curriculum structure of the hypermedia environment and its underpinning theory

Learning theory foundations: The ExConTra learning paradigm

The structure of our hypermedia learning environment is based on the principles of the ExConTra learning paradigm as depicted in figure 4 (Makrakis & Kostoulas-Makrakis, 2012).

Figure 4: The ExConTra learning paradigm.

Beginning with experiencing, learners identify a realistic and authentic task associated with a sustainable development issue, such as climate change and start collecting the information needed for their analyses, using various inquiry-based methods. Reducing the production of greenhouse gasses and in preparing societies for adaptability to risk and physical environmental change, climate change education needs to be experienced-based and practice-centred. Learning-centred actions for changing unsustainable practices are needed (e.g. learning to implement energy saving measures), so that learners can experience and reflexively review their values and practices in climate change solutions. Through reflecting, self and/or social, as well as through further reading and observing, learners organize and examine the collected data for the new experience from multiple perspectives in order to find meaning. For learners to make meaning, either individually and/or shared, they need to reflect on their own experiences, leading them to develop more abstract understandings of their experiences (conceptualizing). Arriving at individual and shared meaning (constructing), learners need to get involved in a shared inquiry enriched through continuous reflection, re-conceptualization and active experimentation. In this sense, learning is an active and contextualized process of constructing meaningful knowledge based on ones own experiences, rather than acquiring it from someone else. Constructed knowledge and meaning is meaningful when it opens up opportunities for action. Merging knowledge and meaning with action (acting) implies a change agency and active citizenship. Acting as change agents, learners are empowered

to transforming experience through critical reflection and active experimentation. When critical reflection is transformed into an action it becomes praxis that turns learners able to transform oneself and society (transforming).

Central to the climate change processes of mitigation, adaptation and transformation are new values, creative thinking and problem solving skills. These skills require learners to engage in critical analysis of causes and consequences, and construct knowledge that may lead to action. This requires teachers involved in climate change education to integrate into their teaching and learning methodologies experiential, constructivist and transformative learning principles and values. Teachers need to shift from functioning as the sole source of information to becoming co-learners and facilitators using multiple sources of information and provide support and motivation in helping learners in the process of self-directed learning. Similarly, students' roles also need to change from passive recipients of climate change information to active learners who search, collect, analyze and interpret climate change data and collectively build up knowledge through inquiry and reflection.

Curriculum structure: A theme-based approach

A horizontal approach was adopted to organise curriculum that gives meaning to the scope and integration of curricular contents of different disciplinary areas and knowledge domains in a certain level of teaching (Makrakis, 2012). The following description introduces the function of this Web-based learning platform for each stage of thematic learning (Figure 5).

Figure 5: Steps in designing a theme-based instruction.

Choosing a theme– This stage involves the choice of a large theme related to a compelling real-life issue, such as climate change which has meaningful connections in the broader framework of human experience that may connect family, school, and community. In a recent study, it has found that web-based thematic learning: 1) has positive effects on learners' concept learning; 2) provides learners with a framework from which develop the related concepts, in a more stable learning mode; 3) is suitable for students with different abilities (Liu & Wang, 2010).

Planning the integrated curriculum– In this stage sub-themes, in the form of thematic areas, such as "climate change and me" are planned to integrate concepts, skills and strategies that give meaning and direction to the whole learning process of climate change. The teachers involved organize the climate change core curriculum (both process skills and content knowledge) and sub-themes in an open and flexible way to assure student involvement at a later stage. Inter/cross disciplinary approaches are adopted in planning the integrated curriculum giving more emphasis in the processes involved rather than the outcomes. In web-based settings, particular emphasis is

given to a variety of interaction choices for participants: teacher-to-student, student-to-student, and student-to-resources and content. Additionally, a well-planned curriculum balances three types of activities: individual activities, small group activities, and large group activities. By ensuring multiple channels of communication, engagement, and collaboration within the design of a curriculum, providing a richly textured environment that can accommodate a full range of student needs and learning styles is of critical importance (Boettcher, 2007).

Designing learning and instruction– In a web-based learning environment the learner interacts with the content, teacher, and technology. This stage involves first the design of learning activities enabled by ICTs. Through designing learning activities suitable in web-based learning environments, and driven by the ExConTra learning, the content becomes the means to an end and not an end in itself. In designing thematic learning and instruction, one approach that is consistent with the ExConTra learning principles is that a group of teachers can brainstorm learning activities using existing curriculum materials and be drawing directly from end-users' (teachers and students) ideas, interests, and experiences during the formative evaluation process. In this process involving community experts and other members could add value to designing meaningful and engaging learning activities. Strategies that ensure the reusability, adaptability, and generalisability of teaching and learning materials should be planned.

Implementing the integrated curriculum: As pointed earlier, one of the most effective strategies for an integrated theme-based curriculum is to teach climate change in conjunction with mathematics, science, social studies, language arts, environmental studies and so on. This allows students to make connections between different areas as they explore a topic in detail and from a variety of approaches. Cross-curriculum projects allow students to see how knowledge and skills are connected in the various school subjects and how knowledge constructed and skills acquired can be transferred to other situations and real-life contexts. This step involves project-based learning as a model for implementing thematic learning activities. It is a shift away from the traditional classroom practices of short, isolated, teacher-centered lessons. Instead, it emphasizes learning activities that are long-term, interdisciplinary, student centered, and integrated with real-world issues and practices in which students plan, implement, and evaluate projects that have real-world applications beyond the classroom. ICTs should be involved in such a curriculum in two ways. First, technology can be used to support the instructional process, and, second, it should be a significant part of the content of the curriculum. The theme should provide a context for learning with ICTs and vice versa. Various ICT tools and Venn diagrams, like concept maps and semantic webs, help show the connection between related concepts and help learners explore meaningful learning experiences. Implementing the integrated curriculum in web-based learning settings with different tools and resources for retrieving content, using the online tools and facilitate interactions among teachers and students as well as other stakeholders, requires new instructional practices, such as peer tutoring, collaborative learning.

Assessing the impact of the integrated curriculum: In this stage, the focus is to determine the extent to which the curriculum plan that was implemented has achieved its goals and objectives as planned. The information collected from evaluating a curriculum forms the basis for making judgements about how successfully has the programme achieved its intended outcomes and the worth or value of the programme. This process can be integrated into three interlinked assessment levels: 1) diagnostic; 2) formative and 3) summative. The term diagnostic refers to a process at the initial phase; formative refers to a process while developing the curriculum so that revisions to it can be made and summative refers to a process at the end/after the curriculum programme is implemented. A critical concept applied to these processes is authentic assessment that is driven by ExConTra learning foundations. Authentic assessment to be incorporated in assessing the impact of the integrated curriculum include an amalgamation of tools and strategies that derive from ExConTra learning but also from objectivist learning theories if such tools contribute to the ExConTra learning principles. Among the most used tools include: multiple choice tests with extended responses to help students become aware of their own thinking processes; observation; checklists; portfolios; concept mapping and Venn diagrams; scenario building; reflection and reflexivity; journalising; simulation; case-study analysis. All the three levels of assessment are interlinked and in a way they provide a holistic framework for assessment. However, we consider

formative assessment as the most critical process as it provides effective feedback and gives the opportunity for learners' and other stakeholders' active participation in the design and development of the integrated curriculum. Within this process, the use of concept maps and other structural knowledge representation techniques are very effective tools (Trumpowe & Shahzad Sarwar, 2010; Ahlberg, 2004). The process of formative assessment should: 1) enable students to self-monitoring progress; give regular feedback to students; support peer learning and assessment; and design self-assessment practice (Liang & Kim, 2004). As Visualization tools such as conceptual maps help students to process the abstract concepts or mental images that they depict and the more they work designing materials, the more they construct their own meaningful realities based to new knowledge (Jonassen, et al., 1998; Jonassen & Reeves, 1996).

Curriculum areas of climate change education for children's right

We also adopt a human rights education approach that is based on empowering learners to differentiate between the charity dimension and other forms of aid, although valuable, and enabling learning environments that support learners to understand the roots of the food-related issues and get involved in action to help eradicate the problem. The structure of the "Children's Rights and Climate Change" curriculum is comprised of 6 areas (Figure 6) integrated across the school curriculum of the primary education level (Figure 7):

1. Right to food and climate change.
2. Right to water and climate change.
3. Right to education and climate change
4. Right to health and climate change
5. Gender equality and climate change
6. Right to environment and climate change
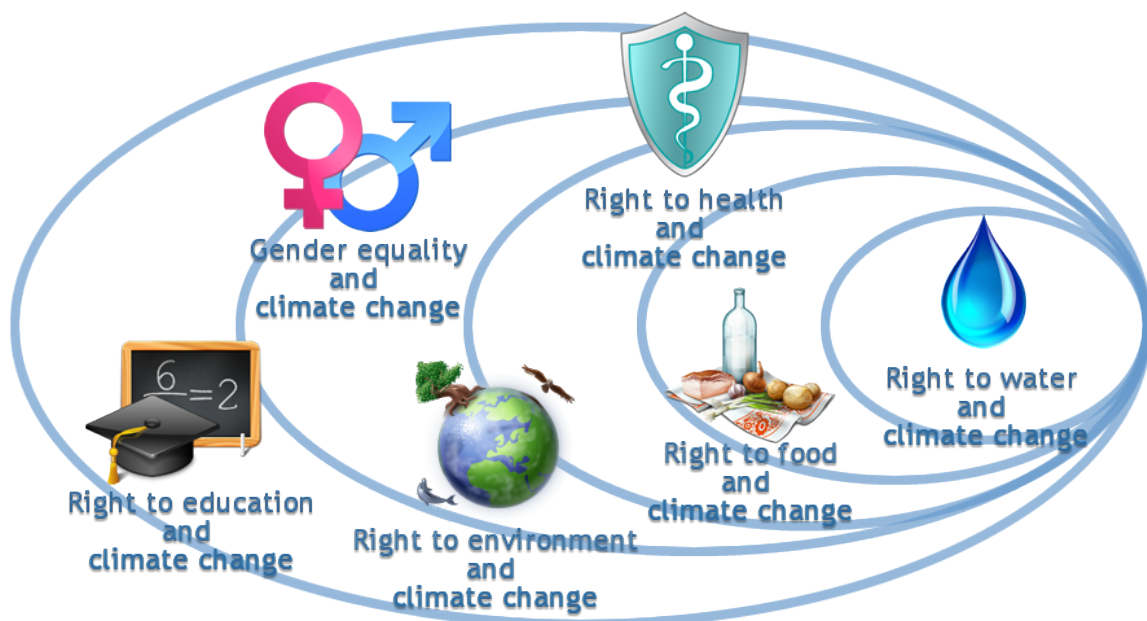
Figure 6: The content areas of the climate change education and children's right curriculum.

In this presentation we will deal with the first five, as the last one is in the process of development. These are designed to be integrated into the existing primary school curriculum from grades 4 to 6. In an integrated methodology interdisciplinary topics are arranged around overlapping concepts and emergent patterns. This process blends the disciplines by finding overlapping skills, concepts, and attitudes in a synergistic manner that makes the knowledge of one subject inseparable from that of another subject. These units together with the supportive web-based learning environment with its technologies can provide a good resource for the respective course of "ICTs, Climate

Change and GIS/GEO Spatial Tools" of the M.Sc. programme within the framework of the ICT-enabled ESD project financed by the European Commission.

Integration Across School Subjects

Curriculum areas

Curriculum areas	Language	Mathematics	Environmental Studies	History	Religion	Geography	Visual Arts	Health Education	Physical Education	Citizenship Education	Natural Sciences
Right to water and climate change		✓	✓			✓	✓	✓		✓	
Right to food and climate change	✓	✓	✓		✓	✓	✓	✓		✓	
Right to education and climate change		✓	✓	✓		✓	✓			✓	
Right to health and climate change		✓	✓			✓	✓	✓	✓	✓	Biology
Gender equality and climate change		✓	✓			✓	✓			✓	Physics
Right to environment and climate change	✓		✓			✓	✓	✓	✓	✓	

Figure 7: The cross-curriculum planning of the climate change education and children's rights curriculum.

The learning environment (figure 8) consists of the introduction and four units: a) Me and my food, b) Food as a basic need, c) Food as a right and d) Right to food and climate change. Access to these units is available through the top menu of the home page of the learning environment. At the left side of each page there is direct access to the basic tools of the learners (concept mapping, word processor, paint) as well as to a modern Greek online dictionary. The engagement of learners in the web-based learning environment starts with the exploration of learners' experiences about the concept of hunger. In the first unit entitled "Me and my food" learners' experience is explored through individual and group activities, with which they are called to mention their nutritional habits and to express their views regarding the foods that are necessary for our survival and growth. After the conceptualization of the nutritional needs through the engagement of learners in various activities, they are asked to create their own meal plan by selecting themselves the kinds of food that it will contain. Then they share their constructed knowledge with their parents and encourage them to create a similar meal plan. At the end of the unit, learners working in groups are called to build a final concept map containing the foods, which they believe are necessary for their survival and growth.

Figure 8: The learning environment.

Description of the curriculum areas

Right to Food and Climate Change

The right to adequate food is recognised in several international conventions. Food as a human right and basic need is the right of everyone to an adequate standard of living for himself and his family. There is little doubt that climate change will accelerate grain sterility; accelerate erosion, desertification and reducing crop and livestock yields which will detrimentally affect the right to food of millions of people worldwide.

In the web-based hypermedia application entitled "Right to Food and Climate Change", learners experience and conceptualize their nutritional needs, while they are engaged in activities that lead to understanding food as a basic need and human right. Additionally, learners, through case studies activities, experience and conceptualize the way the denial of the right to food is related to some extreme local climate conditions, which are due to the climate change phenomenon. Students are also asked to find ways of action in order to mitigate the climate change phenomenon and the shortage of food that derives from this phenomenon.

The unit "Food as a basic need" aims to make learners understand how important nutrition is for human survival, making a connection to food as a basic need and human right, in particular with child's rights. During the experiential phase, learners are watching embedded advertisement videos about food. Learners' groups are reflecting upon the four groups of rights, the so called four pillars of the CRC and they are asked to decide in which group the right to food should be included. In order to understand the importance of this right, learners are called first to calculate the number of people in the world who are denied the right to food and to consider the consequences of that denial. As a case study, we selected the Horn of Africa Peninsula, an area in which a great amount of the population is malnourished. In the next unit entitled "Right to water and climate change" Pakistan is examined as a case study in comparison with the previously examined case study of the

Horn of Africa Peninsula. Through this comparative examination, learners' groups are asked to explore similarities and differences between these two areas, which have a high percentage of malnourished inhabitants. Through the study of selected texts and critical reflective questions, it is attempted to motivate learners to conceptualize the relationship between the denial of the right to food and some extreme local climate conditions that have been arisen as an effect of the climate change phenomenon. Then, learners' groups are asked to use their constructed knowledge in order to find ways of action with which they could mitigate the climate change phenomenon and the denial of the right to food that is caused by the effects of this phenomenon. At the end, learners' groups are called to reflect upon all the previous activities and to share their knowledge by making a presentation for a healthy and environmentally responsible nutrition.

Right to Water and Climate Change
The right to water is intricately related to the preservation of a number of rights; underpinning the right to health in article and the right to food in article. As the earth gets warmer, there will be lower and more erratic rainfall, which will exacerbate the already existing problems related to water supplies and access. The "Right to water and climate change" unit aims to make learners understand that access to drinkable water is a need which they have the right to fulfill as well as to encourage them to get involved in actions for the protection of the corresponding right. Additionally, learners, through case studies activities, are experiencing how the denial of the right to water is related to some extreme local climate conditions, which are due to the climate change phenomenon. The web-based learning environment consists of the introduction and five units: a) restrictions of access to drinkable water, b) cost of access to drinkable water, c) climate change and drinkable water in the Mediterranean countries, d) over-consumption of water and e) pollution of the hydrographic network.

Through open source learning technologies and authentic learning activities that are enriched by open education learning objects elicited from the Web, learners experiencing the issues of the limited availability of drinkable water, the number of people worldwide that are denied the right to water and they conceptualize the effects that this denial could have. During conceptualization, learners are also directed to consider the cost of drinkable water consumption. Learners also experience and conceptualize the effects of climate change phenomenon in the availability of drinkable water in the Mediterranean countries. Finally, we attempt to empower learners to take action regarding the protection of their right to drinkable water. This is accomplished through activities that involve not only climate change, but also the two other main causes for the limitation of the availability of drinkable water: over-consumption of water and the underground water pollution. In the unit entitled "Restrictions of access to drinkable water" learners' experiential learning starts with the number of people worldwide that are denied of this right and then they conceptualize the effects that this denial could have. In the last two units learners conceptualize two other factors that influence the availability of drinkable water: its over-consumption and water pollution. In the last unit they reflect upon Asopos' river pollution as a case study.

Right to Education and Climate Change
Education is a human right for everyone. The thematic area of education as a human need and right is explored in the "Right to education and climate change" unit. Learners are experiencing how the denial of the right to education is related to some extreme local climate conditions, which are due to the climate change phenomenon. It consists of the introduction and four units: a) education as a basic need, b) education as a right, c) right to education and climate change and d) right to education and local action. In particular, learners are encouraged to get involved and act locally in an attempt to overcome the obstacles that limit the provision of education to children locally as well as globally, with a particular focus on those obstacles related to the effects of the climate change phenomenon.

The engagement of learners in the web-based learning environment starts with putting them to experience a hypothetical situation, in which they would have to live in a deserted place where it would be no school. Thus, learners are engaged in the unit titled "Education as a basic need" and

are asked to conceptualize the impact that this lack of school would have in their life. Then, they experience and conceptualize the ways in which school is beneficial for our life as well as the extent to which education is denied to people globally, by solving simple mathematical problems. Learners then study the case of 1goal campaign that was organized by the International Federation of Association Football (FIFA), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and ActionAid. They are watching an advertisement of this campaign which helps them to transform their learning and see education not only as a need but as a right. Thus, learners are engaged in the unit entitled "Education as a right" Learners' groups are reflecting upon the provisions of the CRC and are called to conceptualize the relation of some articles of the Convention with education. They are provided with online text and multimedia material. Then, learners are experiencing the extent to which the right to education is fulfilled globally (focusing on Nigeria as a case study) and locally. In their local study they are also called to reflect upon the provision of education in Greece now and in the past. Learners' parents and grandparents are engaged in this comparative reflection. Learners also conceptualize the factors that are affecting the right to education and the experiences about the relation of education and climate change. Tanzania and Poland are explored as case studies of climate change impacts on education. Through these case studies learners divided into groups are asked to use their constructed knowledge and find ways of action with which they could mitigate the climate change phenomenon and the denial of the right to education that is caused by the effects of this phenomenon.

Participation in the campaign "Schools as Protectors of Children", organized by United Nations Children's Fund (UNICEF) Greece is suggested as a possible way of action that engages learners in the concluding unit of our intervention entitled "Right to education and local action", in which learners are conceptualizing the main factors that restrict the right to education in Greece, with child labor being one of the most severe ones, and then they are asked to apply their constructed knowledge in order to find ways of further personal involvement and action with the aim to protect the right to education for all the children locally as well as globally.

Right to Health and Climate Change
Climate change poses significant risks to the right to health for millions of people worldwide through the spread of a wide range of diseases. In the unit entitled "Right to Health and Climate Change" learners experience and conceptualize their health needs, while they are engaged in activities that lead to understanding health as a basic need and human right. Additionally, learners, through case studies activities, experience and conceptualize the way that some diseases are related to some extreme local climate conditions, which are due to the climate change phenomenon. They are finally asked to find ways of action in order to intervene in this relation. The learning environment consists of three units: a) Health as a basic need b) Health as a right, c) Right to health and climate change.

The engagement of learners in the web-based learning environment starts with the exploration of learners' experiences about the concept of health. In the first unit entitled "Health as a basic need" learners' experience is explored through individual and group activities, with which they are called to express their views regarding health self-protection and they experience in which ways health care is provided by the state. Through reflective activities it is attempted learners to identify which are the main factors influencing our health. Learners then study the Declaration from the International Conference on Primary Health Care, in Alma-Ata, September 1978, which expressed the need for urgent action to protect and promote the health of all, believing that it is a fundamental human right. Thus, learners are engaged in the unit entitled "Health as a right" Learners' groups are reflecting upon the provisions of the CRC and are called to conceptualize the relation of some articles of the Convention with health. Moreover, they are given material to study, which helps them to construct knowledge regarding the relation of the right to health with the rights to food, water and education, which were examined in the previous units. Malaria is explored as a case study of the climate change impacts with this vector-borne disease. Through these case studies learners divided into groups are asked to use their constructed knowledge and

find ways of action with which they could mitigate the climate change phenomenon and the denial of the right to education that is caused by the effects of this phenomenon.

Gender Equality and Climate Change
Climate and gender issues are inter-related for several reasons. Women and men affect the climate in different ways. The European Institute for Gender Equality (EIGE) (2012) has published a report on gender equality and climate change which covers all the European Union Member States and provides comparable data on the European Union level. The findings demonstrate that women's involvement in climate change decision-making at national, European and international levels is still low.

The unit entitled "Gender equality and climate change" aims to turn learners able to understand that certain inequalities exist between men and women and that these inequalities are intensified by the effects of the climate change phenomenon. It also attempts to make learners understand that they have the right to be treated equally, irrespective of their gender as well as to make connections between gender equality and the child right's which are reviewed in the other units of the learning environment. The web-based learning environment consists of the introduction and five units: a) Women in society b) Gender equality as a right, c) Gender equality and climate change, d) Gender equality and child's rights. When learners enter the web-based learning environment they first experience the problem of illiteracy around the world and the fact that it mostly involves women. In the first unit entitled "Women in society" learners experience women's position at work and in social and political life and they conceptualize existing inequalities between women and men.

The unit gender equality as a right aims to make learners understand that all people should be treated equally irrespective of their gender. Learners experience the situation of women in several places around the world. In the next unit entitled "Gender equality and climate change" Senegal is examined as a case study. Through the study of selected texts and critical reflective questions, it is attempted to motivate learners to conceptualize the relationship between gender equality and some extreme local climate conditions that have been arisen as an effect of the climate change phenomenon. In the last unit entitled "Gender equality and climate change", learners' groups are asked to use their constructed knowledge in order to make connections between gender equality and other child's rights. The aim is to make learners understand the extent to which the protection of other child's rights is related with gender equality and thus to motivate them to actively participate in actions for their protection of their rights irrespective of gender.

Concluding Remarks

Many poor people already live in fragile climates, where food, health, education and clean water are scarce – climate change will exacerbate this fragility. Our children, especially the poor are already facing a dismal future which appears to be even more detrimental. The potential impact on children has been a critical missing element from the debate about climate change. Increasing awareness, constructing new knowledge and generating action should be a priority that education should cope with. The web-based hypermedia environment on the issue of "Children's Rights and Climate Change Education" presented in the previous sections can be used for enriching the primary school curriculum by integrating an education for a sustainable development perspective. Our learning environment adopts a child rights-based approach to the integration of climate change into the primary school curriculum. The structure of our hypermedia learning environment is based on the principles of the ExConTra learning paradigm (experiencing, constructing, transforming), which empowers learners for active citizenship. Five of the six units were presented: right to food, water, education, health and climate change, as well as gender equality and climate change, as the last one is in the process of development. The activities integrated within this application are directly connected to the Hellenic primary school curriculum and in particular to the subjects of Civic Education, Geography, Mathematics, Language and Religion, as we adopt a cross thematic and interdisciplinary curricular approach. A number of learning objects and ICT tools, largely

elicited from the Web, have been used as scaffolds to advance the issues of food, water, education, health and gender equality as basic needs and human rights in connection to climate change education for sustainable development.

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Acknowledgement:

Teacher Education for Sustainability in Network Society: Combining Digital and Sustainability Literacies

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Abstract

How should teacher education for sustainability (TEfS) respond to new information and communication technologies that can enable new forms of social and environmental relations and new forms of pedagogy? To answer that question, this article will consider the potential of Web 2.0 technologies or social media to enrich the content and pedagogy of education for sustainable development (ESD) in both university and school classrooms. It will suggest that teachers should be introduced to critical social theory that seeks to explain the role of these new technologies in the recent wave of capitalist development that precipitated economic and ecological crisis, and their potential to bring about more sustainable alternatives. Such alternatives will be based on more radical and deliberative forms of democracy and citizenship enabled by the new technologies, and TEfS should equip teachers to explore these through appropriate forms of citizenship education and model them in their classrooms via new forms of critical pedagogy. Such ideas as those of Erik Olin Wright on real utopias and Manuel Castells on network society provide such TEfS with appropriate theory, while consideration of how You Tube videos might be used to develop critical digital and sustainability literacies in the classroom, illustrates how such theory might be related to practice.
Key-words: Teacher Education for Sustainability, Education for Sustainable Development, Network Society

New technologies, neoliberal capitalism and unsustainable development

All teachers who claim to educate for sustainability should have a critical grasp of the structures and processes shaping the development and underdevelopment of the societies in which they teach. TEfS should help them to understand that information and communication technologies linked to the internet enabled, but did not cause, the neoliberal regime of capital accumulation that began in the late 1970s and ended with the financial crisis of 2007/8. This neo-liberal era was characterised by deregulation; privatisation; the privileging of corporate power; ultra-mobile capital; globalisation; outsourcing; imperialist militarism in Iraq and Afghanistan; growing social inequality and unrest; and increased environmental degradation. Designed to restore the rates of return on capital and further shift power to economic and political elites, it used new technologies to speed up the circulation of capital (for example just in time delivery); introduce new consumer and financial products and services (personal computers, spread betting); intensify globalisation (global logistics networks); wage war (pilotless aircraft); control social unrest (video surveillance); maintain ideological control (new forms of popular entertainment and media); improve environmental management (remote sensing); and introduce new priorities to schooling (computer literacy). New technologies also provided new ways of engineering nature (biotechnology) and increasing the efficiency of resource use (waste free production) that are often represented as sustainable development.

That neo-liberalism failed to revive capital's fortunes and proved unsustainable is due to three factors: its inherent instability; the increasing cost of reproducing the conditions of production; and the falling demand for capital investment and workers due to technological change. Capitalism has an inbuilt tendency to grow to a state in which it cannot sell all it produces and capital must be scrapped before a new wave of accumulation can begin. In the recent neoliberal era in the West, capital accumulated as credit and property bubbles as bankers borrowed to speculate on

increasingly complex financial products and households borrowed against rising property prices to maintain consumer lifestyles rendered less accessible by falling real wages. Capital was re-invested in property and financial bubbles to maintain economic growth but eventually sub-prime mortgages and complex financial products proved impossible to sell at their inflated values and the whole debt dependent regime collapsed (Harvey, 2010; De Santos et al, 2009). In Europe a one size fits all monetary policy reinforced mounting instability. Countries on the periphery had higher costs and lower productivity than those in the core, but a common interest rate allowed them to disguise their weaknesses by borrowing on the strength of inflated asset-prices and credit ratings. In the absence of controls on capital movement, trade surpluses generated in the core were recycled into Mediterranean property speculation: a situation echoed in the global imbalances between China and the West. When property and financial bubbles burst governments stood behind their banks, bailing them out at huge public cost. The result is a collapse in public investment, growing austerity, mounting social problems, and rising unemployment particularly amongst the young.

Europe's debt crisis is compounded by ecological debt as an accelerating treadmill of production and consumption has damaged or destroyed ecological resources and services often in other parts of the world. Capital finds it harder and more costly to reproduce the conditions of production (fertile soil, clean air and water, waste treatment, space free from pollution and congestion, healthy and suitably educated workers) and this is a further reason why recent growth has proved unsustainable (O'Connor, 1991). Capital is now seeking to shed the costs associated with reproducing the conditions of production by requiring citizens to pay for health care and education; by lobbying for further deregulation of the environment and land-use planning; and by further outsourcing production to countries with cheap resources and/or low environmental and welfare standards (Harvey, 2011). Teachers will recognise that the continuing restructuring of education is part of these developments and is associated with the loss of professionalism and worsening conditions of service in many European states.

Technological change is the third factor contributing to neo-liberalism's failure to revive capital's fortunes. While capitalism currently requires 3% growth to absorb the constant supply of new capital created, there is a falling demand for capital investment and workers as less capital and labour are now needed to produce each unit of output (Schutt, 2010). As markets for some manufactured goods become saturated, consumer demand shifts to services that are less capital intensive. Web technologies deliver communication and media services at reducing cost to consumers and conventional suppliers of music, films, newspapers and postal services, find it increasingly difficult to make a profit. There is growing resistance to intellectual property rights, a growth of open-source products such as Linux and Wikipedia, and a readiness to use services such as eBay to buy used rather than new goods. While some take a positive view of Web 2.0's potential for business (Tapscott & Williams, 2008, 2010), the dot com boom and bust of 1995 – 2000 illustrates the uncertainty that ICT brings to financial markets and the associated threat to investor confidence. Economic instability is compounded by high levels of unemployment that increase the costs of welfare, further reduce demand, and pose issues for teachers seeking to motivate older school students.

Network Society, the network state and networked individuals

Manual Castells (2008) offers teachers a new way of understanding the societies created by neo-liberal capitalism and enabled by new technologies. He maintains that we live in a world marked by globalisation: the process that constitutes a social system with the capacity to work as a single unit on a planetary scale in real or chosen time. ICT, including rapid transportation and computer networks, gives the system the technological capacity to selectively connect anyone and anything to global networks that structure the planet and through which flow people, energy, materials, and information. All the world's core economic, communicative and cultural activities have become dependent on strategic nodes in these networks that include global financial markets; global

production and distribution of goods and services; international trade; global networks of science and technology; global media; and global interactive networks of communication.

Critical issues facing people and governments around the world, such as the need for more sustainable forms of development, are largely produced and shaped by interdependent global processes that move beyond the realm of supposedly sovereign states. The power of the state is challenged by that of transnational corporations and undermined by agents within global civil society that seek alternative forms of global governance. As politics shifts to the global arena, the nation state is the source of four distinct but interrelated political crises:

- **Crisis of efficiency.** Problems such as climate change or regulation of financial markets cannot be adequately managed.
- **Crisis of legitimacy**. Governments that are less efficient lose their legitimacy and support from citizens. In network society the media become the essential space of politics and its resulting simplification to images, personalities, sound bites, scandal and spin, has deepens the crisis of legitimacy. Many see politicians as self-interested, corrupt, and irrelevant to their lives.
- **Crisis of identity.** As people lose faith in their political identity as citizens, they seek autonomy in forms of resistance identity and cultural identity politics.
- **Crisis of equity.** Neo-liberalism and globalisation increase inequality within and between countries and social groups. Welfare states are undermined in the absence of a global regulatory environment.

The increasing inability of nation states to confront and manage such issues as the need for sustainable development leads to ad-hoc forms of global governance and ultimately to a new form of state. Nation states (comprising governments, parliaments, political party system, judiciary, and state bureaucracy) transform themselves by three main mechanisms:

- **States associate with each other forming networks of states.** For example the European Union, NAFTA.
- **States build an increasingly dense network of international institutions and supra-national organisations to deal with global issues.** For example the UN, IMF, NATO, UNEP.
- **States decentralise power and resources in an effort to increase legitimacy and/or to tap into other forms of cultural or political allegiance.** For example the Welsh Assembly in the UK.

From this three pronged process emerges a new form of state, **the network state**. As it practices global governance through ad-hoc networks it confronts major problems arising from the contradiction between the historically constructed nature of the institutions that come into the network and the new functions and mechanisms they have to assume to perform in the network while still relating to their nation bound societies. Co-ordination, ideological and geopolitical problems arise because the network state finds it difficult to co-ordinate decision-making and policy across many issues and agencies at many scales; to find common language, principles and values to underpin governance in such policy areas as sustainable development; and to abandon the old geopolitics based on the interests of nation states for a new culture of global co-operation. These contradictions can only be overcome if the world's geopolitical actors allow the evolution of the network state into a system of constitutionally accepted networked global governance or cosmopolitan democracy with associated forms of citizenship (Held, 1995, Ferry, 2011).

A key component of network society is the global/local media system made up of oligopolistic multimedia businesses controlling the mass media and an increasingly inclusive hypertext; a multitude of horizontal networks of autonomous local/global communication; and the interactions between the two systems that form a complex pattern of connections and disconnections. Web 2.0 technology now allows mass self-communication or networks that join many-to-many in the sending and receiving of messages that bypass the mass media and generally escape government control. The logic embedded in such networks supports a major change in sociability as **networked individuals** build identities, contacts, and outlooks from the resources on offer according to their needs and moods. Since the scope of network society is both global and local ('glocal') such individuals are no longer tied to particular times and places. ICT enables the

coordinates of our everyday lives to be transcended so that we can enter virtual times and places (computer games) and simultaneously perceive, think and act in both local and global terms (we buy fair traded goods locally to support banana growers who we have learnt about on the internet). Networked individuals may simply escape into the social networks and virtual worlds that ICT offers, or they may become 'netizens' seeking more comprehensive and effective forms of global governance. Clearly developments in the theory and practice of ESD and TEfS are needed to acknowledge the rise of network society, the nature of students as networked individuals, and the changing form of cultural power.

Power in Network Society

Castells (2011a) argues that power in network society is exercised through the construction of meaning and the hold of communications and media networks over the minds of people. Changes in social communication and sociability enabled by ICT allow a greater diversity of messages and meanings to reach wider audiences, but the communication and construction of meaning is still shaped by four different kinds of power:

- *Networking power: the power of actors and organisations who control networks to include/exclude individuals and groups (the power of editors at BBC News to decide who is interviewed about an issue relating to sustainable development);*
- *Network power:* the power that results from the standards or rules or inclusion built into the network that guide and co-ordinate social interaction. (the stated and hidden rules that need to be followed to work in or with the <u>World Trade Organisation</u>);
- *Networked power:* the power of actors over other actors in the network (the power of a moderator to edit or censor a contribution to a web based discussion such as the <u>Great Northern Debate</u>);
- *Network-making power:* the power to programme specific networks according to the interests and values of the programmers, and the power to link/delink different networks following alliances/falling out between the dominant actors of those networks (the power to decide what links appear on <u>ESD websites</u>).

While all these forms of power shape people's understanding of the world, Castells considers network-making power to be the ultimate form of power. Recent events surrounding News International and its links with politicians and the police in the UK (the phone-hacking scandal) or the revelations concerning the privileged access given to the International Institute of Finance (a lobby group for 450 of the biggest banks in the world) to EU talks on Greece's future, illustrate the close links between networks of financial, corporate and political power and the media networks that represent their interests. Meanwhile the web as a source of individual empowerment is under threat from corporations seeking to corral users into marketable segments (the 'walled gardens' created by Facebook and Apple) and from state power seeking control and censorship (China's great firewall). Laws are needed to protect our privacy and rights to speak and assemble in cyberspace and Iceland's Modern Media Initiative provides a model of what is possible. Morozov (2011) and Mason (2012) adopt pessimistic and optimistic views on whether the internet will spread democracy around the world and it is to the role of new technologies in enabling democratization that we now turn.

New technologies, green socialism and sustainable development

It is now several decades since the writings of Ivan Illich and Andre Gorz warned us of the dangers of 'technofacism' in modern societies and argued the case for appropriate technology that liberates rather than enslaves citizens. Gorz (1980) saw ecology not as an end in itself but as an essential part of the larger struggle against capitalism that is able to adapt to ecological constraints. The main goal should be an economic, social and cultural revolution that abolishes capitalism and establishes new sustainable relationships between the individual and society, and between people

and nature. For Gorz the key to such a society lay in the potential of ICT to free people from work (through automation) so that they have time to manage their own affairs and develop civil society to such an extent that the state's role is simply that of spreading knowledge, equipping citizens for self management, and co-ordinating self-managing local communities from above. In 1980 he sketched a future France, with a 20 hour working week, a lively odd-job sector, a basic citizens' income paid at a flat rate to all irrespective of their employment status or income, environmentally sound forms of production and consumption, and a cultural life that encouraged the development of rich, all-round personalities.

Gorz's ideas were taken up and developed by post-industrial and green socialists (Pepper, 1993, Little, 1998, Foster et al, 2010) who realized that the key to sustainability is the social control of capital to direct it into socially useful production and the social control of technology to ensure it is used in socially responsible ways. While these writers and others envisioned future utopias, green socialism has lacked a theory of transition or ways in which its utopias might be realised. Wright (2010) fills this gap by suggesting that socialists should adopt a 'flexible strategic pluralism' in the ways they approach the transition. This should be guided by a greater realism regarding economic systems; the multiple pathways they offer for increasing social power; and the advantages and disadvantages of three logics of transformation.

Wright begins from the premise that socialism (democratic power over the allocation and use of productive resources) requires the radical democratization of all arenas of power (the state, economy, civil society) with power rooted in civil society (social power) controlling both state and economic power. Since all economic systems (national economies, firms, etc) are complex configurations of capitalist, statist and socialist elements, transformation should not be envisioned as a binary shift from one form of power to another, but a shift in the configuration of power relations that constitute economic hybrids. There are multiple institutional forms through which social power can be increased and Wright identifies a pluralist model of socialism that offers seven different kinds of pathway for democratising power (statist socialism; social democratic economic regulation; associational democracy; social capitalism; social economy; cooperative market economy; and participatory socialism). These pathways allow different specific real utopian innovations with regard to democratising the state (he explores, for example, municipal participatory budgeting, egalitarian public financing of electoral campaigns, random selection citizen's assemblies) and economy (Wikipedia, the Quebec social economy for childcare and eldercare; unconditional basic income, solidarity funds, share-levy wage-earner funds, the Mondragon co-op, and participatory economics). There are multiple strategic logics through which such innovative institutions can be constructed and advanced: ruptural (creating new institutions of empowerment through a sharp break with existing institutions and social structures); interstitial (building new forms of social empowerment in the niches and margins of capitalist society); and symbiotic (extending and deepening the institutional forms of popular social empowerment while at the same time helping solve certain problems faced by dominant classes and elites). Occupy Athens is an example of ruptural logic; the barter system in Volos, using local currency, is an example of interstitial logic, while the green left's advocacy of a green new deal for Europe might be considered an example of symbiotic logic.

Like Harvey's theory of co-revolutionary change (Harvey, 2010) Wright's theory of transformation requires that we abandon Marx's strong theory of the inevitable demise of capitalism. Both require us to recognise multiple pathways, agents, and logics, to accept strategic indeterminacy, and to continually test and retest the limits of possibility as we act and learn our way to sustainability. Wright provides a summary of the likely changes, most if not all of them enabled by new technologies:

> *Unconditional basic income frees up time for social economy participation. Share-levy wage-earner funds and solidarity funds enhance the capacity of unions and other associations to control firms and investments. Worker-owned cooperatives are revitalized by new information technologies which make cooperation among cooperatives easier, and new cooperative market infrastructures are developed which buffer producer cooperatives from destructive market pressures. Direct state involvement in the economy is combined with new forms of associational participation which improve the efficiency and*

accountability of state enterprises. Participatory budgeting diffuses across a wide range of cities and extends to new domains of government spending. And entirely new institutions as yet unforeseen are invented to push forward social empowerment in new ways. (Wright, 2010, p. 373).

If social empowerment is the key to green socialism and sustainability, then it is vital that the web remains a source of empowerment so that groups within civil society are able to use social media to debate and promote radical social alternatives. Such tools enable online activism (Hill, 2010) and deliberative democracy (Chadwick, 2009, Baber & Bartlett, 2005, Williamson, 2011) that can balance the interests of nature and future generations alongside current human interests and allows citizens to develop the kind of outlook that underpins ecological, cosmopolitan and global citizenship (Huckle, 2008). Such democracy is based on a set of core propositions: political equality of participants; interpersonal reasoning as the guiding political procedure; and the public giving, weighing, acceptance, or rejection of reasons. These also underpin the critical social theory of Habermas (Horster, 1992) that explains why deliberative democracy is needed to prevent science and technology serving minority interests and how the views of citizens might be moved toward a reasoned consensus on their application based on sound argument and reliable evidence. Since science and technology can only know nature in instrumental terms, they should be constantly weighed against other knowledge when applied to sustainable development. Such knowledge includes critical political ecology that is alert to the social construction of all knowledge, supposedly neutral explanations of ecological reality, and multiple discourses of sustainable development. Citizens can arrive at ecologically rational decisions provided they consider a wide range of knowledge and values covering what is technically possible, culturally appropriate, and morally and politically just. This assumption underpins critical pedagogy (eco-pedagogy) in ESD (Huckle, 1996; Kahn, 2008) and TEfS should introduce such pedagogy and demonstrate how it can be enriched by such ideas as those of Castells, Wright, Gorz, Harvey and others.

Network society, global civil society and green socialism

In network society the public sphere or space for debate on public affairs, shifts from the local to the global and is increasingly constructed around global communication networks. This space is occupied by a global civil society that has arisen due to the decreased ability of nationally based political systems to manage the world's problems. It structures and channels citizen debates over such issues as sustainable development towards the networked state and consists of a variety of social interests including transnational business; world religions; public intellectuals; and individuals and organisations promoting diverse models and discourses of sustainable development and global democracy. Castells (2008) recognises four different kinds of organisation within global civil society which overlap in their efforts as they engage with the pathways and logics that Wright outlines, innovate with institutions, and shape debate and policy on sustainable development:

- **Local civil society actors defending local interests.** For example labour unions defending local jobs against outsourcing or local fishermen protesting against foreign owned factory ships.
- **Nongovernmental organisations with a global frame of reference.** For example Greenpeace, Oxfam or the Business Council for Sustainable Development.
- **Social movements that aim to control the process of globalisation.** For example the Zapatistas defending Mexicans against NAFTA; the anti-globalisation movement;
- **Movements seeking to shift public opinion that use the media system and horizontal, autonomous networks of communication.** For example UK Uncut protest against tax avoidance; Occupy Wall Street; Adbusters.

Castells addressed Occupy London (Castells, 2011b) and analysed it in a subsequent lecture in Cambridge (Castells, 2011c). He regards its use of ICT and media to win wide support and introduce alternative ideas to a wider public as being critical elements in its success. While the

mainstream media depicted it as marginal, unlawful, and over, it experimented with participatory planning and deliberative democracy and was inspired by utopias including those associated with green socialism. Determined to make the case that bankers should pay for the crisis they had caused, and that politicians no longer represented citizens, the worldwide Occupy movement demonstrated that social change begins in people's minds and develops as they build networks and challenge network making power. (Gessen et al, 2012).

Sustainability, critical, and digital literacies

Having outlined how TEfS might explore the role of ICT in enabling an unsustainable neoliberal capitalism and its potential role in the transition to a more sustainable green socialism, I now intend to link ESD and TEfS to critical and digital literacies. Luke and Woods (2009) review approaches to critical literacy that might be introduced within TEfS and suggest that it involves engagement with the major texts, discourses and modes of information in a culture. Critical literacy attempts to attend to the ideological and hegemonic function of texts and critical pedagogy is one means by which these are revealed. While critical literacy and pedagogy are underpinned by a variety of philosophical assumptions and pedagogical emphases that Luke and Woods survey (including those based on Habermas' critical theories) they share a commitment to the use of literacy for purposes of equity, social justice, and sustainability. *They aim for nothing less than readers, writers, listeners and viewers who have a cogent, articulated and relevant understanding of texts, their techniques, their investments and their consequences, and who are able to use these understandings and capacities to act mindfully and justly to change their worlds* (Luke & Woods, p. 9).

Lankshear and Knobel (2008) review the different meanings of digital literacy that have accumulated over recent years and distinguish between technical or instrumental forms that list specific skills and technique (computer literacy) and critical forms that emphasize mastery of ideas and insist on careful evaluation of information and intelligent analysis and synthesis (media literacy). Critical approaches focus on the cognitive and socio-emotional aspects of working in digital environments where information is multimediated and the networked individual has to be skilled at deciphering complex images and sounds as well as the syntactical subtleties of words. They encompass the ability to understand and use information in multiple forms from a variety of sources when it is presented via digital codification: blogs, video games, text messages, online social network pages, discussion forums, internet memes, FAQs, online search results, and so on. Unfortunately a 'digital divide' is opening up between home and school:

> *. . . we are witnessing a widening gap between the culture of the school and the culture of children's lives outside school. In their leisure time, children are encouraged to see themselves as active participants, navigating their way independently through complex multimedia environments. Yet in school they are expected to submit to a pedagogic regime that is fundamentally premised on the testing of decontextualized skills and knowledge. By and large the use of information and communication technology in school signally fails to engage with the ways in which young people are now relating to information, and with the ways they choose to communicate.* (Buckingham, 2007, p. 178)

Digital technologies suggest a radical new way of learning (connective learning, Siemens, 2004) and the need to change curriculum and pedagogy (Collins & Halverson, 2009, Jouneau-Sion & Sanchez, 2011). Pass and Creech (2008), Tella and Adu (2009) and Blewitt (2006) have reviewed the opportunities and challenges that ICT provides for ESD more generally, while Cifuentes et al (2011) have examined the role of Web 2.0 technologies in the related field of global citizenship education. It is my intention to maintain a focus on critical literacy and pedagogy, and following Lambert and Morgan's argument regarding ICT and geography teaching (Lambert & Morgan, 2010: 160), what is needed is not merely a 'tech-savvy' approach that capitalizes on the interactivity of Web 2.0 to enliven ESD (You Tube rather than PowerPoint presentations, blogs rather than essays, teachers and students contributing to wikis), but an approach that sees all knowledge relating to sustainable development as being socially constructed and provides students

with opportunities to reflect and act the kind of ideas outlined in the earlier sections of this paper as mediated by digital technology. Such learning would develop sustainability literacy (their ability to read the symptoms and causes of unsustainable development and write more sustainable futures) whilst also contributing to political literacy and the development of identity. Clearly this has wide implications for TEfS requiring course of initial and continuing professional development to apply relevant theory to the development of critical pedagogy that seeks both digital and sustainability literacy.

In such merging of critical sustainability and digital literacies TEfS should follow Buckingham (2009, 2012) by approaching media not as technologies but as cultural forms that represent the world and communicate ideas. It should acknowledge that bias in unavoidable, that information relating to sustainable development is inevitably shaped by discourse and ideology, and that in network society media texts play a key role in the politics of sustainable development and are shaped by, and in turn shape, the kind of network power that Castells outlines. Buckingham (2008) suggests how four key concepts central to media education (representation, language, production, and audience) can be applied to the analysis of websites and the key questions he uses are equally relevant to other texts communicated via social media. He argues that media production should accompany media analysis as a means of developing media/digital literacy and this may involve blogging, social networking, game making, or small-scale video production. The aim is for teachers and students to understand how the media work, how meaning is created, who has the power, and how that power can be challenged.

Mocigemba (2008) presents three theses and anti-theses relating to podcasting and sustainable development that can be applied to social media more generally (Figure 1). TEfS and ESD linked to digital literacy should encourage teachers and students to evaluate these as they encounter and produce a variety of texts. Figure 1 also provide a starting point for us to consider whether the above ideas already outlined can be put into practice.

From theory to practice, You Tube in the ESD classroom

After outlining the role of social media in providing a new space for civic engagement and linking this to Habermas' notion of communicative rationality, Kellner and Gooyang (Kellner & Gooyang, 2009; Gooyang, 2009) consider the potential and limitations of You Tube to empower young citizens. While You Tube is embedded in capitalist social relations (owned by Google) and can be considered 'another play-pen in the capitalist fun house' or a medium dominated by self-expression, narcissism, silliness and entertainment, mainly used by relatively rich, white male English speakers, Kellner and Gooyang suggest that linked to a critical media pedagogy it offers some potential as a 'reservoir of true enlightenment'. You Tube allows individuals to 'organise and deploy novel strategies of self-education and social transformation'; can be seen as a 'dialogical learning community'; and by allowing users to post videos and opinions it provides opportunities for them to exhibit personal autonomy and active and critical citizenship. In this way it extends and democratises civil society.

The hopes and fears raised by Mocigemba, and Kellner and Gooyang, can be tested as part of TEfS, by examining the potential of You Tube to stimulate learning and communication around the central ideas outlined in this article. Do You Tube videos address alternative development paths for Europe including more sustainable paths linked to socialism and the radical democratisation of European society? Do they address Wright's ideas on the multiple pathways and logics shaping the prospects for change and Castells' ideas about network society? Are they likely to appeal to students in classrooms, provide an extended forum for debate and discussion, and a rich medium for critical media pedagogy?

To begin to answer these questions I searched for relevant videos on You Tube, selected nine that are listed in the table below (Figure 2), and noted related statistics on how many times they had been viewed and how many comments and expressions of like/dislike they had attracted.

With reference to Mocigemba's three theses/anti-theses, we can note that while there is relevant content on You Tube it is not attracting large audiences and there is a lack of related comment and

debate. The video statistics facility shows the location and gender of an audience that is generally located in Europe and male. Developing any sort of unified narrative on sustainable development from the vast array of videos on offer requires prior knowledge of sustainability politics and skilled use of search terms. The ratio of likes to dislikes suggests that the videos are viewed by those already sympathetic to the arguments presented and by following links to organisations that uploaded the videos, the viewer may gain access to networks that aid their ongoing search for political and personal identity.

Turning to Wright's and Castells' ideas, there is clearly a need for teachers to approach You Tube with these in mind as they provide relevant search terms and criteria for evaluating videos for classroom use. There is sufficient on You Tube to illustrate their ideas but also evidence that this is as yet not a key medium for learning about and debating radical social change. Once selected by the teacher or the students, You Tube videos can aid the development of political literacy and sustainability citizenship, but this will require a fair amount of conventional teaching and learning if the videos are to be interpreted in ways associated with critical media literacy..

Searching You Tube suggests that few schools are uploading videos on sustainability topics and that those that are uploaded mainly focus on sustainable schooling. Teachers' concerns about e-safety may explain this lack of engagement as may the relatively high level of sustainability literacy needed to comprehend much of the material uploaded to You Tube. The medium has potential but as yet its significance for ESD in the lives of school students pails into insignificance compared with its use for entertainment and distraction from real world issues.

And the present challenge?

As I write in late April 2012 it is clear that Europe's networked state is not working. An austerity programme that diminishes sovereignty, consigns youth to high levels of unemployment, and steers Europe towards a decade of stagnation, is destroying the social solidarity on which the European Union depends. Some citizens continue to demand the radical democratisation of Europe that would sweep away the existing neoliberal treaties of the EU, establish a new framework for economic integration and political union, redistribute wealth, and employ ecological planning to recover from capitalist crisis. This paper has argued that their arguments should feature in TEfS and ESD along with those that are more reformist and conservative. The critical understanding and use of social media should become a key element of TEfS but teacher educators will need to be realistic about what such media currently offer.

Web 2.0 media can open up debate on SD by:	Opening the debate on SD via Web 2.0 media is only a theoretical possibility because:
• Turning lecture into debate • Lowering entry barriers to discourse • Turning passive governance into a deliberative process • Increasing civic engagement and political participation particularly amongst the young • Tailoring messages to specific audiences who can receive them free of space/time/cost constraints • Expressing minority views and placing new issues on the agenda • Encouraging active searching, selecting, and responding (learning)	• Audiences may be small or non-existent (but any audience worthwhile) • Communication may not stimulate genuine dialogue (need for online leadership/moderators) • Online participation in debates on SD topics appeals mainly to those already familiar with the blogosphere • Talk does not necessarily lead to action • Attention slips from the public to the private sphere as with mobile phones • People enjoy their passivity and retreat into privacy
Web 2.0 media can enforce a culture and lifestyle of SD by:	**Web 2.0 media will have little effect outside cyberspace because:**
• Overcoming the immunization, ignorance and rejection prompted by threatening, moralizing and patronizing environmental communication	• Audience is low and messages have little social and cultural impact (no mass self communication a reality) • Cultural creatives may be further divided

• Emphasising solutions, inducing positive emotions, and mentioning additional immaterial benefits • Associating SD with popular media brands like You Tube ('The medium is the message') • Using user generated content to increase identification with sustainability values and overcome suspicion of manipulation/propaganda • Providing unifying narratives for groups sympathetic to SD, labelled cultural creatives or post materialists	by digital creatives and their diverse messages • They will reinforce the digital divide, many have no access or lack media literacy
Web 2.0 is a useful tool for the existing SD community because: • It is a way to create synergy and use network power to attract public attention • It can reduce dependence on established media and journalists by bypassing, critiquing and correcting them (citizen journalists) • Its use raises the reputation of the SD community	**Web 2.0 is dangerous for the established SD community because:** • Citizen journalists may understand SD less well than traditional journalists • Consideration of SD becomes dependent on media literacy and an affinity with ICT • Copyright hinders translation of traditional media materials dealing with SD • Its use threatens the reputation of the SD community

Figure 1: Web 2.0 (social media) and sustainable development (SD): Based on Mocigemba (2008).

Title	Date uploaded	Uploaded by	Viewed by	Comments	Likes / dis-likes
European Green Party spokesperson Phillippe Lamberts MEP on the Spanish Protests	30/05/2011	European Green Party	58	0	2/0
Susan George – Green New Deal	06/09/2011	attactv	2673	1	18/1
Participatory budgeting comes to Kensington	24/10/2011	Dorablount	308	0	0/0
The story of We the Citizens (Citizens Assembly, Ireland)	09.12.2011	wethecitizenVideo	79	0	1/0
Greek Town develops bartering system without Euros	04/12/2012	LeakSource2012	15248	28	162/0
Coops can work – Mondragon Coop 1	01/11/2011	FreeTheWorker	278	0	1/0
Occupy Athens	06/10/2011	Redandblack540	691	3	7/1
Manuel Castells at	26/11/2011	VoicingTheCity	958	0	4/0

Occupy London						
The Icelandic Modern Media Initiative	20/05/11	corbettreport	2326	6	62/1

Figure 2: Nine You Tube Videos relevant to debate on sustainable development in Europe (Viewed and statistics recorded on 25/04/12).

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Pedagogy, Places and People

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Abstract

The paper will explore the potential of new technologies in helping educators to play an active role in creating and promoting the learning that is needed for local and global communities to live sustainably. In particular it will examine the potential of the virtual world to develop local and global communities for transformative learning for sustainable development. It is organised into three sections:
1. The need for new ways of knowing, learning and understanding
2. The challenges and opportunities of the virtual world
3. The role of virtual learning communities in ESD
4. RCEs a s a mobilising mechanism

Faced with the major challenges of climate change, environmental degradation, poverty and social inequality it is clear that learning to live sustainably has never been more urgent. The credit crunch has thrown these into sharp relief and provided an opportunity to take stock of our current ways of organising the world economy which have led us to this unsustainable impasse. We are faced with a critical moment in world history which offers the chance to make the changes needed to set human beings on a path to a more sustainable future. In order to address these immense challenges, new forms of learning are needed and the paper will argue that all educators, as responsible members of local and global communities, need to play key roles as agents for change. Globalisation and new technologies have changed the way we think about the world and about what constitutes the global and the local. It is clear that both local and global solutions must be found to address the serious dilemmas of the 21st century. This paper will see to examine the opportunities and challenges of the virtual world in enabling and supporting the development of effective ESD communities of practice.

Key-words: ESD, RCEs, Communities of practice, Virtual learning communities

The need for new ways of knowing, learning and understanding

One of the obstacles to change has been a reluctance or an inability to integrate social and environmental concerns into policy making and practice. This in itself is in part a reflection of the divisions between the two agendas of environment and development (Wade and Parker 2008: 9) and the obstacles of language and understanding faced by the social sciences in working more closely with the natural sciences and vice versa. The three pillars of sustainable development are considered to be environment, economy, society (UNESCO) yet in much policy making the economic pillar is still privileged over the other two.

According to UNESCO (2012) 'Investing in education is crucial for achieving sustainable development, poverty eradication, equity and inclusiveness. Education holds the key to productivity and sustainable growth, improves health and nutrition, income and livelihoods, creating a condition for achieving all of the MDGs and the EFA goals.' As economic models are still so central to our world view, and as all people on earth need a livelihood in order to survive then we cannot afford to ignore some central questions:

What do we mean by sustainable growth? What kind of society do we need to build in order to achieve sustainable living? How can ESD help to deliver this? In recent years there has been a developing critique which indicates that our current economic paradigm of high consumption material growth is not appropriate and that business as usual is not an option (Stiglitz et al, 2009; Sachs, 2012). Some commentators would argue that the very notion of 'sustainable growth' is a

tautology since economic growth cannot of itself as presently constructed be sustainable. In relation to this, many commentators are also challenging the appropriacy of GDP as a useful measurement of human well – being. Stiglitz et al (2009) noted that 'for a long time there have been increasing concerns about the adequacy of current measures of economic performance, in particular those based on GDP figures. Moreover, there are even broader concerns about the relevance of these figures as measures of societal well-being. The inadequacies of these figures from the perspective of sustainability-- economic, environmental, and social sustainability-- have been of particular concern'

Following on from this discourse, in 2012 it was reported that Jeffrey Sachs, special adviser to UN secretary -general Ban ki-Moon on the MDGs ' is clear that the old economic paradigm, which is based on a fixation of GDP growth, is leading us to disaster, but that we need to find a completely new way of measuring the success of society. He believes that sustainable development goals (SDGs) could be one route towards achieving that (Guardian online June 22nd 2012). If such a set of sustainable development goals could be agreed these could possibly set the parameters for a new notion of growth which did not depend on measurements of GDP. Education and learning would be essential to develop such a concept of sustainable growth and for a well balanced society which values societal well being and quality of life.

The Politics of knowledge

Society has not always been constructed as it is presently. A few hundred years ago, religion and state held far higher sway than the economy, for example. The parameters within which we lead our everyday lives are constantly shifting but there are key elements which as human being s we seem to share in relation to overall well being (Dolan et al, 2011).

Education policy over the past three decades has been very successful in many countries in raising standards of literacy and numeracy (especially with regard to the Millennium Development Goals) - but mainly within a constrained and rather instrumental model of education. While many would argue that this model has been quite successful in delivering economic growth in many countries, it has not delivered sustainability. Since the birth of industrialisation, it has also presided over the fastest and most wide ranging ecological destruction of our planet. We are now said to be in a period of the 6th greatest extinction of natural life during our planetary history and a large body of scientific evidence attributes   responsibility for this to our human actions. In addition, there is increasing evidence from the research on human well being (Dolan et al, 2011) that after achieving the important threshold of income to maintain a reasonably comfortable life, economic growth and increased wealth does not add to the sum of human happiness. In fact, many of the wealthiest countries have very low   indicators of human well being. According to the 2012 New Economics Foundation, the country which seems to have the highest state of well being is Costa Rice with the USA only in 105th position out of a possible 151 countries (Happy Planet Index 2012). And while Costa Rica has one of the smallest ecological footprints, the USA has one of the largest. Yet at the same time, many countries around the world, especially those with ongoing endemic conflicts such as Haiti and Afghanistan, exist with the lowest levels of well being as they are still struggling to establish security and eradicate extreme poverty. Therefore, it is very timely to consider how we can learn to embed the values of community, social justice, and ecological stewardship within future economic models.

Quality education and ESD

Mary Pigozzi eloquently describes a vision of 'Quality Education' which brings together these economic, social and environmental concerns:
A quality education must reflect learning in relation to the learner as individual, family and community member and part of a world society. A quality education understands the past, is relevant to the present and has a view to the future. Quality education relates to knowledge

building and the skillful application of all forms of knowledge by unique individuals that function both independently and in relation to others. A quality education reflects the dynamic nature of culture and languages, the value of the individual in relation to the larger context and the importance of living in a way that promotes equality in the present and fosters a sustainable future. (Pigozzi, 2003)

ESD has much to offer and a key role to play here in influencing the agenda both in policy and practice within this discourse around quality education. There is now a level of consensus around the concept of education for sustainable development (ESD) at the international level which has been brought about by the work of UNESCO, the UN body with the lead role in promoting the education commitments derived from Agenda 21. UNESCO has identified the following elements which characterise ESD which is facilitated through participatory and reflective approaches. According to UNESCO ESD

- o is based on the principles of intergenerational equity, social justice, fair distribution of resources and community participation, that underlie sustainable development;
- o promotes a shift in mental models which inform our environmental, social and economic decisions;
- o is locally relevant and culturally appropriate;
- o is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences;
- o engages formal, non-formal and informal education;
- o accommodates the evolving nature of the concept of sustainability;
- o promotes life-long learning
- o addresses content, taking into account context, global issues and local priorities;
- o builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable workforce and quality of life;
- o is cross disciplinary. No one discipline can claim ESD as its own, but all disciplines can contribute to ESD;
- o uses a variety of pedagogical techniques that promote participatory learning and critical reflective skills'. (UNESCO, 2007)

ESD stresses the importance of contextualisation, relevance and appropriacy of learning. It highlights the importance of breaking down barriers between formal, non formal and informal education. It makes the links between scientific knowledge and local, indigenous knowledge - all of which are needed for the future sustainability of the planet.   An in depth indigenous understanding of local ecology, such as plant and forest lore for example, is essential for addressing issues of climate change. Traditional home building in earthquake zones, together with modern scientific know how has enabled safer dwellings to be built for people. Indigenous knowledge is of course often built up over many generations and centuries of experimenting –but this is rarely written down or recognised. As UNESCO (2012) emphasised, 'when addressing global environmental change, the knowledge and priorities of indigenous peoples and local communities are seldom considered in decision-making. However, indigenous knowledge offers insights, precision and nuance, which complement science.'

ACCU (2009) has also detailed many examples of the importance of what they call 'grassroots approaches to ESD' in Tales of hope 11 (2009).These also highlight the importance of traditional spiritual values of care and community which are held by many indigenous groups and which in many ways embody the values we need for ESD.

Since the 1992 commitments of Agenda 21, policy and practice in ESD have developed considerably at the local, regional and global levels and in many countries there is now government policy in place in all areas of the formal education sector, from schools to higher education. In addition, national legal requirements on sustainable development in relation to other sectors, such as the built environment, have created space and demand for training at a range of levels. As the focus for the UN Decade from 2005 to 2014, education is now viewed as a prime lever for social change, described by UNESCO in the implementation plan for the Decade in the following way: 'It means education that enables people to foresee, face up to and solve the problems that threaten life on our planet.' (UNESCO, 2005) More recently ESD was further

highlighted at Rio plus 20 Summit in 2012 when UNESCO again re stated the case for the importance of education and called for 'mainstreaming ESD comprehensively into relevant national education policies and practices' (UNESCO 2012).

The role of networks and learning communities of practice

Networks have long been an important mechanism for community action and engagement for mobilising groups of people around key issues, as, for example, the Occupy movement illustrates. Networks are not new to universities either but in the past many of these have developed in relation to subject specific areas, through for example, subject bodies like the Political Studies Association and the Geographical Association. Informal HE networks have also emerged through shared interest (particular projects, social networks).
 However, a network is not necessarily the same thing as a community of practice as Wenger (1998) makes clear, although sometimes they may share some of the same characteristics. In their work on social networks, Wellman and Berkowitz (1998) focus on networks in relation to communications through interpersonal relationships via a level of informal structure. Lave and Wenger have drawn on this in their investigations of situated learning and communities of practice which looks at social networks more from the perspective of action and learning – many ESD networks can frequently more accurately be characterised in this way.
Network theory has provided some insights into relationships though it has largely focused on communications in relation to business efficiency in organisations. The goal of ESD is much more complex and multi-level than any organisational goal, of course. ESD has a focus on developing relationships in order to transform practice and has a responsibility to both present and future generations. The notion of learning communities of practice thus seems very relevant to the goals and aspirations of ESD.

Developing a virtual learning community of practice for sustainability

An early example of a virtual learning community was the UK distance learning master's programme in Education for Sustainability which was set up in 1994 by a consortium of Non Governmental Organisations (NGOs) through a collaboration with London South Bank University (LSBU). After 1992 governments were very slow to act on the educational commitments of Agenda 21 so in many cases NGOs decided to take the initiative. In this instance the NGOs comprised both environmental and development agendas and included Oxfam, Save the Children Fund, Action Aid, Intermediate Technology, Council for Environmental Education, Development Education Association and World Wide Fund for Nature (WWF), which provided most of the financial backing and leadership of the project. From the start it was envisaged the programme would be primarily by distance learning and one of the challenges was to develop a strong and supportive learning community. Initially this was through paper based materials which were developed and posted to students while tutoring was conducted mainly by phone or letter. It is hard to believe now but in 1994 there was no email or internet communication available at universities in the UK! However, this did not mean that it was impossible to create a virtual learning community, but it did make it more difficult. Students were encouraged to send in their biopics and a student Guide was produced each year with information on individual student interests and contact details. A newsletter was also written and sent out on a termly basis with course updates and information about relevant conferences, books etc. optional day schools were held and a written report was circulated to students around the world.
 'Communities are social systems intended to serve specific purposes' (Daniels 2009), however, Jocey Quinn (2010:45) critiques the term 'learning community' as she feels that is too unproblematised and limiting and she puts forward an argument for the concept of 'imagined social capital'. However, to Wenger learning communities are not different from communities of practice. In fact to him a community of practice provides the opportunity for learning, both for the acquisition of knowledge and for the creation of knowledge (Wenger, 1998: 214).

However, Wenger was manly talking about informal learning within the workplace and not about a specific formalised learning environment. The EFS community was specifically set up for the purpose of learning so how could this equate to a community of practice? Wenger describes communities of practice as groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 2006). There is a relationship here to notions of social capital. An effective ESD learning community of practice might be considered to fulfil the criteria identified by Wenger (1998, 2006) but would clearly also need to include the key components of ESD (UNESCO 2007) and would need to demonstrate a commitment to the values and principles of ESD.

The EFS programme described above could be described as an ESD learning community but to what extent is this a community of practice? EFS students clearly shared a concern and passion for what they were doing as evidenced by their coursework and commitment to become agents for change. Their coursework indicated a range of work in formal, non formal and informal settings end of year evaluations indicated a shared ethos and a strong belief in the shared values of the course (QAA, 2001). Interaction with tutors was taking place on a regular basis but interaction between students was of course impeded by the difficulties and slowness of communication. The development of the internet has provided a tool which has changed this situation immeasurably.

Challenges and Opportunities of the virtual world

The use of the internet in university courses has increased exponentially in the last five years, with most HE institutions now offering a range of distance or blended learning course, at least partially mediated by on line provision. This has thrown up a wide range of challenges and opportunities. Manuel Castells (1996, 2000) maintains that we are moving from the capitalist industrial age into the capitalist information age and the basis of the technological means by which it acts has changed from energy to information. New technologies allow for the collapse of space and for the potential for rapid and asynchronous communication which also changes the relationship to time. ICT has created new nodes of power centres within networks. Some networks, such as that of financial capital, are global in scale while others are local or organisational. Some can be captured by powerful interests and lobbying groups while others can be used in radical challenge to an established system, such as during the Arab spring.

There is no doubt that the internet has provided unprecedented access to information and that it is changing the way that human beings relate to information, and to news media. In relation to ESD, Chet Bowers (2000) is also concerned that computers are a culturally mediating and transforming technology and he warns about the fact that they are perpetuating unsustainable western perspectives of consumption. He recognises that the use of ICT is here to stay but that that we need to adopt a cautious and critical approach – otherwise there is a danger that environmentally destructive cultural practices will only increase.

There are also implications for the world's environmental resources as each new on line innovation requires more and more energy to maintain servers and consumers vie to buy the latest gadgets, while often consigning older models to land fill. Valuable minerals are being exploited in vulnerable parts of the world in order to satisfy demand and are implicated in conflicts such as that of the Congo. ESD practitioners need to be wary of adopting the use of new technologies uncritically and indeed this underlines the importance of critical thinking skills and competences as part of any ESD programme.

The development of social media and networks has also led to a blurring between the public and private spheres. Sites such as Facebook have provided opportunities for people to exchange and share personal photos, ideas, information on an unprecedented scale - which has enabled close friendships to be maintained and developed across space and time. At the same time, it has brought dangers to some when private information has become public or when the virtual world has enabled people to practise deceit and deception.

Unequal global access is also an issue, although this is changing fast but currently many areas of the globe still have limited availability of broadband and Wi-Fi. This is the case in many of the poorest countries in Sub Saharan Africa (SSA) and this can limit the potential to develop accessible virtual learning communities in these regions. Some African students on the EFS programme have found their internet very slow and have been unable to contribute as much as they would like to group discussions. Many do not own personal computers and are forced to use internet cafés which are expensive and also provide a very noisy and public environment.

Another implication for the increasing use of new technologies is the danger that people may become more detached from their own local communities and friends. This would clearly have implications for ESD if that were to be the case – because ESD learning communities of practice operate on so many different levels – from personal to local to global. Wellman et al describes some critics' concerns that 'we will become increasingly home centred and disconnected from our friends family, and communities (Wellman et al, 2001:301). However, according to Atkinson (2012:10) 'on examining the evidence there are a number of case studies which counter this view. In broad terms, local community broadband has the potential to tackle social isolation, providing the opportunity for social interaction. But it also has a broader function. Far from reducing community feeling, the virtual communities that it helps shape can build social capital. It can act as a forum to discuss local issues, giving local people the opportunity to express their opinions and potentially have an impact on local policy. It can help build local campaigns'. Atkinson also notes that a UK Department for Culture Media and Sport (DCMS) report encourages the development of community broadband and talks of the internet as ' a participative, generative network promoting interactivity, collaboration and conversation' (DCMS, 2009:22).The Community Broadband Network (CBN) is a UK social enterprise which supports and helps develop community led broad band initiatives. This has enabled access to the internet for a number of isolated communities in sparsely inhabited areas. Other initiatives are providing access for people with disabilities or chronic ill health. Atkinson highlights one such initiative where 'members of the local community have been working with Dundee University on projects for independent living for those subject to chronic ill health and for the introduction of so called tele-medicine. A fast and reliable community broadband network is key to this' (Atkinson, 2012).

All these concerns are important but essentially the internet is primarily a tool for communication, and like all tools it is one which can be used both positively and negatively. It should also be remembered that it is a tool which is socially constructed, that is to say, it is shaped by people – albeit with a range of different views, interests and power. Hence, the importance of the critical dimensions in ESD – with regard to both sources and information and also to the wider implications of the use of ICT in education. The protocols for the use of social media and new technologies are still developing and ESD practitioners can contribute to this by ensuring that ESD principles and practice are part of this process. As a tool for the construction of virtual learning communities of practice, the way these are developed will of course depend on the values and ideologies of the people involved and it is important to bear this in mind when examining the potential for ESD. It is the role of new technologies as a tool which will be examined here, in relation to supporting the development of learning communities of practice.

Key elements of a virtual learning community of practice

There are a variety of types of ESD learning communities of practice centred around different kinds of nodes. Some examples of these are identified below:

A formal taught course
The EFS programme at LSBU started life as a distance learning course before the advent of new technologies but in the last 5 years the improvement in on line communication has enabled the learning community to develop into a more active local and global learning community of practice. (See http://www.lsbu.ac.uk/sustainability/ for the ESF Learning Community web site)

This has been a gradual process and development has been incremental and not without some teething problems when technical support has been found wanting. In particular the role of the

VLE has increasingly provided a space for sharing of ideas and concerns on a more regular interactive basis. We have found that the pre requisites for this are the following elements:

A safe space to talk and share

Time to get to know each other

Discussion area-lightly moderated

Freedom to make mistakes

Clear ethical protocols which all sign up to

Well structured, relevant activities (learning objects)

Applying theory to practice

Time and space for individual reflection and feedback from tutors

Because on line technology also provides for synchronous as well as asynchronous communication, this enables students who live at very different parts of the globe with varying time zones to communicate effectively with each other and with tutors. Previously distance learning (DL) tutors had to plan carefully for telephone discussion with their students and it was not always possible. On line activities can be planned with this in mind so that responses can be made over a period of days or weeks – thus giving greater flexibility and time for reflection. However, it should be noted that many students are (understandably) still wary of committing their thoughts on line and need a great deal of encouragement and incentive to do so.

The availability of Skype and other on line video links has also meant that it is possible for students to have face to face conversations from time to time with their tutors and with each other. As other social media have developed, Face book has also provided a more informal setting for students to meet and share views and of course the internet has provided them with the ability to set up their own private groups away from the eyes of tutors when they so wish.

New technologies do set up a range of expectations in students, however, and it is important to manage these effectively. For this reason it is important to set up clear protocols and to keep to them. For example, there is a danger that the increased ease of access will encourage students to contact tutors at all hours of the day and this is just not manageable. In personal sustainability terms for tutors this would be quite impossible so clear parameters need to be set.

Where the use of the VLE has been most effective has been in strengthening and supporting relationships which have been made initially face to face, from actual to virtual. An example of this is with a cohort of EFS African students who first met at a residential week in Kenya. They selected a moderator for each course unit to remind them and chivvy them to input discussion and to share ideas. Taking such responsibility seemed to work well in establishing a group sensibility and dynamic and enabled some rich interaction, with limited intervention from tutors. A few months later two of the students were involved in a very serious car crash and were in hospital for some time. In many cases they would have dropped out of the course or at the very least would have repeated the year but through the VLE the word went out to their fellow students in Kenya, Tanzania, Uganda, South Africa, Mozambique, Swaziland and Ghana. As a result of this they received immense pastoral and moral support and encouragement and went on to complete their coursework by the end of the year! This could not have happened without the firm establishment of relationships at the residential but it was not possible without the VLE and other new technologies.

A shared professional interest

Teacher education is an example of a shared professional interest and
two of the most extensive and effective teacher education ESD networks at a regional and national level are the Baltic and Black Sea TE network and the UK TE network for Equity and Sustainability. Both these networks are run by a steering group and are able to organise annual/ bi annual conferences where participants can share practice, debate and discuss new ideas. Most of the communication is conducted virtually and there is a web site where resources and conference papers are shared. Contacts between network members are via email lists and newsletters. The networks are at the same time part of the local educational arena, national arenas and international arenas. They are both also involved in the wider UNESCO ESD Teacher Education network and so have a global reach also and they demonstrate key elements of communities of practice.

A review of the work of the UK network by Inman, Rogers, Mackay and Wade (2011) demonstrated that it 'functions as a community of practice in a number of ways; locally (within institutions), regionally, nationally and internationally. At a regional level meetings take place between tutors from ITE providers in a particular region to share practice around integrating ESD/GC into Initial Teacher Education programmes; at a national level the steering group meets termly and an annual conference enables dissemination and brings members of the community together. The sharing of practice has already resulted in innovation and change in teacher education courses at some individual institutions' such as the Open University and University of East London. (Inman et al., 2011) These programmes influence student teachers at these institutions, the pupils they teach while on teaching practice and potentially, their practice throughout their teaching career. The internet has enabled 'The multi-layered nature of the UK Network (which) means that there is a two way flow of information between the different communities of practices (regional, national and international) of which the Network is comprised.' (Inman et al., 2011). What this network does not have yet, however, is a virtual forum for the exchange of ideas and debates between members of the network - these take place at face to face events or through journal articles, though the scope is limited by the formal setting of a conference or steering group. Although there are several NGOs involved in the UK Teacher Education network the focus is also (intentionally) centred on teacher education and discussions take place within these boundaries. There is limited engagement with non formal settings and informal education at present though there is certainly scope to do so in the future.

A global initiative

The RCE initiative of the UN Decade for ESD (2005-2014) aims to develop a global knowledge network for transformative education to promote sustainable communities. RCEs have largely developed organically in response to regional contexts and needs, while at the same time being part of a wider global network. All RCEs have to be accredited by the UN University at a global level, but most have started from individual universities and build on existing networks, as well as creating new ones. They are all committed to the vision and the goals of ESD and in this sense they could be said to share Wenger's key dimensions of practice which underpin the concept of the community of practice 'Mutual engagement ; A joint enterprise; A shared repertoire'(Wenger, 2007: 73).

In essence an RCE is virtual by nature and 'not a physical centre but an institutional mechanism to facilitate capacity development for sustainable development. An RCE is a network of existing local-regional institutions mobilised to jointly promote all types of learning for a sustainable future. RCEs, both individually and collectively, aspire to achieve the goals of the Decade for ESD' (Mochizuki and Fadeeva, 2008). The RCE initiative offers a framework to develop actual and virtual communities of practice for sustainability because they are active at local, regional and global levels and the internet has enabled inter communication across all these levels.

RCE have four elements: governance; collaboration; research and development; transformative education ('contributing to the transformation of the current education and training systems to satisfy ambitions of the region regarding sustainable living and livelihood') (UN-IAS 2012). Their goals are to:

- re-orient education towards SD, …..tailored to address issues and local context of the community in which they operate
- increase access to quality education that is most needed in the regional context
- deliver trainers' training programmes
- lead advocacy and awareness raising efforts to raise public awareness about the importance of educators and the essential role of ESD in achieving a sustainable future (UN-IAS, 2012)

In addition RCEs are cross sectoral and involve educators at all levels of formal and non formal learning and are therefore able to draw on scientific, local and indigenous knowledge. They are based on the UNESCO principles (see above) and in the framework for ESD with its emphasis on

interdisciplinarity, lifelong learning, participation, formal, non formal and informal education. (UNESCO, 2007). As Wenger points out, 'Practice does not exist in the abstract. It exists because people are engaged in actions whose meanings they negotiate with each other'(Wenger, 1998:74). This ongoing negotiation of meaning is integral to the success of all RCE projects and is a consistent part of mutual engagement. The internet can provide a valuable tool for negotiation and discussion across regions and countries and the speed of response can enable misunderstanding s to be sorted out more quickly. Nonetheless this same ability for instant response can lead to unrealistic expectations, for example, in seeking partners for a new project. And as most discussions are conducted through the medium of the English language, this may give rise to some confusion and misunderstanding. It also raises many questions in relation to the development of knowledge and understanding more generally – which is something ESD needs to pay attention to but which is beyond the scope of this paper.

Wenger's analysis mainly concerned the work of apprentices in formal work settings but in the case of ESD and the work of RCEs, this engagement is not necessarily of course a statutory part of each person's job description. In fact many members of RCEs are volunteers and contribute to the RCE outside their contracted work. However, as Wenger points out, 'Homogeneity is neither a requirement for, nor the result of, a community of practice' (Wenger, 1998:76). In effect, the mutual engagement towards the goals of ESD enables mutual support on a learning journey that participants volunteer to take. Obviously within the RCE Community there will be different levels of involvement, some members will take more peripheral roles and some more integral and dynamic and these are likely to change over time. And there is no need for all members to be in constant agreement with each other. On the contrary 'disagreement challenge and competition can all be forms of participation' (Wenger, 1998:77).

However, the development of each RCE project's 'joint enterprise' is the result of a collective process of discussion and negotiation'…. and is defined by the participants in the very process of pursuing it'. (Wenger 1997:74) The action research approach that underpins much of ESD and the work of RCEs has also meant that the overall parameters are constantly evaluated and reshaped and then the learning from this is used as a basis to shape the next project in a rolling cycle of research and development. The 'shared repertoire' where participants develop shared language and histories has developed over time is demonstrated in a number of RCE publications that have emerged from the collaborations.

Most (though not all) RCEs are coordinated by universities, such as RCE Crete which is coordinated by the UNESCO Chair ICT in Education for Sustainable Development at the University of Crete – these maintain an important position in their local and regional communities: they offer a wide range of employment to local people and they also impact on the natural and built environment. Universities are of course not only part of the local community but are also part of the national and global communities through their wider networks and responsibilities. The concept of the RCE recognised this fact and aimed to promote transformative educative for sustainability by developing a global learning space for exchange of ideas and knowledge. They would do this by creating a network of networks. This would be need to be largely virtual in order to encompass all the key players and organisations though it would be supplemented and supported by periodic face to face contacts as appropriate. However, this is not to downgrade the personal contact relational elements which are always key to the success of such communities of practice. Without mutual trust, understanding and shared goals, RCEs would be very ineffective.

In January 2012 there were 100 RCEs across the globe, supported by a secretariat at UNU Institute of Advanced Studies(UN- IAS), with a bi-annual conference where delegates come together to share ideas and develop collaborative synergy. The RCE initiative is also linked in with the global UN milestones and events towards sustainable development which has given it potential to be a mobilising mechanism at a global as well as a local level. Of all the three types of ESD communities of practice, it is the RCE which to me best addresses the criteria put forward by Wenger for effective learning and action and which offers the greatest potential for development and creativity. This is not to say that the others are ineffective, on the contrary, but they are working within the parameters of a formal setting with academic boundaries – which undoubtedly affect their ability to develop and negotiate shared meaning and activity.

The role of virtual learning communities of practice in ESD

Strengthening Local and global dimensions

The shrinkage in space and time which new technologies have brought about has allowed a much greater amount of interaction and participation at local and global levels. This is a key dimension of ESD (UNESCO, 2007) and it enables learning to take place in different geographical locations, each possibly drawing from the other as practitioners interact across time and space. At the same time, access to internet information sources allows participants to refer to both national and global policy and practice and contextualise their work more coherently.

RCEs (Regional Centres of Expertise in ESD) are both a local/ regional network and a global network; they are also often members of national and wider international (for example, European) networks. As such, individuals and organisations can share ideas and knowledge by interacting at a range of levels. While it is the **quality** of relationships that matter there is no doubt that the internet has brought in opportunities for supporting and strengthening these relationships in a way that would not have been possible without it.

RCEs have a structure (albeit loose and flexible) and accountability to UNU and to other RCEs within the networks. This offers a strong sense of solidarity and mutual support in developing learning communities and networks for sustainability which have the power to play an active role in creating and promoting the learning that is needed for local and global communities to live sustainably. In taking on a lead role in RCEs, universities have the potential to stop being part of the problem and to become part of the solution   to the urgent challenges facing people, place and planet by actively mobilising sustainable communities locally and globally.

Creating new knowledge

Wenger notes that 'the very characteristics that make communities of practice a good fit for stewarding knowledge—autonomy, practitioner-orientation, informality, crossing boundaries—are also characteristics that make them a challenge for traditional hierarchical organizations'. Many organisations in the business sector have taken up this idea in order to innovate and improve performance but these characteristics can run counter to the organisational management style. The goal of ESD, however, is much more complex and multi-level than any organisational goal, of course. ESD focuses on developing relationships in order to transform practice and has a responsibility to both present and future generations. These characteristics therefore chime well with the development of new learning and knowledge for ESD.

The EFS programme at LSBU provides an early example of cross sectoral, transdisciplinary education, where   academics engaged with experienced practitioners to share learning and develop new knowledge. ESD lends itself to this kind of engagement as it requires the involvement of all sectors and all areas of learning and understanding, formal, non formal and informal. This three sector engagement is illustrated in the diagram below.
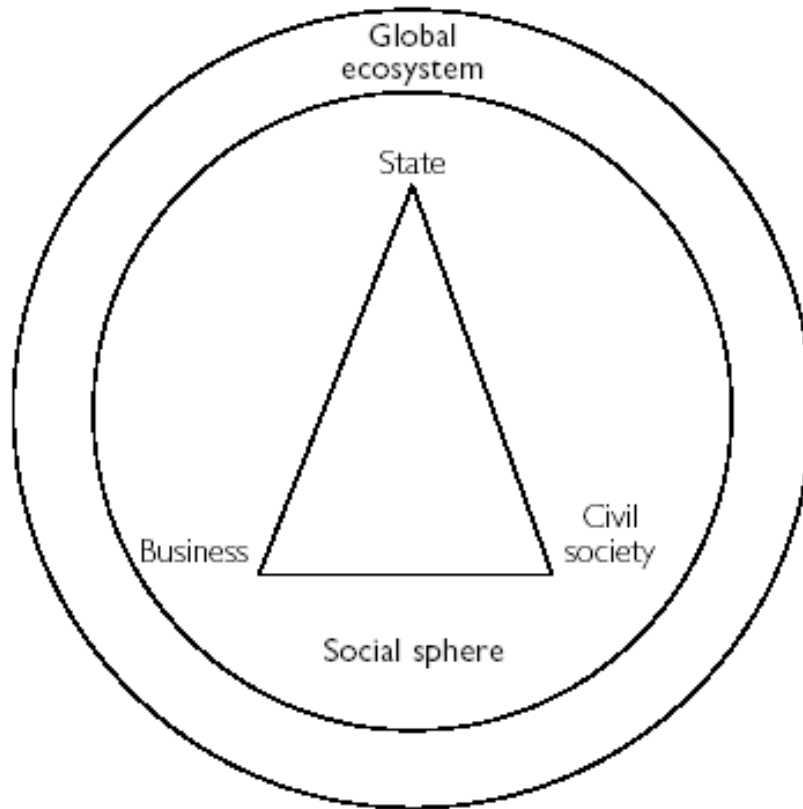
Figure 1: Dependent Three Sector model. From Parker, J 'An Introduction to Education for Sustainability' Unit One EFS programme 2009.

ESD is still an emerging transdisciplinary concept, growing up and being constructed in an internet age. The virtual world provides immediate access to differing interpretations and new ideas which are essential to its development. Students, along with tutors are knowledge creators and practitioners and are learning, reflecting and applying their ideas to a wide range of situations and contexts across the globe. The internet gives them the opportunity to share and confer about their experiences, no matter where they are based. For nearly two decades the LSBU EFS community has been involved in changing the ESD landscape, both through professional practice and also through involvement with NGOs and other networks. This work has included curriculum development in Fiji, Tanzania, South Africa, Canada and Hong Kong (Wade & Parker 2008). Other graduates have been involved in national and international policy making, such as the Ramsar Convention on Wetlands and the World Summit on Sustainable Development (WSSD). (For some illustrations of this learning and practice see http://www.efscommunity.t83.net/ and also, 'Journeys around Education For Sustainability' edited by Parker and Wade, 2008).

The RCE concept was actually first conceived as a way of enabling the latest scientific and technical knowledge to be reflected more in what is taught in schools by breaking down barriers between scientists and educators (Mochizuki and Fadeeva 2008 372). As such, RCEs were first perceived as knowledge hubs, which brought together a range of discipline and sectors, to provide responses to ESD challenges in the region. This model of RCEs did enable universities to build on their strengths as knowledge hubs as well as to build new knowledge through social and organisational learning. In principle, this model enables the sharing of scientific and technical information for the benefit of local communities and has enabled, for example, schools in one of Nairobi's largest informal settlements, Kibera, to develop successful water harvesting projects and school gardens. RCE Greater Nairobi presents an example of an RCE which was very strongly founded on the principles of community development for sustainability and indeed it was first developed through an NGO, Kenya Organisation for Environmental Education (KOEE) and was only in 2010 fully adopted by Kenyatta University.

ESD has recognised the importance of making links between formal and non formal educators, and the need to breakdown some of the hierarchies of knowledge which transcribe this. Educational expertise in responding to community needs has generally resided with community and adult educators rather than with educators from the formal sector. Although this area has lacked government support and validation, the formal sector has much to learn from its experience and expertise. RCEs can provide the mobilising mechanisms for this to happen, as in RCE Greater Nairobi which was originally set up by the NGO, Kenya Organisation for Environmental Education. This has of necessity developed largely through face to face interaction, but in other parts of the world where web access is more reliable the internet has enabled communication and interaction across the sectors. Many RCEs have set up web sites to provide an external face and to encourage wider participation. RCE Rhine Meuse, for example, is building a web space for all European RCEs to participate and share joint enterprises where appropriate.

The RCE community of practice also offers opportunities to apply expert knowledge as well as to develop new knowledge in response to local and regional problems and concerns. RCE Greater Nairobi, together with UNU and a number of other African universities has been very involved in developing a new master's programme for the African region on Community Development. In this instance the RCE identified a regional need which was shared with several other African countries and UNU provided the global knowledge networks to enable the course to be developed.

In Malaysia , a worm composting project at RCE Penang brought together scientists and members of the local community to use technology from University of Sains Malaysia which enabled the local community to use waste from paddy, cow dung and general village waste to increase their income by 100 per cent (Sanusi and Khelgat-Doost, 2008: 493). In this case, RCE Penang was able to combine expert (global) scientific knowledge with local community knowledge to provide solutions to issues of sustainable livelihoods.

Transparency, accountability and democracy
New technologies can provide a tool for providing transparency and accountability which in turn can support democratic, participatory processes which underpin ESD.

UNESCO's International Teacher Education(TE) ESD network, which was originally set up by a group of university rectors, is now recognised as one of UNESCO's flagship projects which is contributing to the UN Decade of ESD. The global network aims to support the development of local / regional networks and there is a considerable amount of synergy between the two. Without the internet it is unlikely whether this initiative would have taken off and certainly without the internet it would have been impossible to disseminate shared resources in an open and accessible manner (www.UNESCO/esd).

In the case of the UK ESD/GC Teacher Education Network, research undertaken by the network 2011-12 (unpublished) indicates further that the network is seen as supporting the dissemination of ESD ideas and resources and is largely perceived as non hierarchical, democratic and accountable, despite being coordinated by one particular research centre at LSBU. However, it is important not to exaggerate the effects of new technology here. Undoubtedly, ICT has enabled and supported this sense of participation, but this has gone hand in hand with strong face to face relationships built up over time and a strong participatory and democratic ethos within the LSBU Education Research Centre (www.lsbu.ac.uk/ccci).

Engagement and action
Educators who seek to effect radical social change obviously need to be active both within the mainstream and outside the mainstream. Communities of practice, such as the one at London South Bank University(above), provide opportunities to do just this as they 'build and strengthen alliances – locally, nationally, and globally – with other groups and social movements in order to intervene successfully in 'educational reform' movements' (Ginsberg et al 1991 :29). In the case of the UK Teacher Education Network, recent research highlighted the importance attached by members to feeling part of a movement for change and a considerable majority felt that the network itself had been successful in achieving this. One of the aims of the network is to influence

policy and practice and many participants were clear that this had been achieved at least partially within their departments and institutions.

The EfS Programme at LSBU has retained its active engagement with NGO networks and, for example, in 2002 the Team co-coordinated an intervention at the World Summit on Sustainable Development (WSSD) in partnership with WWF-UK and Oxfam. Graduates of this programme have gone on to become champions of ESD in many different countries and to form influential networks for change. Organisations they are involved in include the London Sustainable Schools network, RCE Wales, RCE Ireland, Kenya National Environmental Management Agency, UNEP's programme in mainstreaming environmental sustainability across African universities (MESA), Botanic Gardens Conservation International.

RCEs as a mobilising mechanism for ESD

To quote Hans Van Ginkel (Wade, 2012), who was instrumental in setting up the RCE initiative, 'This approach also has a tremendous *mobilizing* potential. Characteristically the successful RCEs would run a large number (a '*portfolio*') of highly attractive and effective EfSD projects, each of these run by two or more member institutions coming from different sectors of society.'

At the heart of ESD and RCEs is the commitment to the transformation of society and the re orienting of education systems towards sustainability. Through their networks the RCEs bring together a wide range of organisations and key people to develop a more holistic, joined up approach to solving some of the problems of the region. They are not constrained by the barriers of the formal sector frameworks as their remit is to work beyond and across these. For example, members of RCE Greater Nairobi include various ministries (such as Education, Environment and Natural Resources, Planning), public schools, the National Museum of Kenya, University of Nairobi and Kenyatta, National chamber of Commerce, Nature Kenya. London RCE also includes a wide range of stakeholders from civil society, business and local government organisations. Among the partners of the London RCE are WWF-UK, Government Office for London, Development Education Association, Botanic Gardens Conservation International, London Remade, London Sustainable Schools Forum, Oxfam Education, Humanities Education Centre, London 21, Bromley Sustainable Schools, London Environmental Education Forum, Sustainability and Environmental Education (SEEd), Academy of Sustainable Communities, People and Planet student network, and Conserve Africa.

In the UK, one of London RCE's initiatives was developed in response to the needs of local communities around the Olympic Park. This enabled a number of local groups to come together, to make links with local universities of East London and Greenwich to consider how to ensure a positive sustainability legacy from the Olympic development. In a sense the RCE performed the role of broker in bringing these groups together to make common purpose while leaving them the autonomy to decide on future plans. This enabled several different groups to join together, for example, from the formal sector (school, universities) and non formal (youth groups, NGOs). RCE/EAST (Toronto) was originally an initiative of the City Council, led by Toronto Zoo. However, when Toronto University became part of the RCE this helped to promote 'the university's objective of engaging in outreach and helping to impact upon the development of public policy, through interdisciplinary engagement in environmental concerns' (Stefanovic, 2008: 423).

RCE Penang co-ordinated by Universiti Sains Malaysia is also closely involved with local communities and sees its role as threefold:

- helping students to be aware of the world in which they live and to gain an understanding of 'the interactions between multifaceted economic, social and environmental problems(including the contribution of individuals to these processes) and a familiarity with perspectives on these issues from other societies and cultures'. (Sanusis and Khelgat-Doost, 2008: 493)
- helping societies to find through its network, social and technical solutions through academic research and professional experience

- developing partnerships between policy makers, decision makers, NGOs and key individuals who are involved in SD related activities at local, regional and international levels

Their Citizenship programme is an example of community engagement in training high school students to identify problems and issues in their communities, and to use an interdisciplinary approach to try to solve them (Sanusi and Khelgat-Doost, 2008: 492).

RCEs are in their early development and there is still much need and potential for development if they are to become really effective. Their structure and framework allows for this and as through their mobilizing mechanism they have the ability to develop strong ESD learning communities of practice - and to address the urgent tasks that we all face in learning and living sustainably within the shared resources of our planet.

Conclusion

In this paper I have tried to show how learning communities of practice are integral to ESD and I have explored some of the potential of new technologies in developing and supporting local and global communities of practice for ESD. The opportunities and challenges of the fast paced changing technological scene are immense: innovations continue apace and it is important to try to keep abreast of them and of their implications for the way our world is shaped. It is of course unlikely (and not to be desired) that virtual communities of practice are ever going to supersede actual face to face involvement and it is important to see the two as going hand in hand. ESD principles and practice also have a great deal to offer to the online world generally in addressing some of the dangers identified earlier.

However, as tools for learning, communication and information sharing, new technologies have great potential despite some of their drawbacks. And it is clear that the virtual world can provide an important creative and enabling space for ESD learning communities of practice. As stated at the start of this paper, the case for change has never been more urgent for our planet and for human kind. As members of ESD learning communities of practice we need to harness all the advantages provided by the new technologies in learning to live more sustainably. Time and space are shrinking in more ways than one and we need to change our unsustainable ways as a matter of urgency – or time and space for a sustainable planet may soon be running out!

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Education for Sustainable Development: Experiences from Action Research with Science Teachers

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Abstract

This study reports on Egyptian science teachers' experiences in collective action research projects with a focus on Education for Sustainable Development (ESD). Science teachers were enrolled in a 'Teaching Strategies' course that had been revised with a focus on sustainability. The course was introduced in the spring semester of the academic year 2011-2012. Throughout the course, 29 teachers worked in groups to develop projects that promote sustainable development through classroom teaching practices that encourage involvement with local communities around school premises. The framework that guided the study was based on experiential, constructivist and transformative learning theories known collectively as 'ExConTra'. A mixed methods methodology was used where teachers' responses to three open-ended reflective questions produced qualitative data that were analysed by identifying themes and patterns. The author developed two quantitative instruments: a Concept Mapping Rubric (CMR) and Sustainable Development Questionnaire (SDQ). The former was to probe the cognitive organisation participants had in relation to the concept of sustainable development before and after developing the action research projects. The latter instrument was used to identify participants' attitudes towards teaching for ESD and their knowledge of classroom pedagogical practices. Statistical data analysis using Statistical Package for the Social Sciences (SPSS) indicates that teachers in their post-tests had developed: better cognitive organisation for the concept of sustainable development; positive attitudes towards teaching for sustainable development; and ESD classroom teaching practices. Involvement in the action research projects where teachers were experiencing, reflecting, conceptualising, constructing, acting and transforming within the context of ESD may be responsible for these results where there are promises to help achieve successful implementation to include ESD in science education.

Key-words: Education for Sustainable Development, Science teachers, Egypt, Action research.

Introduction

One of the fashion words found recently in the literature is that of Education for Sustainable Development. Its roots can be tracked back to the 1990s at the United Nations conference in Rio de Janeiro. Since then, there have been major developments towards ESD, specifically the emphasis on ESD in the Earth Summit 2002, the United Nation's Declaration of the Decade of Education for Sustainable Development (DESD) in 2005-2014, and in Rio+20 United Nation's conference on Sustainable Development in June 2012. In general, Sustainable Development (SD) is perceived as the vision for a better world in which environmental, social, economic and cultural considerations are balanced. Education for Sustainable Development (ESD), therefore, presents a tool for achieving this vision and improving quality of life. With this in mind, a new vision of education is formed, a vision that helps understand the world by addressing the complexity and interconnectedness of daily problems, locally and globally.

There is strong evidence to suggest that the Arab countries, including Egypt, are lagging behind in practices related to sustainable development (Esty, Levy & Winston, 2003). There is therefore a need to find ways to promote ESD. Teacher education programmes, whether pre-service or in-service, could be a powerful start, especially through reorienting teacher education courses to

address sustainability. Teachers are agents of change in any reform effort who will shape the knowledge, skills and values of future generations given the regional priorities and the need to modernise curricula to address ESD. Paradoxically, they are also viewed as major obstacles to change if their emphasis is only on factual and procedural knowledge, at the expense of deeper levels of understanding (Prawat, 1992).

This study introduced science teachers to sustainable development and highlighted the importance of teachers in promoting ESD practices in schools and among their students. The process of infusing sustainability among science teachers was enabled through the reorientation of a 'teaching strategies' course at one of the governmental universities in Egypt. The reoriented course was presented as a means to counteract more limited manifestations of this type of course that often focuses on '...*the facts of their subject and not deal with associated social or ethical issues*' (Levinson & Turner, 2001:2), resulting in misrepresentations of the nature of science education.

Theoretical Framework and Literature Review

The theoretical framework that guided this study was the ExConTra learning model (Makrakis & Kostoulas-Makrakis, 2012) where there is emphasis on three major learning theories, namely experiential, constructivist and transformative learning theory. The model consists of six independent but interconnected components. These are experiencing, reflecting, conceptualising, constructing, acting and transforming, all of which are found throughout the process of action research. Through action research teachers are likely to become aware of their own beliefs and practices, expand their commitment to developing a variety of teaching methods, and renew their interest in learning about teaching. It is therefore a means to systemic inquiry into daily teaching practices, where teachers reflect on teaching on a deeper level (Kraft, 2002). Through such activity, teachers' roles change within a new perspective as they become active knowledge producers who continuously develop practical knowledge while solving problems in practice (Darling-Hammond, 1996; Schon, 1983). Moreover, they become part of the educational reform process as they are empowered to change and initiate change and apply new ideas. Furthermore, action research can bridge the gap between theory and practice because it helps teachers to understand the purpose of educational research and, in turn, informs educational theory of the reality of the classroom (Briscoe & Wells, 2002). In addition, teachers are empowered by having ownership of their professional knowledge.

In the case of science education, there have been a number of attempts to identify the potential contribution of science curriculum to ESD (e.g. Wellington, 2003; UNESCO, 2004). There are suggestions that the aims of school science education need to be examined with respect to socio-scientific relevance in issues such as food scarcity and poverty and hense sustainable development (Holbrook, 2009). Others have seen ESD as one example of developing scientific literacy as the '21st century science' incorporates a number of sustainable development issues within its vision of scientific literacy (Summers & Childs, 2007). When it comes to science teachers, envisioning teaching as inquiry is a relevant perspective of the science discipline. Studies that support teachers' involvement in action research on student learning, include for example Hammer and Schifter (2001) and van Zee, Lay, and Roberts (2003) while those that are speicifally realted to science teachers and action research in terms of a means to professional development include for example Ponte, Ax, Beijaard, & Wubbels (2004). Action research in this study was used as a means for participants to reflect on their own practice and to understand and improve their practice and the situation in which they are practicing. Through the process of engaging in action research, teachers gain deep insights into how they are working whilst looking forward to their future practices (Kraft, 2002) and therefore enabling them to 'transform' in their thoughts, feelings and actions in a paradigm shift.

Gedzune & Gedzune (2011) concluded that students through action research developed reflective skills on ecological consciousness and building sustainable and inclusive relationships with the world. In a study by Salite (2008) teachers' research skills were developed by involving them in action research. Nonetheless, attitudes and values towards environmental issues were developed

through active involvement in action research that allowed for active participation in the course activities and responded to different learning needs that impacted pre-service teachers' transformative pedagogies (Pace, 2010). This insight is congruent with what sustainability opts for by calling for transforming to a new paradigm of thinking and acting. Action research is therefore a catalytic change for sustainability where teachers are likely to become aware of their own beliefs and practices, expand their commitment to developing a variety of teaching methods, and renew their interest in learning about teaching. This is a role that teachers are not used to and need effort to transform. In this new role teachers become researchers and active knowledge producers.
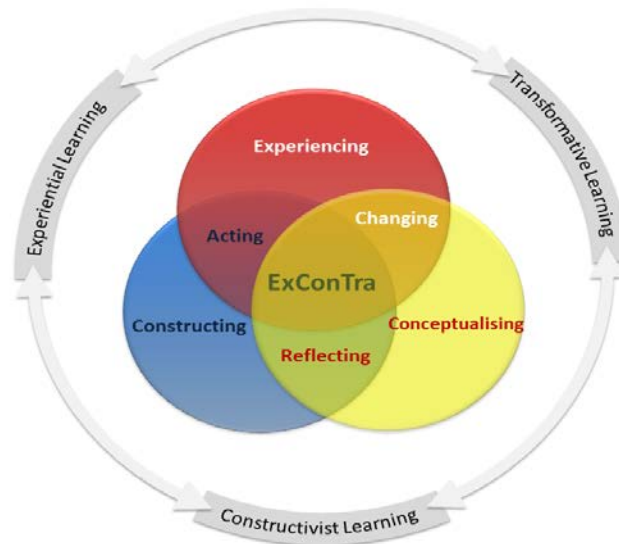
Figure 1. Theoritical framework of the study 'ExConTra'.

Context of the study

The springboard of this study is mainly the global demands on all nations to preserve resources for future generations and improve the quality of daily life. Moreover, there are demands to nurture the sense of solidarity nationally, regionally and internationally. This is especially the case in Egypt and other nations that witnessed the Arab spring which asked strongly for change and for improved quality of life. The Arab Spring asked for the main concepts of sustainability based on social equality and respect for human rights that lead to quality of life. In order to fulfil such vision, a systematic and holistic approach is essential where collaborative effort of a large number of people taking many small steps in the right direction towards a sustainable world.

In the Arab region, the vision of ESD is in line with the United Nation's DESD global orientations (UNESCO, 2008). Through the UNESCO Regional Bureau in the Arab states, the researchers administered a questionnaire in 14 Arab countries to document the status of ESD. Analysis of the responses illustrated the challenges facing the region. These challenges were classified into three main dimensions: economic, social and environmental. In each partner country of the 14 Arab countries, the Ministry of Education and Higher Education were informed of the follow-up and assessment of how to overcome these challenges. Although education is the first step towards a successful future and nurturing the human mind can foster a generation renowned for creativity, innovation, leadership and achievement, yet, educational systems in the Arab countries are facing numerous challenges themselves and this decreases their capacity to achieve the desired goals of ESD (UNESCO, 2008).

In Egypt, there are many decrees, especially those issued by the Ministry of Environment that foster one of the many dimensions of sustainable development, yet the daily practices of the individuals are far from what the country needs. However, the author believes that education is the first step towards a successful future. ESD requires a combination of teaching strategies that together allow for transformative learning in a course with an ESD philosophy and practice. Visioning and creating new perspectives are important tasks because the transformative role of

education is a key issue in ESD. Teachers' actions will change as a product of reflecting and visioning, because such future action will take into account reflection on what has happened and use this as a means to envision a transformation that will create new solutions and new ideas. Action research is therefore perceived as an effective tool to foster such reflection and visioning in order to improve teacher competencies.

From the above, the expected pathway for any development is in the hands of the Schools of Education that act as a vehicle for any anticipated change, especially as Egypt is working towards achieving the goals of Education for All (EFA) and the Millennium Development Goals (MDGs). ESD would therefore seem an integral part of achieving these two global agendas.

Nonetheless, this study is an attempt to introduce ESD at one of the governmental universities in Egypt where SD is not commonly found in courses and curricula. Even where SD is found, there exists a narrow interpretation linked to environmental issues only. This is specifically the case for courses offered at the School of Education whether at the undergraduate or postgraduate levels for 'teaching methodology' courses.

Statement of the problem

Considering the vital roles teachers have to prepare and develop pupil's ability to become effective citizens in a sustainable society; teachers are required to apply practices that foster active and experiential learning approaches that are important for ESD. Courses offered at the School of Education, which is responsible for teacher education programmes and in-service training, seem to lack offering courses on ESD in its holistic and futuristic perspective. This result came from a preliminary analysis of the programmes offered at the undergraduate and postgraduate levels. Moreover, a questionnaire was administered to a group of 23 teachers attending a seminar at the Department of Curricula and Instruction in order to indicate their prior knowledge of the ESD to justify and document the need for a revised ESD course. The questionnaire consisted of 10 questions with a five point Likert scale. The first part of the questionnaire consisted of questions directed to identifying teachers' perception of SD, while the second part asked teachers about their ESD teaching practices. The Likert scale was as follows: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree. Results illustrated that the majority of the teachers responded negatively, as they, either, agreed or strongly agreed that they lack ESD knowledge. They also identified that their current teaching practices are not focused on ESD practices. Based on these results it seemed central to fill in a gap in the courses presented at the School of Education in order to develop the teaching practices of a sample of in-service science teachers through reorienting a 'teaching strategies' course offered to postgraduate science teachers if Egypt were to achieve a sustainable future. Therefore, the study sought to answer the following research questions:

Purpose of the study

The aim of this study was to:
1. Reorient the 'teaching strategies' course by infusing ESD,
2. Engage science teachers in action research as a means to transformative learning,
3. Develop science teachers' perceptions regarding SD,
4. Develop science teachers' attitudes towards ESD and its pedagogical practices.

Research questions

The main research question that guided the study was 'What are science teachers' experiences from their involvement in action research in the reoriented course in relation to ESD?' A number of subquestions were raised to formulate the stages of the study: What are science teachers' perceptions of SD?, What are science teachers' attitudes towards teaching for ESD?, What are science teachers' pedagogical practices for ESD?, How do science teachers perceive their experiences through developing action research in ESD?

Methods

Research design
A mixed method approach with quantitative and qualitative data was employed. This was mainly in order to deal with the processes proposed at the different stages of the study that answer the research questions and addresses its main aims. The study set out to investigate the possible impact of involvement in developing action research in ESD as part of the reoriented course within the stated theoretical framework on participants' perception towards ESD in addition to their attitudes and pedagogical practices in class.

Profile of the participants
A convenience sampling was used to select participants of this study as they were enrolled in a compulsory course presented at the School of Education that the author of this study teaches. Demographic data were collected that specified gender, age range, years of experience in science teaching and experience with computers. There were 9 male teachers and 20 female science teachers enrolled in the course.

Procedure
Reoriented course on ESD
The course was reoriented towards sustainability where the author made crucial decisions, as to 'what to teach' and 'how to teach'. The purpose was to reorient the existing course on 'Teaching Strategies' by adding content on ESD and mainly adopt teaching methodologies and assignments that address issues which are pertinent to ESD. The main method in revising the course was by the 'infusion approach' that permits to address sustainability by teaching the course with a different perspective and philosophy without changing the meaning and aim of the original version. Therefore the course was guided by the author's philosophy to change and reflect, taking into consideration that sustainability demands individual and social transformation, which involves a radical shift of awareness and worldview (Reason, 2007) or transformative changes in our frames of reference (Mezirow, 2000). To make sure that the reoriented course followed an acceptable structure in terms of course design, course objectives and description were then stated. There was particular emphasis on the types of learning that ESD promotes within Delores (1996) report. In general, the course was based on the 'ExConTra' model where the author's main philosophy was to get science teachers involved in reflective activities that could allow them to change and transform. The course was a 4-hour weekly course offered in the spring semester in the academic year 2011-2012.

Science teachers were asked throughout the study to reflect on their perceptions towards SD and the critical issues that are witnessed in the local community and educational system, particularly as aspects of ESD relate directly to science education and science literacy in addition to the social and ethical context of science in schools or what is termed by Socio-Scientific Issues (SSI). Teachers were also asked to reflect on their classroom teaching practices and then develop action research projects to incorporate the main issues of SD in their daily pedagogical teaching. This was done purposely to provide teachers with opportunities for transformative learning as 'agents of change'. As for the action research, this was done collectively through the use of Wikis as a tool for online communication and collaborative discussion. In general, technology can provide opportunities for learners to construct meaningful learning environments which can be applied to ESD such as: a) engaging and challenging learners; b) stimulating dialogue and social negotiation through new modes of social interaction; c) learning by exploring and discovering, d) doing and reflecting; e) constructing personal and collective representations of meaning; and f) supporting discourse in dealing with real-life problems (Makrakis, 2011). Science teachers in this study developed research projects that started by identifying a focus of an ESD problem then go through developing action plans, data collection, and finally reaching to results, suggestions and final reflections. The whole process of the study consisted on the six components of the ExConTra learning model. The action research projects were analysed qualitatively according to rubrics developed by the author of the study. Pre and post data were also collected in terms of their

perspectives of the concept of SD and their teaching practices in regards to ESD. Quantitative data were analysed using Statistical Package for the Social Sciences (SPSS). Figure 2 shows the procedure of the study.
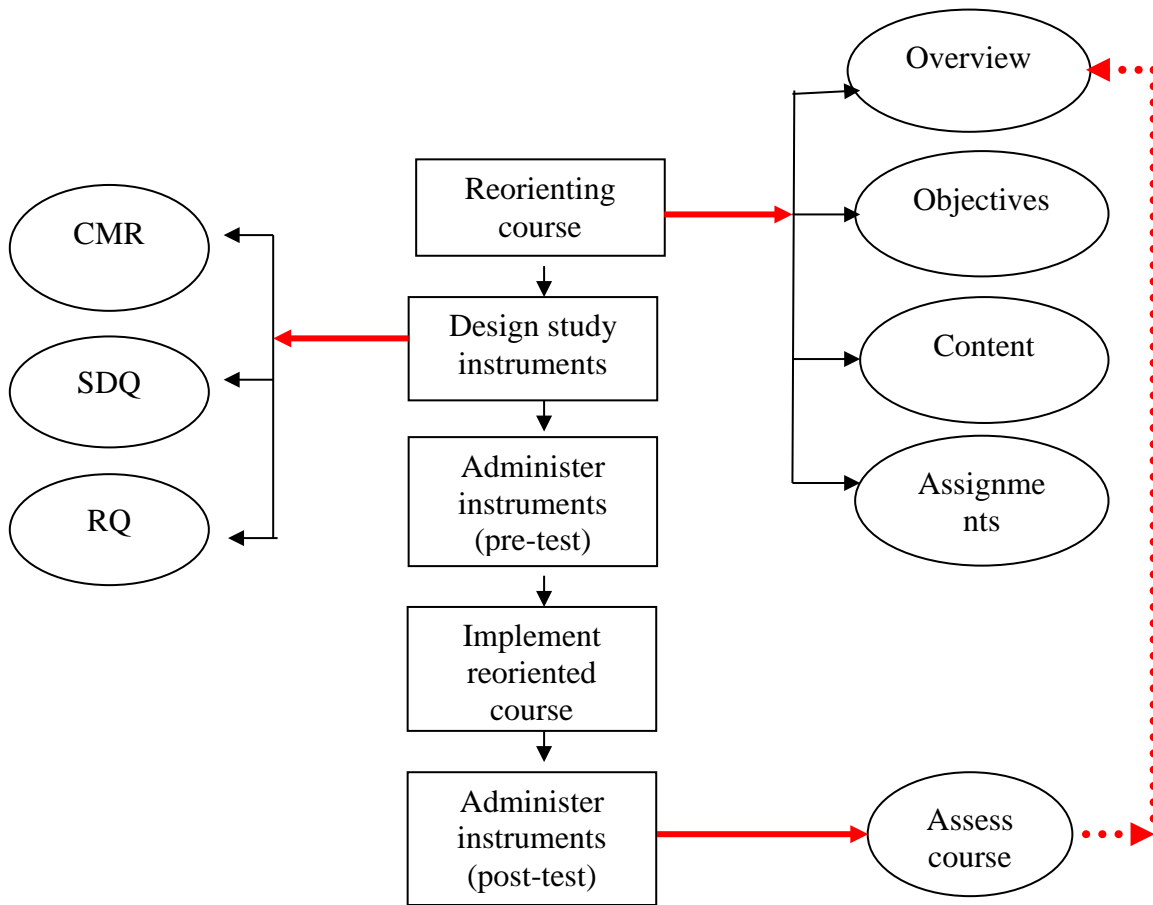
Figure 2: Procedure of the study.

Instruments

Concept Mapping Rubric (CMR)

Participants were asked to construct a concept map of sustainable development before engaging in the action research as a pre-test and at the end as a post-test. The concept maps were structured according to each participant's chosen concepts and connections. The aim of this was to probe on the cognitive organisation participants had before and after developing the action research projects. Although there is extensive work on concept mapping such as that developed by Novak & Gowin (1984) and Cronin, Dekker, & Dunn (1982), and specific work on ESD by Ahlberg (2004), the author decided to use a grading system which analyses concepts under SD dimensions that are stated in the literature. The rubric also analysed the number of valid cross-links among concepts and the number of hierarchal levels. The reliability and validity of the rubric were determined by having a second rater. The raters scored concept maps and discrepancies between raters were discussed until near consensus was reached. As for the validity, this was determined by experts who helped decide on the construct validy. The lowest total score on the concept map was 3 while the highest was 12.

Sustainable Development Questionnaire (SDQ)

The SDQ questionnaire was developed in light of previous studies, both inside and outside the Arab context. From these studies was, Azapagic, Perdan, & Shallcross (2005), Kagawa (2007),

Qablan, Abu AL-Ruz, Khasawneh, & Al-Omari (2009), Spiropoulou, Antonakaki, Kontaxaki & Sarantis (2007), Summers, Corney, & Childs (2004) and Summers, Childs, & Corneya (2005). The questionnaire was divided into two scales. The first scale was developed in order to identify participants' attitudes towards teaching for ESD, while the second aimed to identify participants' classroom pedagogical practices. The former scale of the SDQ asked participants to respond to each statement by selecting one of five Likert style responses: strongly agree, agree, undecided, disagree, and strongly disagree. There were both negative and positive statements that were placed randomly, where scores can range between 10-50. The later asked participants to select their responses according to the frequency of their classroom practices on a three-point scale: never, seldom, or frequently, where score range between 10-30. Content validity was determined by a panel of experts consisting of four science educators and two psychologists. Reliability coefficient of the attitude scale and ESD teaching practices were determined by 16 science in-service teachers, where reliability coefficient 'item-total statistics' were calculated, alpha = 0.87 and = 0.73 respectively. The author investigated participants' attitudes as studies in the literature identified the influence of science teachers' beliefs and attitudes on their teaching practices (Haney, Czerniak, & Lumpe, 1996; Pajares, 1992) and in order to expect that teachers apply ESD teaching practices in their own classes, attitudes and beliefs were therefore a concern of this current study.

Reflective questionnaire (RQ)
Open-ended questions were developed to document participants' views on how they perceived their experience in developing action research in ESD. Responses to the questions were analysed qualitatively in order to identify the underlying themes. Questions were as follows:
-   How do you view the collaborative action research experience that you were involved in?
-   How did your engagement in action research impact you personally?
-   How did your engagement in action research impact you professionally?

Results and Discussion

The results are presented under four subtitles that reflect the four research questions.

Research question one
"What are science teachers' perceptions of SD?" A blank sheet was given to participants to construct their concepts maps of SD in a time limit of twenty minutes before developing their action research projects. The same task was done again after developing the action projects. Participants were graded using the proposed grading system in this study. A dependent t-test analysis with 95 per cent confidence using SPSS version 19 shows that the final mean is greater than the initial mean. This entails that participants' involvement in the action research had a better conceptual knowledge construction on SD at the end of the research than at the beginning in terms of the number of concepts and the dimensions it represents. This reflects the theoretical framework, ExConTra as it particularly emphasis the conceptualising and constructing components of the model. The mean and standard deviation of the pre and post concept mapping are as follows in Table 1.

	Mean	SD	t	p
Pre test	4.4483	1.50205	-9.495	<0.05
Post test	7.9310	1.86951		

Table 1: T-test analysis on pre/post data from participants' concept mapping for SD (*n=29*).

Statistical analysis shows that there is a statistical significant difference between participants' pre and post-data on the SD concept mapping, in favour of the post-data. In the pre-concept mapping analyses participants' concepts related to SD were mainly in the environmental dimension, while in the post analysis this changed rapidly into other additional dimensions. This finding is in line

with that from studies such as Summers & Childs (2007) and Summers, Corney, & Childs (2004). Social, cultural and economic dimensions were included in participants' post concept mappings as well as the environmental. From the examples found were equality, democracy, freedom of speech, social responsibility, human right, green schools. Nonetheless, the significant increase in teachers' perspectives on SD in the post-data can be due to the effect of the independent variable of the study, namely the reoriented course and the action research that teachers were engaged in that provided for meaningful experiential learning, as part of the ExConTra model, on the key concepts and values of various SD dimensions. This finding aligns with what a study indicated that when professional development is content-focused, connected to other aspects of teachers' lives and coherent, it is more likely to have positive impact on teachers' knowledge and skills than less coherent experiences (Garret , Porter, Desimone, Birman, & Yoon, 2001). This is what the action research projects seemed to advocate as it added meaning to science teachers responsibilities and roles. According to Makrakis & Kostoulas-Makrakis (2012) in their ExConTra model, for learners to make meaning, either individually and/or shared, they need to reflect on their own experiences, leading them to develop more abstract understandings of their experiences (conceptualizing). Arriving at individual and shared meaning (constructing), learners need to get involved in a shared inquiry enriched through continuous reflection, re-conceptualization and active experimentation. Other studies also acknowledged the role of action research in developing their participants' SD knowledge (e.g. Corney, 2006). It is important to develop participants' perspective of SD if they are expected to act as 'agents of change' in their schools and classroom contexts, hence the growth of research in studying teachers and lecturers' perceptions of ESD (Cotton, Warren, Maiboroda, & Bailey, 2007; Jones, Trier, & Richards, 2008; Reid & Petocz, 2006). To conclude this point, Smith (2009) stressed on the importance of the way teachers interpret ESD and how it will affect the way that they teach it.

Research question two
"What are science teachers' attitudes towards teaching for ESD?"
The quantitative data collected from all participants were analysed using SPSS-version 19.0 software. Prior to analysis, descriptive statistics of all variables in the study were examined using frequencies and the minimum and maximum values for each variable were examined for the accuracy of data entry by inspecting out of range values, which did not show any outliers. Statistical analysis shows that there is a significant difference between participants' pre and post-data on the attitudes towards teaching for ESD scale in favour of the post data (Table 2). It is important to develop positive attitudes, especially if teachers are expected to transfer their experiences in classroom and school contexts. In this case, if teachers are convinced about the importance of ESD practices, they can become 'agents of change' in their schools for an educational and political reform. They can also try to overcome the factors that inhibit the facilitation of ESD practices in schools and local communities. Acting as change agents, learners are empowered to transforming experience through critical reflection and active experimentation. When critical reflection is transformed into an action it becomes praxis that turns learners able to function as agents of change (Makrakis & Kostoulas-Makrakis, 2012). By this role teachers are applying components of the ExConTra learning model specifically the acting and transforming components.
Nonetheless, the significant increase in teachers' attitudes in the post data can be due to their experiential involvement in the action research projects that link directly to science teaching. This finding supports what Cotton, et. al. (2007) found when 55% of their respondents agreed or strongly agreed that sustainable development was central to their teaching interests as respondents suggested imaginative and diverse teaching strategies that reflected the contested and exploratory nature of sustainable development. Qablan, Abu AL-Ruz, Khasawneh, & Al-Omari (2009) in a Jordanian study also found that university teachers developed attitudes towards ESD teaching. In general this study claims that a change in attitudes would seem essential for teachers to become agents of change.

	Mean	SD	t	p
Pre test	31.7586	7.47689	-6.524	<0.05
Post test	40.7931	4.12639		

Table 2: T-test analysis on pre/post data from participants' attitudes towards teaching for ESD (*n=29*).

Research question three

"What are science teachers' pedagogical practices for ESD?"

Although teachers were not actually observed in the classroom, which is considered a limitation to this study, practices were indicated through teachers' responses to the SDQ. Statistical analysis shows that there is a significant difference between participants' pre and post-data on their ESD classroom practices according to responses from the second scale in the SDQ (Table 3). This result stresses on the components of the ExConTra learning model, as teachers seem to be interested in experiencing, acting and transforming ESD in their science classroom teaching practices. By referring back to the literature, vitality of teaching for sustainability is supported by Posch & Steiner (2006) and Filho & Santos (2005) who stated the importance of initiating and applying new approaches in teaching for sustainable development. The main emphasis in ESD practices lie in a paradigm shift from teacher centred approaches that seem to dominate science classes to that which encourages active and participatory learning approaches according to Tilbury (2011).

	Mean	SD	t	p
Pre test	20.8621	4.24873	-7.093	<0.05
Post test	26.2759	1.77073		

Table 3: T-test analysis on pre/post data from participants' ESD teaching practices (*n=29*).

Research question four

"How do science teachers perceive their experiences through developing action research projects in ESD?"

A reflective questionnaire with open-ended questions was designed to investigate science teachers' experiences while developing their action research projects. Analysis of teachers' responses required a coding process based on the qualitative findings. The main purpose of the analysis was not to quantify data but to find themes and patterns across teachers' responses. In general, the projects that the science teachers developed emphasised key aspects related to ESD. The teachers developed seven projects in total, where four teachers were involved in each group except for one group that had five teachers. Wikis were used as a means to communicating, discussing, decision-making and developing the action research projects. It was also a means to uploading and sharing material related to their ESD projects whether it were text or videos. The process of developing the ESD action plans and the use of technology where based on all six components of the ExConTra learning model: experiencing, reflecting, conceptualising, constructing, acting and transforming.

How do you view the collaborative action research experience that you were involved in?

Two main themes were identified in relation to the analysis of responses to this question. These were identified as the 'social theme' and the 'change theme'.

Social

The social theme that emerged from the data was the benefits of collaborating with colleagues in developing their action research projects. The science teachers in their group collectively determined the focus of the research and collaboratively shared and discussed aspects via online

Wikis. By the end of the course, all groups completed their ESD research and presented their projects to the rest of the cohort. All teachers indicated that they had valuable learning opportunities by sharing ideas throughout the process. They repeatedly mentioned that they learned from each other about various aspects of teaching and how to infuse ESD in their practices and schools. In particular, the teachers found that each one felt a spirit of community. The point on collegial support echoes finding from previous studies such as Briscoe & Wells (2002), Burbank & Kauchak (2003), and Kraft (2002) and seems an essential component for supporting teachers' learning and professional development. One teacher, for example, mentioned ''I really enjoyed and learned from everyone in the course, while another said "The interaction that we had was valuable. We shared ideas that we could use in the classroom and how to bring sustainable development into reality". However, another teacher mentioned the difficulty of working in groups at first then showed how this soon disappeared throughout the work "It was really difficult at first then soon we started to cope and understand each other and commit to our task".

Change

In the literature there is documented evidence that 'change' is difficult to achieve with teachers, as they seem to resist it quite often. However, teachers need to be persuaded of the need to change their teaching practice and be allowed the chance to acquire the knowledge so that the idea of change and transformation matures in them and motivates a change of attitudes (Connelly & Clandinin, 1988). An indication that this had happened to participants in this study is that 'change' was a key finding in the analysed data, as teachers stated that they had 'changed' or will continue to 'change' in one way or another. Data revealed that as the teachers' knowledge changed, so did their teaching practices. Some of the teachers linked 'change' to their practices and professional development while others referred to 'change' in terms of their skills and values especially towards ESD as a new topic to their repertoire. However, most teachers not only recognized their 'change' but also discussed the struggle it took in order to change. Others felt good about the 'change' they made but felt they could have done more, given the time and energy. Examples of teachers' responses are: "Action research and the logical thinking needed for it changed my professional practices by changing my thoughts from just theoretical ideas on paper to concrete practices applicable in the real world", "I also have more confidence to make positive change", "Since action research works in cycles, modifications are necessary, as well as encouraged. There is no fear of not getting it right the first time", "I know that my actions can bring about change, not only to myself, but to my school too", "I developed reflective skills necessary for my work as a revolutionary teacher who wants to change for the better", "I have to be positive to make change for the better and not to give up".

How did your engagement in action research impact you personally?

Three themes were identified through analysing responses for this reflective question. Science teachers indicated that the action research helped develop 1) knowledge, 2) skills, and 3) values and dispositions that were beneficial on the personal level. In the knowledge theme teachers developed concepts such as: democracy, social responsibility, equity, fair trade, citizenship, economic satisfaction and consumer right. In the skills theme, teachers' responses were mainly about the skills they developed and dispositions towards aspects related to ESD. It seemed that the process of going through action research helped develop thinking skills such as: positive thinking, scientific thinking, critical thinking, creative thinking, research skills, future planning and reflective thinking. Other skills were also developed such as: communication skills, organisation skills, Internet search skills, decision-making, problem solving, freedom of speech and self-assessment. From the values and dispositions that were commonly identified as being developed: better acceptance of the other, appreciation of human rights, tolerance, and appreciation of community service. The following are examples from teachers' quotes from the identified themes.

> "I am more aware of my actions and the affects they have on my environment and others while engaged in action research".
> "Acknowledging the importance of biodiversity and behaviours positive to the environment".

> "This project has made me change even at home. I am aware and concerned about resources so I am trying to manage and consume water, energy and food better"
>
> "Involvement in action research made me apply reflective thinking in my daily life"

How did your engagement in action research impact you professionally?

Three themes were also identified through analysing responses for this reflective question: 1) knowledge, 2) skills and 3) values. Knowledge related to sustainable development and relevant research that could be applied with students at various stages in addition to the experiences of other countries in ESD in order to identify what could be done in Egypt, if applicable. Identify ways of making use of all resources, especially everyday used material that could be designed for teacher aids in the classroom. Through the developed projects, teachers realised that there is a great need to link between school administrators and the local community. One teacher stated "I have now updated knowledge in my field that can help develop myself and my students", while another mentioned, "I can change students' behaviour especially in aspects of sustainable development and everyday practices", "Increase the effectiveness of science teaching and therefore the achievement levels of my students".

In terms of the values and dispositions that were developed by the teachers, these were accepting student individual differences, development of positive relations with students, and appreciation of a respectful learning environment. Teachers went on to developing through their proposed projects students' ESD awareness and behaviour and disseminate this to the local community. They even valued the use of technology in their teaching. An example of this theme was what one teachers stated "Accept students comments and ideas wilfully"

The skills varied from life long learning skills that relate to the 'change' teachers had identified before and hands on application of action research that helped link theory to practice in a realistic way. Also teachers mentioned the use of Wiki and how it helped in formalising their ideas and suggestions for providing for ESD in their own schools. Examples from teachers' quotes are as follows:

> "I have learnt to review and assess my own teaching"; "How to infuse ESD in terms of its teaching practices and the application of reflective thinking"; "Sharing with students thoughts and ideas in solving SD issues in the local community"; "How to manage waste in the school".
>
> "I now understand that action research is a valid means to solving educational problems in schools and providing for concrete suggestions through action plans that are realistic and hands-on".
>
> "I see myself as responsible for solving everyday problems in the class, as I have a positive role in the profession".
>
> "Apply ESD in schools, developing students' ability to living peacefully with others".

Stressing on developing reflective practices in teaching was the highlight of several responses. The process of action research encouraged the teacher researchers to reflect about the art and science of teaching. Sagor (2000: 7) believed that an important purpose for action research was "building the reflective practitioner". Danielson & McGreal (2000) viewed reflection as a critical aspect of professional growth. Teachers described the introduction of new teaching strategies as they responded that their teaching practices had changed through involvement of the action research projects. Many said that the research project helped them develop new strengths in teaching and add to their existing repertoire of instructional methods. This was based on their understanding and appreciation of the Earth Summit that advocates for student centred teaching and respecting the five pillars of learning identified by (Delores, 1996). One teacher wrote, "Yes, my teaching has changed as a result of the action research. My science teaching will surely not be the same as before as now I will link science with sustainable development issues". Teachers also mentioned that the action research process made them more confident to try these new strategies. Ferrance (2000) and Sax & Fishe (2001) found similar results; action research gives teachers more confidence in their own work. Teachers appeared empowered and confident in regards to daily and future pedagogical practices and decisions.

Conclusion

The significance of this study hinges upon the voices, viewpoints, and experiences of science teachers' engagement in action research. The research empowered the teachers to take the role of active participants in the research process and helped them develop and critically analyse and reflect on their own knowledge about teaching and ESD in their schools and subject areas. While engaging in this work, teachers came to trust their own ability to construct knowledge, to improve their practice and feel that they have a positive impact as agents of change in their school context and with classroom teaching practices in relation to ESD. Findings from this study suggest that for collaborative action research to be effective at empowering teachers, teachers need to join with other passionate teachers to explore ways to voice freely their concerns, develop action plans, and enact their plans for change. Action research was a valid means to experiencing, reflecting, conceptualising, constructing, acting, and transforming science teachers in ESD. Through action research science teachers' conceptual organisation of the SD developed further, and teachers' attitudes towards ESD in addition to their classroom pedagogical practices improved in the post-test. The author therefore recommends including action research in teacher education programmes particularly where teachers work collaboratively together and where the six components of the ExConTra learning model can be applied. With such view on action research, teacher education programs will fulfil their accountability for transforming teaching practices for successful educational reform.

The true change factor that influenced science teachers in this study was the philosophy and methodology of the course rather than its content, where the assignments and action research provided opportunities for active engagement in learning that changed their attitudes and values towards SD, their teaching for ESD and therefore was a transformative experience.

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Branding the Green Education. Challenges Facing Implementation of Education for Sustainable Development in Egypt

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Abstract

Due to the scarcity in natural resources and the demand for green labour and economy, education for sustainable development (ESD) gained great importance in developed countries let alone developing ones. From this point of view, this paper is studying the possibility of infusing ESD in Egypt after one and a half year of January 2011 youth revolution. A primary data gathering method was conducted on a sample size of 79 young undergraduate people (67 from the American University in Cairo (AUC) and 12 fresh graduates from conventional educational systems.) The results indicated that there is a positive relationship between high cultural resources along with early childhood awareness, and ESD adoption and infusion. Also, Spearman's rank association test showed a negative relationship between ESD infusion and the satisfaction level of the current conventional curriculum. On the other hand, Spearman's rank association test showed that α is greater than 0.05; accordingly there was no correlation between ESD infusion if introduced within the curriculum of an existing well-established university than if introduced as the final outcome of a newly ESD specialized university. The paper highlights the importance of ESD's brand associations offered as a service product. After validating the hypothesis the author discussed the findings and provided solid recommendations for ESD infusion in Egypt.

Key-Words: Education for Sustainable Development, Branding, Re-orient University Curricula to Address Sustainability, Cultural resources, Sekem, Heliopolis University for Sustainable Development

Background

Education for sustainable development (ESD) is the main platform for the new millennium. This paper discusses the diffusion of ESD from a marketing perspective. ESD is both a challenge and an opportunity. It is a challenge to promote ESD due to the limited cultural resources in Egypt as well as in other developing countries. Neither parents nor students would understand the real value of ESD. Nevertheless the gains and opportunities are more likely to offset the expected difficulties. From a positive angle different reputable organizations are endorsing ESD. Eventually this positive global outlook could generate progressive public support and awareness.

Marketing efforts hand in hand with all other public relation activities would highlight and distinguish ESD from other conventional educational systems. This paper will provide a thorough analysis for the Egyptian education system. The analysis of previous academic studies will identify the literature gap thus raising the importance of this study. The paper is an empirical analysis that aims to generate a vivid model for ESD adoption in Egypt and other culturally similar countries. Promoting ESD in Egypt is the main theme of the paper. The paper is composed of three dimensions: (i) Identifying ESD brand elements and investigating these attributes as people processing service type, (ii) undertaking a survey to validate our theoretical model and (iii) drafting the recommendations of ESD adoption, and suggesting future research. Our aim is to elaborate on the most suitable marketing strategy for ESD diffusion. Within this context a model will be created for enhancing ESD infusion. The practical and theoretical background along with

the research methodology will identify the paper limitations. The major objective of this paper is to provide a full-validated model for ESD adoption.

Sustainable development, as defined by the EU, stands for meeting the development needs of present generations without jeopardizing the ability of future generations to meet their own development needs. Sustainable development does not focus solely on environmental issues, but broadly captures the different dimensions of development. Traditionally, sustainable development is conceptually considered in terms of three main pillars:

- Environmental sustainability: is defined as the ability of the environment to continue to function properly indefinitely. The goal of environmental sustainability is to minimize environmental degradation and to stop and reverse the process that leads to environmental degradation.
- Economic sustainability: is defined as the way to achieving economic growth whilst respecting environmental limits, finding ways to minimize damage to the natural world and making use of the earth's resources in a sustainable way.
- Social sustainability: The social pillar of sustainable development is defined as a compilation of actions and efforts to promote development that does not deplete the stock of social and human resources but rather contributes to the enhancement of their potential. The social pillar also refers to the concept of "building sustainable and harmonious communities". (Final Report submitted by GHK, 2008)

Education is a prerequisite for promoting the behavioral changes and providing all citizens with the key competences needed to achieve sustainable development. Success in revising unsustainable trends will, to a large extent, depend on high-quality education for sustainable development.

Education and training should contribute to all three axes of sustainable development, namely:

- **The Social perspective** – education and training strengthen social cohesion by investment in human capital;
- **The Economic perspective** – education and training contribute to building a knowledge society based on sustainable economic growth; and,
- **The Environmental perspective** – education and training are crucial for changes in citizens' behavior on issues such as: consumption, transport, use of sustainable energies, etc. (Final Report submitted by GHK, 2008)

ESD is a complicated process that requires collaboration of different partners to introduce. ESD is a holistic orientation that necessitates coordination of different stakeholders to ensure environmental preservation as well as social and economic development. An understanding of sustainable development begins in early childhood. The diffusion of ESD is not limited only to universities. Schools, faculties, non-governmental organizations (NGO's), farmers, manufacturers, service providers and others have a vital role for ESD diffusion (Likon,Asunta, Rihtaršič, Korže, 2011). Education for sustainable development is a vision to empower people to meet future challenges. Out of this importance, the United Nations (UN) declared 2005-2014 as the UN Decade for Education for Sustainable Development (DESD). Since education for sustainable development is composed of economic, social, cultural, and environmental issues, UNESCO was asked to lead the decade.

Reorienting universities to address sustainable development is essential to equip graduates with the necessary skills and knowledge and sustainability values to meet the future challenges. ESD is multidisciplinary also including human rights and climate changes. Based on this context the Re-orient University Curricula to Address Sustainability (RUCAS) project was established to assist university staff and management in Egypt, Lebanon, and Jordan to infuse ESD in higher education curricula (Stockholm University Institute for International Education, 2011).

In 2008, the Danish Technology Institute and Technopolis group had identified the type of learning and context of ESD curricula as follows:

Formal learning: learning that occurs within an organized and structured context (i.e. formal education institutions such as schools, colleges, vocational training institutes and universities), and follows a particular structured design. It typically leads to a formal recognition (diploma,

certificate). In those cases, the issues of sustainable development tend to be inserted in the curriculum of the institution;

Non-formal learning: learning which is embedded in planned activities that are not explicitly designated as formal learning, but which contain an important learning element, such as vocational skills acquired on the workplace;

Informal learning: learning resulting from daily life activities related to work, leisure, free-time, etc. This type of learning is sometimes referred as experiential learning. Generally, it does not lead to certification. (Final Report submitted by GHK, 2008)

Our assumption is that the full curriculum of ESD should initially be introduced in the Egyptian education system through both public and private universities to ensure infusion. The education system in Egypt is divided into four main categories: public that refers to schools and universities owned by the government, Azhary that refers to schools and universities owned by the government but provide education on Islamic religious basis, private/language that are privately owned schools and universities, and international like IGCSE and American Diploma. Graduates of Azhary and public schools are not considered part or even potential target market for ESD. Pupils enrolled in those schools are barely satisfying their basic necessities. They are called survivors with low financial resources and innovation capabilities. Their personal characteristics make them very loyal to traditional providers/products (SRI Consulting Business Intelligence, 2012). Private education expenses are far beyond survivors' limited financial ability. Parents who send their offspring to other regular private/language schools could afford the private education fees; but will definitely face extreme cognitive hardships to understand ESD core value. The assumption is based on the limited cultural resources in Egypt.

Usually the middle class segment is psychologically dominating the high uncertainty avoidance range (Hofstede, 1998). This means that the middle class segment avoids taking risks and hate ambiguity. They prefer to buy common or traditional products and depending on their peers, relatives and personal experience for buying high involvement products or fateful products. Based on this analysis, most of the middle class segment prefers traditional private universities. Thus, the diffusion of ESD in Egypt will encounter extreme hardships as perceived by students and parents who are affiliated to private language schools. This assumption is based on launching ESD as a new product for a new university. On the other hand, we would relax this assumption a little bit if ESD is being introduced as a new program in an already well-established university like the American University in Cairo (AUC) or the German University in Cairo (GUC).

Nevertheless if ESD is being introduced as a new program in existing private universities students' perception could be positive than being introduced in a newly born university that is specialized in ESD. Based on this assumption some efforts could be made to attract international school graduates to join ESD in well-established universities.

Advocates could promote ESD as an experience to shed the light on its unique competitive advantage and to sharpen its distinguished market position. A potential position could be established on branding the customer experience. Most of international school graduates are targeting the AUC as the Crème de la Crème University in Egypt. Studies showed that young adults and teenagers are blindly imitating their peers. It is not likely that ESD will flourish in its early stages but for sure there is a wide opportunity for ESD growth. Egypt is facing many environmental challenges and a growing need for practicing green economy to ensure social and economic development particularly after January 2011 revolution. The paper assumes that conventional, vocational, private, and public schools and universities lack the essence of ESD (The American University in Cairo, 2012).

Research Problem

Students and parents will face cognitive dissonance to understand the education for sustainable development full value a fact that hinders its full diffusion in Egypt

The term cognitive dissonance is used to describe the feeling of discomfort that results from holding two conflicting beliefs. When there is a discrepancy between beliefs and behaviors, something must change in order to eliminate or reduce the dissonance. (Cherry, 2012)

Referring to this definition, students and parents will face a feeling of discomfort in their beliefs and behaviors to judge on a sustainable education as compared to the traditional conventional education curriculum.

Assumptions

1. An understanding of sustainable development begins in early childhood.
2. ESD diffusion depends on infusing it in the Egyptian education system curricula.
3. Limited cultural resources in Egypt hinder ESD diffusion.
4. The infusion of ESD in Egypt will encounter extreme hardships as perceived by students and parents.
5. If ESD is being introduced as a new program in an already existing university students' perception could be more positive than if being introduced in a newly born university.

Branding Education for Sustainable Development

The American Marketing Association (AMA) defines a brand as a "name, term, sign, symbol or design, or a combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of other sellers.

Brand associations and beliefs are deeply rooted in customers' minds. Brands are like people with their own personalities. Brand associations are the attributes or images of the brand. Branding strategies are deeper than the functional or practical part of the brand. Branding is too much into the intangible attributes or characteristics of the brand (Kevin and Donald, 2004).

A strong brand creates consumer preference for the product/service behind the brand, it provides increased revenues and market share, increases the company's market value, prevents new competitors from entering the market, and creates a unique and differentiated company image.

ESD has different brand associations with different effects on consumers. Freedom, responsibility, and passion are the main pillars of ESD brand's associations. From these pillars other brand associations are likely to evolve such as: nature, energy, community, arts, culture, development, innovation, natural resources, humanities, and major environmental issues.

Therefore, ESD is a holistic orientation for branding the education experience. This experience will be practiced through building students' unique personalities as a result of industry internships and community service activities. ESD identity is a rounded orientation composed of fun and sophistication. Thus, we assume that ESD brand associations represent its value proposition that distinguishes its brand personality.

The paper investigates if brand associations could come from outside the world (McCracken 1986) to present a meaningful picture or it would be difficult for Egyptians to understand ESD branding themes. The paper assumes that ESD and its tangible and intangible associations represent a cultural meaning and a positioning strategy. As mentioned previously due to the limited cultural resources in Egypt, it is expected that parents and students will face extreme hardships to understand ESD concept. Thus the following hypotheses are formulated:

H1.High cultural resources are positively correlated with ESD infusion.

To validate a long-standing marketing concept Aaker (1999) affirmed that brand personalities and traits are only important if these traits are reflecting customers' personality and characteristics. People like to own and use products that reflect their self-concepts. This has been evident in this statement "we are what we have".

Some areas, which have not been investigated yet, are related to the education type and its correlation with specific cultural understanding. Another important dimension that the previous

literature did not provide is to identify the cultural attributes and the branding elements for promoting education for sustainable development. Needless to say, that by identifying the appealing ESD brand associations; all other following tactics will be much easier to carry on. The researcher agrees with Aaker (1999) that brand image plays a role as a symbolic value and could strongly influence the buyer's choice.

Customers' values and brand associations are two sides of one coin. Such values if appropriately understood will have a great impact on identifying the appealing associations for promoting ESD. Having said that, establishing the fitting ESD brand image would definitely influence purchasing and consumption curves. In fact, desired images and personal status are shaped in early childhood. This paper assumes that if ESD theories and practices are embedded in core curricula at primary schools it will be well perceived by the target audience. Pupils' personal traits will be anchored around ESD brand salience. Thus we hypothesize the following:

H2. Early childhood awareness increases the possibilities of ESD adoption.

On another note if ESD is part of a well-established university curriculum it would be infused easier than if being introduced as a standalone curricula in a new university. Thus, the following hypothesis is provided:

H3. There is a positive correlation between ESD diffusion if introduced within the curriculum of an existing well-established university than if introduced as the final outcome of a newly established university.

Based on the nature of ESD curricula, it is to be positioned on sophistication, future orientation, progression, culture, and fun. This positioning theme is in alignment with ESD branding elements and at the same time fits with the characteristics of ESD target audience. Another branding attribute that needs further illustration is people as part of the service factory. Universities in general are providing intangible services. People in service factories are embedded in the branding character of any serious service provider (Tschirhart, Christensen, Perry, 2005). ESD as a pure intangible product is located at the far end of the service spectrum. Consumers in pure intangible services count more on the service branding attributes prior to purchase and consumption. Depending on branding attributes to evaluate the service prior to consumption has a rationale point. Services are very hard to evaluate prior to consumption. Therefore, branding elements help customers to expect the service value before consumption (Rao&Ruekert, 1994). ESD falls within the range of the experience attributes that entails trying the service first to evaluate it after consumption. Some services belong to the credential attributes that are facing difficulty to evaluate the service even after consumption.

Sekem

Sekem is a hieroglyphic word, which means vitality. It is also a very well known Egyptian company for its holistic self-sustained nature. Sekem is composed of diversified companies that represent a solid and integrated supply chain based on sustainability. One of Sekem's strategic business units is Heliopolis University (HU) for Sustainable Development. HU is introduced in the Egyptian market as part of the Sekem group. Based on Sekem's success and achievements in addressing sustainable development challenges Heliopolis University will be positioned as an extension for Sekem brand associations. Thus, Sekem will form cobranding alignment with HU to utilize another market opportunity represented in ESD (Rao&Ruekert, 1994). Sekem and HU cobranding is a pure example of intangible complimentary offers based on relevant brand associations. It is wise to establish cobranding only if the offers are relevant and fitting with each other. This scenario is best described by referring to IBM and Intel cobranding strategy. Sekem and HU cobranded strategy is relevant and makes the most sense since both are addressing sustainability but from different dimensions. Sekem is offering tangible real goods like organic foods and it is contributing positively to the society and community through various developmental projects. Whereas HU provides ESD services thus both are very well associated together. Based on this assumption cobranding might also foster the infusion of ESD in developing countries.

A valid reason for cobranding in general and for ESD particularly is when a second brand is needed to signify quality (Park, Jun, & Shocker, 1996; Rao&Ruekert, 1994). If the new brand attributes are not sufficient to convey the brand meaning or to deliver the quality promised then cobranding is one option to signify value and quality and thus satisfaction. Based on the previous discussion the following hypothesis is addressed:

H4.There is a negative relationship between ESD infusion and satisfaction level of current conventional curriculum

As mentioned previously ESD is a hard to grasp concept in limited cultural resource societies; hence cobranding with a well-established meaningful brand could facilitate the launching process and convey the brand promise. The point is to reduce consumers' cognitive dissonance especially in information processing service. Cobranding strategies is one solution for handling customers' anxiety or concerns. Also brand alliance is crucial when partners face scarce resources. As a matter of fact resources are not limited to tangible resources but intangibles as well. An unknown brand is a resource deficiency that needs to be complimented by being affiliated to a strong brand (Tschirhart, Christensen, Perry, 2005). Universities could overcome ESD brand deficiency by partnering with stakeholders and institutions that are well perceived in sustainable development or are highly ranked in any other related field.

On another note ESD is a people processing service; therefore university employees are part of the final output. In order to maximize the final output employees as administrators and faculty members must buy into the norms and principles of sustainable development. It is a matter of being holistically committed to ESD marketing promise. The more the service is located at the far end of the intangibility spectrum the more the personnel will represent big portion in the service brand (Bateson, 1995; Riley, 2000).

Theoretical Framework

The main objective of this paper is to identify the most influential independent variables which impact ESD infusion in Egypt, and to identify the impact of the demographic structure as a moderating variable on ESD adoption. Based on the statistical measures the researcher aims to validate the hypothesis.

The initial model includes four independent variables (High cultural resources, ESD early childhood awareness, ESD embedded curriculum in a well-established university, and education satisfaction) demographic component (age, gender, education level, income level, and Internet literacy). The dependent variable is the acceptance and the infusion of ESD in Egypt. The researcher conducted an empirical study to investigate the model validity. Based on the secondary sources and the empirical data gathering the final model is presented at the end of the paper.
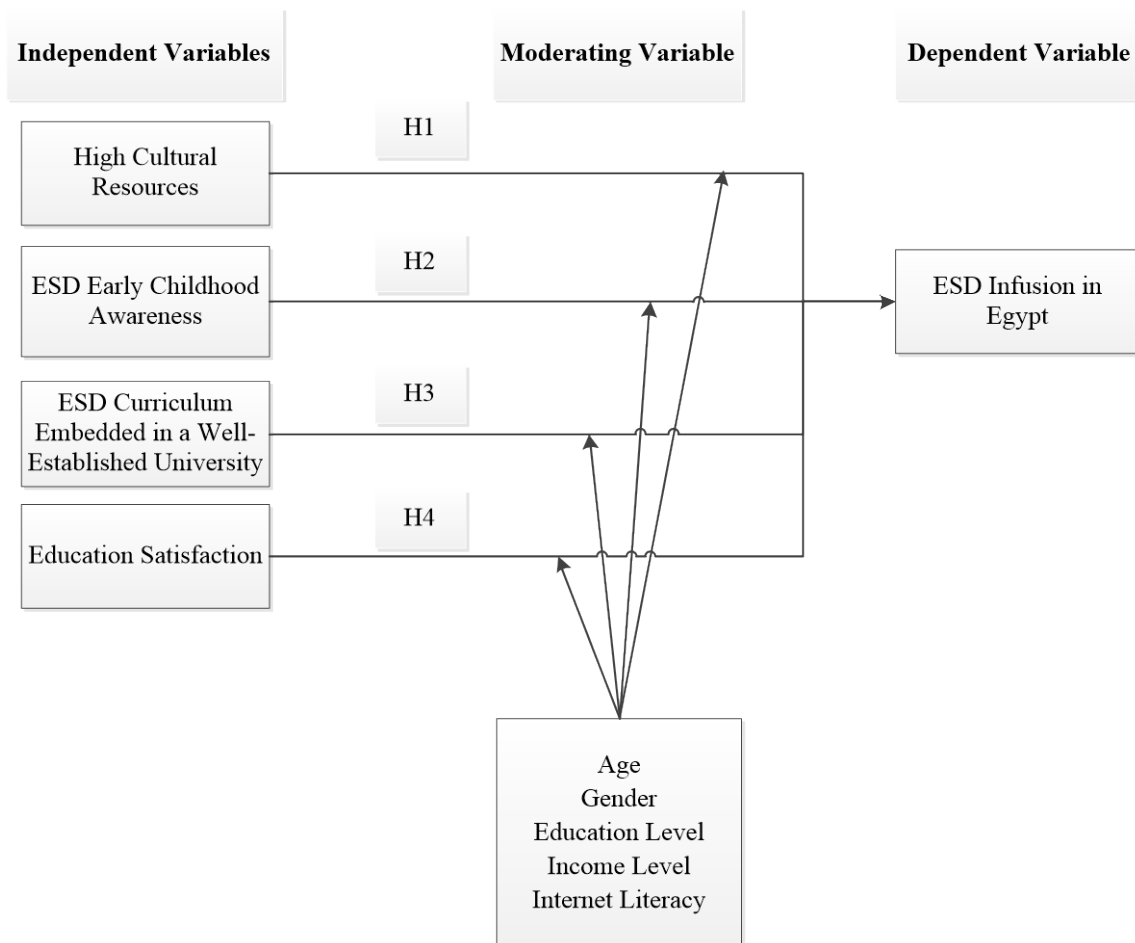
Figure 1: The Proposed Model.

Sampling Technique

Due to the lack of sampling frame, the sampling method is a non-probability sampling method; the most appropriate one is the snowball sampling technique. The student database of the American University in Cairo represented the main sample frame. Elder generations are being included in the study by using the judgmental sampling approach.

Importance of Education for Sustainable Development Infusion

Our economic activities led us to face unprecedented challenges. These challenges exceeded the environmental spectrum to assault our personal health. Tremendous threats as indicated by the multiple financial and economic crises prove that the conventional economic models are vulnerable and weak (International Greening Education Event, 2011). No doubt that ESD is the most promising path to utilize the limited global resources and to generate green labour generations. The constraints faced to promote ESD may hinder its adoption. According to this situation the author aims to reach the following objectives:
1. Identifying existing and potential bottlenecks for ESD adoption in the Egyptian education system.
2. Identifying the target market for ESD.
3. Sorting ESD competitive advantages.

4. Indicating the most appropriate marketing tactics to deal with threats and opportunities facing ESD providers.
5. Providing a concrete model for ESD infusion.

The paper analysis focuses on identifying the threats and the limitations for infusing ESD in Egypt. It gives a special attention to investigate the infusion of ESD in private universities. The questionnaire measures students' perception if ESD is introduced as part of current universities curricula or if it is to be offered by a specialized ESD university. The data is gathered through primary data collection method. Quantitative close-ended questions were only used to obtain the results.

Sample Description

The sample size is 79 young people (67 AUC undergraduates and 12 fresh graduates from conventional educational systems). Females to males' ratio are 6:4 which means that the sample includes 62% females and 38% males. As indicated hereunder the sample age bracket represents 70% below 24 years old.
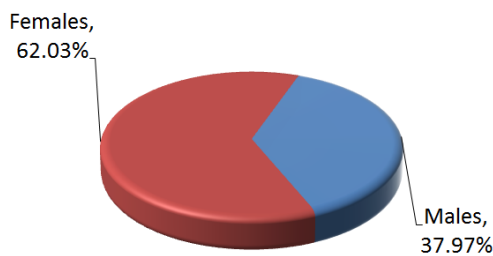
Figure 1: Males to Females' Ratio.
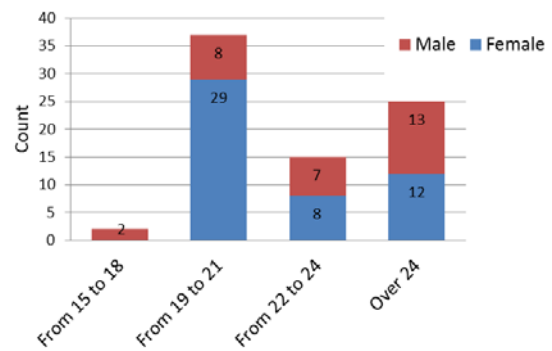
Figure 2: Age Brackets.

Figure 3: Education Status.

		Gender	
		Female	Male
		Count	Count
Age bracket	From 15 to 18	0	2
	From 19 to 21	29	8
	From 22 to 24	8	7
	Over 24	12	13
Education	Completed	12	13
	High school	0	2
	University	37	15

Table 1: Age and Education Segmented by Gender.

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Feature	Percentage
Quality of education.	28%
University reputation	24%
Type of education	21%
University curriculum	10%
Faculty members	8%
University activities	8%
Campus facilities	1%

Participants were asked to rank order the appealing university features they consider when selecting a university as indicated in (table 2)

Table 2: Appealing University Features.

Age and ESD Awareness

As indicated in (table 3and chart5) most of the respondents have either no previous knowledge or very basic knowledge about ESD. Those within the age bracket from 19 10 24 years have a very basic understanding of what ESD is but it goes after that the older the person the less knowledge about ESD he/she has.

		What is Your Age Bracket?							
		From 15 to 18		From 19 to 21		From 22 to 24		Over 24	
		Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count
Early Childhood and Previous ESD Awareness	No Previous Knowledge	100.00%	2	5.40%	2	13.30%	2	28.00%	7
	Very Basic Understanding	0.00%	0	54.10%	20	53.30%	8	40.00%	10
	Basic Understanding	0.00%	0	35.10%	13	33.30%	5	32.00%	8
	Fair Knowledge	0.00%	0	5.40%	2	0.00%	0	0.00%	0
	Very Knowledgeable	0.00%	0	0.00%	0	0.00%	0	0.00%	0

Table 3: Early Childhood and Previous ESD Awareness - Segmented by Age.
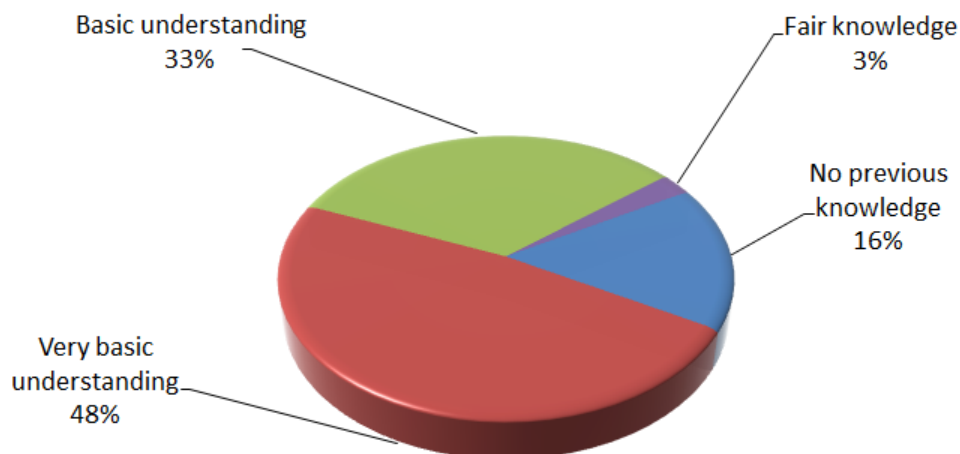
Figure 5: Early Childhood and Previous ESD Awareness Chart.

Awareness and ESD Adoption

As highlighted in (table 4 and figure 6) the majority of the sample who has no previous knowledge about ESD was neutral toward adoption and infusion of ESD.

		Early Childhood and Previous Awareness								
		No Previous Knowledge		Very Basic Understanding		Basic Understanding		Fair Knowledge		Very knowledgeable	
		Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count
ESD Adoption and Infusion	Strongly Disagree	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
	Disagree	0.00%	0	5.30%	2	0.00%	0	0.00%	0	0.00%	0
	Neutral	69.20%	9	15.80%	6	23.10%	6	0.00%	0	0.00%	0
	Agree	23.10%	3	55.30%	21	50.00%	13	0.00%	0	0.00%	0
	Strongly Agree	7.70%	1	23.70%	9	26.90%	7	100.00%	2	0.00%	0

Table 4: ESD Adoption Segmented by Previous ESD Knowledge.
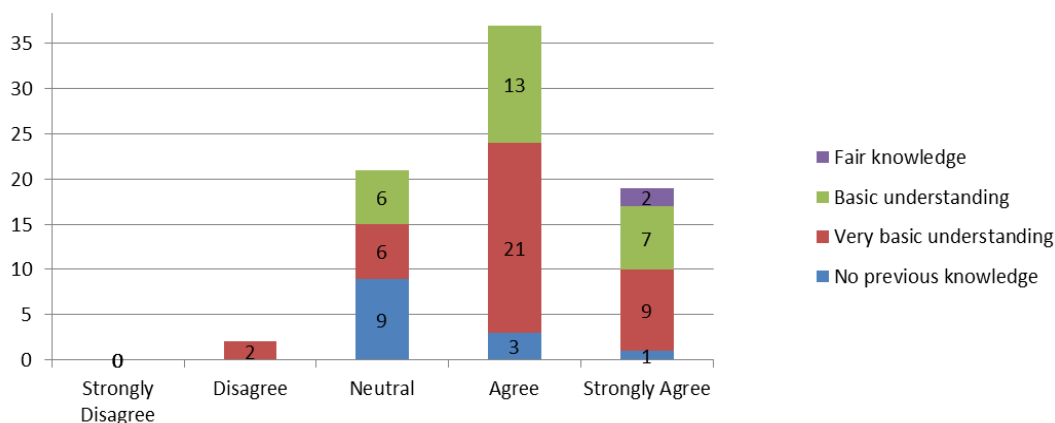
Figure 6: ESD Adoption Segmented by Previous ESD Knowledge.

Education Satisfaction and ESD

The results indicated that 80% of the satisfied students prefer to study ESD in well-established universities and 41.1% of the satisfied students are willing to specialize in ESD in their current universities. Moreover, 25% of the satisfied students are willing to continue studying ESD in postgraduates' studies. As for the unsatisfied students, 65% of them prefer to study ESD in a well-established university. And 87% of the unsatisfied students are willing to specialize in ESD in a well-established university. Also, 78.3% of the unsatisfied students are willing to continue ESD in their postgraduates' studies. As for ESD quality 59% of the satisfied students believe that well-established universities will provide better ESD and 51% of the unsatisfied students felt the same. The difference is not big. However, 73.9% of the unsatisfied students are willing to join a totally new university specialized in ESD compared to only 35.7% of the satisfied students. And this brings us to the opportunity available in the Higher education market for new universities to enter with the specialty of sustainable development as its core program me.

Heliopolis University (HU) FOR SUSTAINABLE DEVELOPMENT - the first non-profit university in the Middle East declaring sustainable development as its overall guiding principle and specialization. It is based on a renewed understanding of the university concept, in which teaching, research and practice are integrated with each other. What differentiates it from other universities is its vision for sustainable development through empowering student to create new ideas that meet fertile ground for further research and teaching.

As previously mentioned the curriculum of a university with an ESD context has to be different. In HU, both core and specialist programs were developed according to the four C's of Sustainable Development, which are Engaging in Context, Raising Consciousness, Assimilating Content, Making a Contribution. (Www.hu.edu.eg)

The core program me includes four course streams

1. Nature and Community: Balancing inner and outer nature through discovering Deep Ecology, Philosophy and Psychology.
2. Social Sciences: Widening knowledge through learning about Politics, Human Rights and Social Research.
3. The Arts: Deepening personal development through engaging in Music, Acting and Speech, Eurhythmy and Fine Arts.
4. Languages, Communication and Enterprise: Understanding cultures through studying English, German and Arabic. (www.hu.edu.eg/)

Incorporating the importance of branding in ESD, HU depended on the 3 pillars of sustainable development by designing a curriculum that reflects social, economic and environmental perspectives not only the traditional curriculum of conventional universities.

		Education Satisfaction			
		Dissatisfied		Satisfied	
		Column N %	Count	Column N %	Count
Would you be more interested to join education for sustainable development in a well-established university or in a new specialized university?	New Specialized University	17.40%	4	10.70%	6
	Neutral	17.40%	4	8.90%	5
	Well-Established University	65.20%	15	80.40%	45
Do you think that well-established universities are better in providing ESD than new specialized universities?	New Specialized Universities are Better	13.00%	3	3.60%	2
	Neutral	34.80%	8	37.50%	21
	Agree	30.40%	7	41.10%	23
	Well Established Universities are Better	21.70%	5	17.90%	10
If there is a totally new university that is opening and its entire curricula is based on education for sustainable development. Would you join?	No	4.30%	1	21.40%	12
	Neutral	21.70%	5	37.50%	21
	Yes	30.40%	7	28.60%	16
	Yes of Course	43.50%	10	7.10%	4
Will you be willing to specialize in education for sustainable development in your university?	No	8.70%	2	10.70%	6
	Maybe	4.30%	1	48.20%	27
	Yes	43.50%	10	30.40%	17
	Yes of Course	43.50%	10	10.70%	6
Will you be interested in education for sustainable development in postgraduate studies?	No	0.00%	0	12.50%	7
	Maybe	21.70%	5	62.50%	35
	Yes	78.30%	18	25.00%	14
Do you think that it should be included in school curriculum?	Strongly Disagree	0.00%	0	0.00%	0
	Disagree	8.70%	2	0.00%	0
	Neutral	0.00%	0	7.10%	4
	Agree	17.40%	4	42.90%	24
	Strongly Agree	73.90%	17	50.00%	28

Table 5: Effect of Education Satisfaction on ESD Interest.

Education Category and ESD

Both private and public school students prefer to enroll in a well-established university for learning ESD but it is apparent that the number of private school students who prefer a well-established university surpasses the number of public school students 77.8% compared to 57.1%. On another note 13.9% of private school students prefer to join newly specialized universities in ESD, compared to zero% of public school students. Also, a very small portion of private school students 2.8% did not indicate that well-established universities would deliver better ESD than newly specialized universities. As for the public school students 42.9% did not see that either. Public school students who indicated their interest to join a new university for ESD reached 57.2% compared to 45.9% of private school students. 54.4% of private school students accepted the idea of continuing ESD in their current universities, compared to 85.8% of public school students.

		Type of education			
		Conventional Schools		International and Private Schools	
		Column N %	Count	Column N %	Count
Would you be more interested to join education for sustainable development in a well-established university or in a new specialized university?	New Specialized University	0.00%	0	13.90%	10
	Neutral	42.90%	3	8.30%	6
	Well-Established University	57.10%	4	77.80%	56
Do you think that well-established universities are better in providing ESD than new specialized universities?	No of Course	0.00%	0	0.00%	0
	No	42.90%	3	2.80%	2
	Maybe	0.00%	0	40.30%	29
	Yes	57.10%	4	36.10%	26
	Yes of course	0.00%	0	20.80%	15
If there is a totally new university that is opening and its entire curricula is based on education for sustainable development. Would you join?	No of course	14.30%	1	2.80%	2
	No	0.00%	0	18.10%	13
	Neutral	28.60%	2	33.30%	24
	Yes	42.90%	3	27.80%	20
	Yes of Course	14.30%	1	18.10%	13
Will you be willing to specialize in education for sustainable development in your university?	No	0.00%	0	11.10%	8
	Maybe	14.30%	1	37.50%	27
	Yes	42.90%	3	33.30%	24
	Yes of Course	42.90%	3	18.10%	13
Will you be interested in education for sustainable development in postgraduate studies?	No	0.00%	0	9.70%	7
	Maybe	57.10%	4	50.00%	36
	Yes	42.90%	3	40.30%	29
Do you think that ESD should be included in school curriculum?	Strongly Disagree	0.00%	0	0.00%	0
	Disagree	28.60%	2	0.00%	0
	Neutral	0.00%	0	5.60%	4
	Agree	14.30%	1	37.50%	27
	Strongly Agree	57.10%	4	56.90%	41

Table 6: Type of Education and ESD.

Gender and ESD

In general it seems that females are more open to ESD than males. Comparing males and females' attitude towards ESD, we found that 90% of males prefer to study ESD in a well-established university and 76.7% of them indicated that well established universities will provide better ESD. This finding has direct impact on their decision to join a new university that specializes in ESD. Whereas 30% of them decided that they won't join a new university for obtaining ESD learning even in their current universities.

On the other hand, females are more open to studying ESD in both well-established and new universities. The percentage of females who prefer to study ESD in well-established universities reached 67.3%. Only 44.9% of the females think that well-established universities are better than newly specialized universities in ESD. Thus only a small percentile 14.3% refuses to join new university specialized in ESD. On another note 63.3% of females are accepting ESD and 44.9% of females would continue postgraduate studies in ESD.

		Gender			
		Female		Male	
		Column N %	Count	Column N %	Count
Would you be more interested to join education for sustainable development in a well-established university or in a new specialized university?	New Specialized University	14.30%	7	10.00%	3
	Neutral	18.40%	9	0.00%	0
	Well-Established University	67.30%	33	90.00%	27
Do you think that well-established universities are better in providing ESD than new specialized universities?	No of Course	0.00%	0	0.00%	0
	No	10.20%	5	0.00%	0
	Maybe	44.90%	22	23.30%	7
	Yes	32.70%	16	46.70%	14
	Yes of Course	12.20%	6	30.00%	9
If there is a totally new university that is opening and its entire curricula is based on education for sustainable development. Would you join?	No of Course	0.00%	0	10.00%	3
	No	14.30%	7	20.00%	6
	Neutral	34.70%	17	30.00%	9
	Yes	28.60%	14	30.00%	9
	Yes of Course	22.40%	11	10.00%	3
Will you be willing to specialize in education for sustainable development in your university?	No	8.20%	4	13.30%	4
	Maybe	28.60%	14	46.70%	14
	Yes	32.70%	16	36.70%	11
	Yes of Course	30.60%	15	3.30%	1
Will you be interested in education for sustainable development in postgraduate studies?	No	4.10%	2	16.70%	5
	Maybe	51.00%	25	50.00%	15
	Yes	44.90%	22	33.30%	10
Do you think that it should be included in school curricula?	Strongly Disagree	0.00%	0	0.00%	0
	Disagree	4.10%	2	0.00%	0
	Neutral	6.10%	3	3.30%	1
	Agree	18.40%	9	63.30%	19
	Strongly Agree	71.40%	35	33.30%	10

Table 7: Gender and ESD.

High Culture Resources and ESD

The results indicate that there is a positive relation between high culture resources and the tendency to select a well-established university offering ESD. Moderate cultured participants indicated that they might join new specialized university offering ESD.

		Culture Resources							
		Low		Moderate		High		Very high	
		Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count
Would you be more interested to join education for sustainable development in a well-established university or in a new specialized university?	New Specialized University	11.1%	1	10.7%	3	14.6%	6	0%	0
	Neutral	33.3%	3	21.4%	6	0.0%	0	0%	0
	Well-Established university	55.6%	5	67.9%	19	85.4%	35	100%	1
Do you think that well-established universities are better in providing ESD than new specialized universities?	No of Course	0.0%	0	0.0%	0	0.0%	0	0%	0
	No	0.0%	0	17.9%	5	0.0%	0	0%	0
	Maybe	66.7%	6	42.9%	12	26.8%	11	0%	0
	Yes	33.3%	3	25.0%	7	46.3%	19	100%	1
	Yes of Course	0.0%	0	14.3%	4	26.8%	11	0%	0
If there is a totally new university that is opening and its entire curricula is based on education for sustain-able development. Would you join?	No of Course	0.0%	0	7.1%	2	2.4%	1	0%	0
	No	44.4%	4	17.9%	5	9.8%	4	0%	0
	Neutral	55.6%	5	28.6%	8	29.3%	12	100%	1
	Yes	0.0%	0	32.1%	9	34.1%	14	0%	0
	Yes of Course	0.0%	0	14.3%	4	24.4%	10	0%	0
Will you be willing to specialize in education for sustainable development in your university?	No	11.1%	1	10.7%	3	9.8%	4	0%	0
	Maybe	44.4%	4	32.1%	9	34.1%	14	100%	1
	Yes	44.4%	4	42.9%	12	26.8%	11	0%	0
	Yes of Course	0.0%	0	14.3%	4	29.3%	12	0%	0
Will you be interested in education for sustainable development in postgraduate studies?	No	22.2%	2	17.9%	5	0.0%	0	0%	0
	Maybe	77.8%	7	35.7%	10	53.7%	22	100%	1
	Yes	0.0%	0	46.4%	13	46.3%	19	0%	0
Do you think that it should be included in school curriculum?	Strongly Disagree	0.0%	0	0.0%	0	0.0%	0	0%	0
	Disagree	0.0%	0	7.1%	2	0.0%	0	0%	0
	Neutral	22.2%	2	3.6%	1	2.4%	1	0%	0
	Agree	55.6%	5	28.6%	8	34.1%	14	100%	1
	Strongly Agree	22.2%	2	60.7%	17	63.4%	26	0%	0

Table 8: High Culture Resources and ESD.

Reliability Analysis

According to Weiss (2011), there will be excellent internal consistency of the scale components if the reliability test outcome is 0.90 and above, high internal consistency if the outcomes are between 0.90 and 0.70, moderate internal consistency if the outcomes are between 0.70 and 0.50 and low internal consistency if the outcomes are below 0.50. The following table shows that all variables of the model are of moderate to high internal consistency.

Variable	Cronbach's Alpha	N. of Items
Early childhood awareness	.760	4
University establishment	.531	2
Education Satisfaction	.575	2
High cultural resources	. 506	5
ESD adoption and infusion	.501	3

Table 9: Results of reliability test.

Hypothesis Validation

			Early Childhood and Previous Awareness	ESD Adoption and Infusion	University Establishment	Education Satisfaction	High Cultural Resources
Spearman's rho	Early Childhood and Previous Awareness	C.C.	1	.242*	0.078	0.101	0.039
		Sig.	.	0.032	0.492	0.378	0.735
		N	79	79	79	79	79
	ESD Adoption and Infusion	C.C.	.242*	1	0.064	-.294**	.310**
		Sig.	0.032	.	0.574	0.009	0.005
		N	79	79	79	79	79
	University Establishment	C.C.	0.078	0.064	1	0.085	.312**
		Sig.	0.492	0.574	.	0.456	0.005
		N	79	79	79	79	79
	Education Satisfaction	C.C.	0.101	-.294**	0.085	1	-0.155
		Sig.	0.378	0.009	0.456	.	0.172
		N	79	79	79	79	79
	High Cultural Resources	C.C.	0.039	.310**	.312**	-0.155	1
		Sig.	0.735	0.005	0.005	0.172	.
		N	79	79	79	79	79

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 10: Spearman's Rank Association Test Results.

H1.High cultural resources are positively correlated with ESD infusion.
H01 is rejected and H1 has been accepted since Spearman's rank association test shows a positive relationship between high cultural resources and ESD adoption and infusion; the relation strength is shown by the correlation coefficient 0.310 with very high significance, as α is less than 0.01.

H2. Early childhood awareness increases the possibilities of ESD adoption.
H02 is rejected and H2 has been accepted since Spearman's rank association test shows a positive relation between early childhood awareness and ESD adoption and infusion; the relation strength is shown by the correlation coefficient 0.242 with very significance, as α is less than 0.05.

H3. There is a positive correlation between ESD infusion if introduced within the curriculum of an existing well-established university than if introduced as the final outcome of a newly established university.
H03 is accepted and H3 has been rejected since Spearman's rank association test shows that α is greater than 0.05.

H4.There is a negative relationship between ESD infusion and satisfaction level of current conventional curriculum.
H04 is rejected and H4 has been accepted since Spearman's rank association test shows a negative relationship between ESD infusion and satisfaction level of current conventional curriculum; the relation strength is shown by the correlation coefficient -0.294 with very high significance as α is less than 0.01.
Based on this Spearman's rank association test results, the model should be altered to be as shown below.
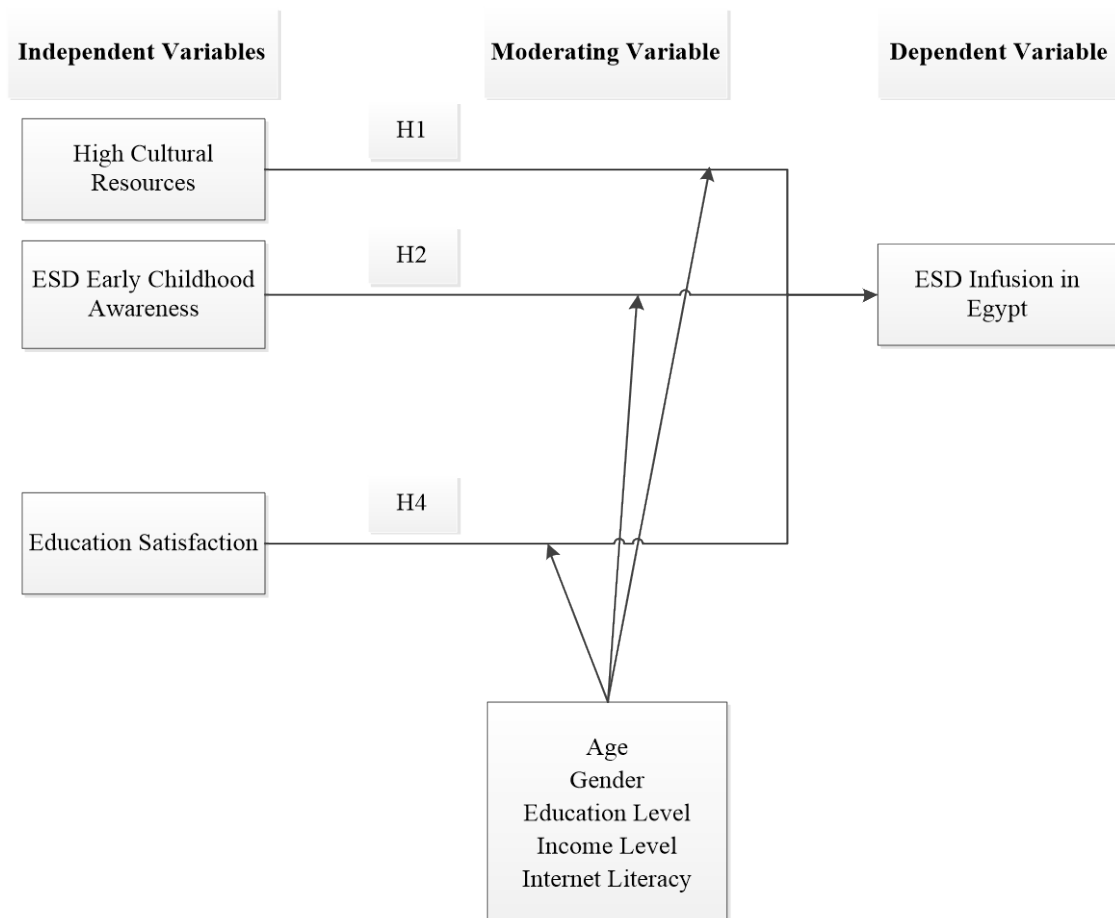
Figure 7: Validated Model.

ANOVA Analysis

Model		ANOVA (b)				
		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.279	3	4.093	8.705	.000a
	Residual	35.265	75	0.47		
	Total	47.544	78			
a. Predictors: (Constant), Early childhood and previous awareness, , High cultural resources , Education satisfaction						
b. Dependent Variable: ESD adoption and infusion						

Table 11: ANOVA Test Results.

ANOVA test results show valid significance of the model, this means that it is not due to a chance. In the model summary, adjusted R square shows that the model explains 22.9% of the population variations.

Model	Model Summary (b)				
	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.508a	0.258	0.229	0.68571	0.258
a. Predictors: (Constant), Early childhood and previous awareness, High cultural resources , Education satisfaction					
b. Dependent Variable: ESD adoption and infusion					

Table 12: Model Summary.

Discussion

As the results indicate respondents either do not have any previous knowledge about ESD or have very basic knowledge about it. These findings are very challenging in Egypt since creating awareness about ESD seems like a prerequisite for ESD infusion. Needless to say that ESD infusion would have been much easier if ESD was embedded in school curricula. This relation has been proven as a positive relation between ESD previous knowledge and ESD infusion.

It was expected to figure out that satisfied students prefer to study ESD in a well-established university and to specialize in ESD in their current university, this finding indicates that ESD as a science by itself is acceptable. Also the results indicated that only 65% of the unsatisfied students are willing to study ESD in a well-established university compared to 80% of their satisfied counterparts. The justification is clear since unsatisfied students are more open to study ESD in a new specialized university; since they are already dissatisfied with their current university.

Both satisfied and dissatisfied students believe that a well-established university will provide better ESD than new universities. 73.9% of the unsatisfied students are willing to join a new university specialized in ESD compared to 35.7% of the satisfied students. The analysis of these results reveals the following cultural analysis. Egypt is ranked high in the uncertainty avoidance range; thus people are not risk takers. Also, Egypt as a developing nation suffered from authoritarian regime for more than 30 years. This is a fact that justifies Egypt position as a high power distance country. One of the very interesting traits of high power distance societies is that people feel more comfortable to join well-established institutions that have formal rules and regulations to follow; even if these guidelines are not convincing.

On another note ESD has a potential market share or market equity since 78.3% of the dissatisfied and 25% of the satisfied respondents indicated that they would be interested to join ESD in postgraduate studies. Assuming that people understood the basics of ESD, we can confirm that infusing ESD in Egypt is likely to happen without serious challenges. But still it is apparent that ESD infusion will face some resistance if it is being introduced in a newly specialized university, to avoid this resistance, new universities should promote high quality of education, as it is the number one feature that affects university selection. Results indicate that students prefer being enrolled in ESD programs offered by well-established universities and not by a new specialized one. The number of public school students who are willing to join a newly specialized university for ESD represented 57.2%. This percentage surpassed the number of private school students 45.9%. However, public school students are not qualified to be included as primary target group for private education enrolment since they cannot afford the university annual tuition. Fortunately both public and private school students are willing to continue postgraduate studies in ESD.

Females are more open to adopt ESD than males. In general the results indicated that females are accepting ESD as an idea. Females are willing to join ESD in a new specialized university more than males. Also the number of males who indicated that well-established universities would be better than specialized university in providing ESD is more than females. This finding proves again that females are accepting ESD in principle regardless of who is providing it. It proves also that females are more risk takers than males. Maybe females are more open to the nature, environment, arts, culture, community engagement, and development than males. However, males and females agree and strongly agree that ESD should be included in school curricula.

As (figure 8) indicates highly cultured people prefer to study ESD in well-established universities. Spearman's rank association test showed a positive relationship between high cultural resources and studying ESD in a well-established university. The relation strength is shown by the correlation coefficient 0.312 with very high significance, as α is less than 0.01. Also as shown in (figure 9) highly cultured people think that well established universities are better in providing ESD than new specialized universities.
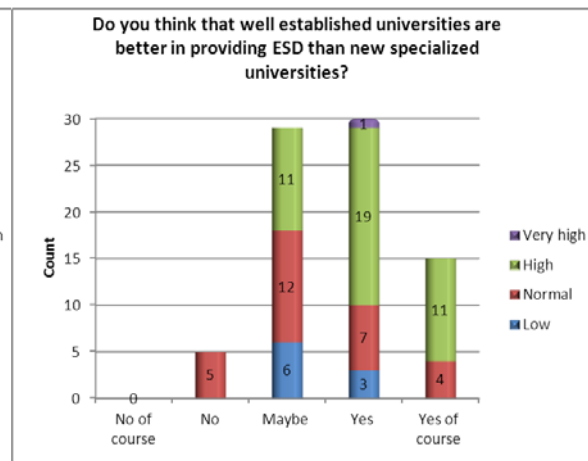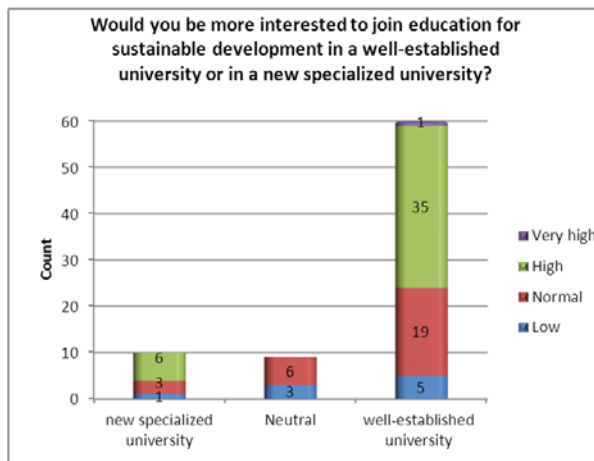
Figure 4: High culture resources and ESD, Would you be more interested to join education for sustainable development in a well-established university or in a new specialized university?

Figure 5: High culture resources and ESD. Do you think that well established universities are better in providing ESD than new specialized universities?

This means that highly cultured students could be considered as the primary target market for ESD programs if offered by well-established universities and newly specialized universities as well (figure 10).
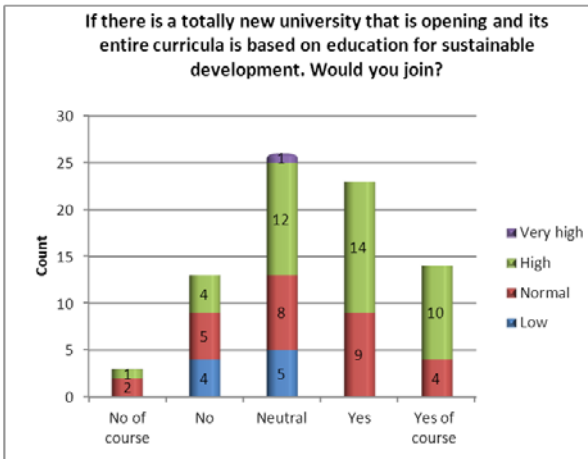
Figure 6: High culture resources and ESD, If there is a totally new university that is opening and its entire curricula is based on education for sustainable development. Would you join?
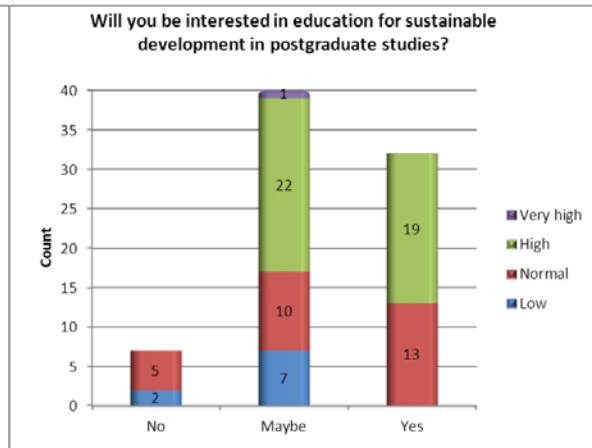
Figure 11: High culture resources and ESD, Will you be interested in education for sustainable development in postgraduate studies?

Nevertheless, highly cultured people prefer well-established universities better than newly specialized ones. This is due to their higher satisfaction level of the current education system than other students who are enrolled in public schools. Accordingly they will prefer to join ESD within the same system that delivered previous satisfaction to them. Thus we could conclude that well-established universities offering ESD programs will appeal most to this group than newly specialized universities

On the other hand it would be a fatal mistake to assume that public school students are the primary target market for new universities that specialize in ESD; because this segment cannot afford the tuition for being enrolled in private education. On the contrary of course public school students are the primary target market for ESD if it has been offered for free or according to a subsidized criterion.

As indicated in (figure 11) moderate and highly cultured students are interested in ESD postgraduate studies. This finding proves our previous point; which is ESD has a high market equity or future market share.

As shown in (figure 12) 65% of the moderate and highly cultured students agreed that ESD should be embedded in school curricula. This finding indicates the valuable perception of ESD among cultured students.
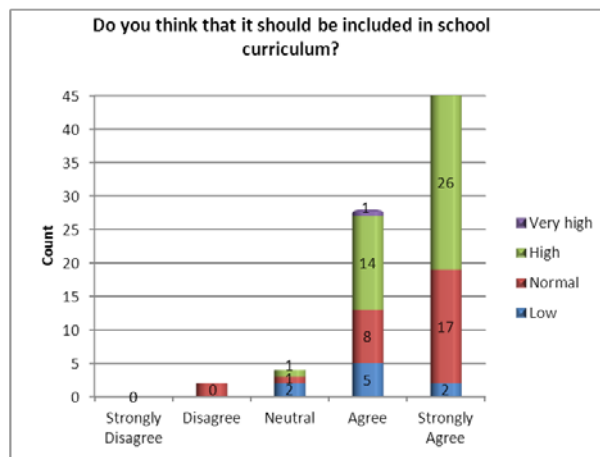
Figure 12: High culture resources and ESD, Do you think that it should be included in school curriculum?

Recommendations

The most competitive advantage for ESD providers is the quality of education. Both public and private universities should consider the education quality as the most appealing feature for students when selecting a university. The second appealing feature for students is the type of education provided by the university. Needless to say that ESD is considered a unique education type that deserves to be highlighted on to attract students' attention. Let alone, that the type of education is one of the most important features affecting university selection, promoting this new type of education will help promoting the university providing it. The reputation of the university came as the second appealing feature for students. That is why offering ESD in well-established universities is attractive for moderate and highly cultured students. As discussed in the literature reviews section; new specialized universities should maintain strong affiliations with well-respected brands that are relevant to ESD. Well-established and new specialized universities should not emphasize on the uniqueness of ESD curricula. Students do not consider the curricula as an appealing feature and they ranked it as number 4. On the contrary students appreciate the nature and type of education more than the curricula. Based on this finding it is strongly recommended to emphasize on the uniqueness of ESD as a new education type without touching the nature of the courses and the curriculum mechanism.

Students surprisingly did not give the campus facilities any weight and they assigned equal importance of weights for faculty members and other activities provided. Universities and other academic institutions must generate appropriate awareness campaigns for infusing ESD. It has been proven that there is a solid correlation between early childhood and previous awareness and ESD infusion. Conventional school graduates are the primary target market for new universities offering ESD in Egypt not international school graduates. The results indicated that international school graduates are satisfied from their education system thus aim to continue their education in the same well-established institution. ESD even if it has been considered by international and other highly ranked private school graduates it is mainly being considered if offered by well-established university not a new specialized one. Thus new universities that specialize on ESD should target conventional school graduates as their primary target market. As for the international school graduates, they are the secondary target market for new specialized ESD universities.

On the other hand the primary target market for a well-established university that offers ESD is the international and other upscale school graduates in Egypt. The secondary target market is represented by the conventional school graduates', this should affect private universities specializing in ESD, as they should seek funds from organization caring about the environment to finance scholarships for public school students as they have higher interest for ESD. Females are more into ESD than males. Thus, universities should focus on gaining female attention as a potential target market more than males. This recommendation is for both well-established and new universities. Cultured students are the main target market for ESD. Promoting ESD should take place in cultural centers and other places visited by moderate and highly cultured students. Libraries and other culture events would be good places for reaching cultured audience. The material used for ESD promotion should give a special attention to ESD as different type of education and at the same time it should be communicated through cultured communication channels.

Future Research

The same research should be conducted for a larger sample size. A comparison study should be made between Egypt and other countries especially those that already infused ESD in their curricula. Investigating the launching process that other ESD universities passes through would be an advantage for potential universities. Assessing brand personality on ESD infusion is another future area for investigation. Also identifying the appropriate fit between the education type and its brand associations should be investigated in future work. Another relevant topic would be measuring the assumed ESD brand associations to cultured people. It is also important to measure

the infusion of ESD in the MENA region as well as the interest of international higher education institutions in partnering with newly established university to infuse ESD.

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The Student Survey Of Education for Sustainable Development Competencies: A Comparison Among Faculties.

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Abstract

The paper reports research employing a quantitative approach to investigating the competences of university students about Educating for Sustainable Development (ESD). Participants were bachelor students of the following five areas: Social Sciences, Educational Sciences, Applied Sciences, Engineering and Health Sciences. The Student Survey of Education for Sustainable Development Competencies was employed. Internal consistency and factor structure of this questionnaire were investigated by assessing Cronbach's alphas and by performing exploratory factor analysis. Data were subjected to ANOVA for comparing the students of the five faculties. The relevance of factors and the differences between students of different areas were discussed considering also how to infuse ESD principles in University curricula for reorienting university study programmes in various faculties to prepare students about sustainable development issues.

Background

The United Nations (UN) launched the UN Decade (2005-2014) of Education for Sustainable Development (ESD) and it provides a set of teaching and learning principles and tools (http://www.UNESCO.org/education/tlsf/). According to UNESCO (2004), ESD is

 ➢ education that allows learners to acquire the skills, capacities, values and knowledge required to ensure sustainable development;
 ➢ education at all levels and in all social contexts (family, school, workplace, community);
 ➢ education that fosters responsible citizens and promotes democracy by allowing individuals and communities to enjoy their rights and fulfil their responsibilities;
 ➢ education for life-long learning;
 ➢ education that fosters the balanced development of the individual.

Within this international scenario Haigh (2005) highlights the needs for higher education to green the university curriculum. Scott's keynote address to the fourth World Environmental Education Congress, Durban, July 2007 (Scott 2009) explores what environmental education researchers might learn from the previous 30 years of work (since the Tbilisi conference), and presents some of the current challenges in doing, and using research. Scott suggests that greater openness to new approaches should be promoted, as well as different ways of thinking and working, more understanding across cultures, and a stronger research focus on understanding the relationship between sustainability, society and learning. According to Scott there are two main reasons for the environmental education community to reach out to other researchers and users of research, and especially to policy-makers:

According to Scott and Gough (2010, p. 3738), higher education students' experience

> "is quite different from that in schools as HE courses tend to focus on specialist and discipline-specific matters, rather than on the broad-based, community and citizenly, focus that we've seen with schools. Although there are attempts to broaden this out (…) doing so remains problematic, as does making sense of the currently fashionable, but rather unfocused, talk about sustainability literacy as some common entitlement of all higher education students".

Scott and Gough also stress that Universities value the pursuit of knowledge and must, therefore, insist on its present and

on-going incompleteness—in the face of those who, for whatever reason, wish to extrapolate to final, general truths. Sustainable development touches on all aspects of our intellectual lives, and will require us to husband what we know, eschew glib certainties, and confront the future with an open, learning orientation (Scott and Gough, 2010, p.3743).

The current research

The objective of the current research was to compare university students of different areas in their competences about Sustainable Development (SD). The aim was to explicate some of the indications which appeared in the background literature, and that differences between Faculties and degree organisation could affect the students' conceptions. The current research compares students competences about ESD in the following five areas: Social Sciences (Educational Psychology and Social Psychology Bachelors), Educational Sciences (Primary Teacher Education), Applied Sciences (Biology, Chemistry, Agriculture Bachelor), Engineering (Environmental Engineering Bachelor) and Health Sciences (Medicine). It involves a large number of participants and employs quantitative data collection techniques with parametric statistical analysis.

Research questions and hypothesis: Based on a review of the literature, the study was implemented on the basis of the hypothesis that university students have different competences about ESD in relation to the different Faculty. In detail, the following research questions were considered: Are there any significant differences between students in their ESD competences in relation to:

ESD Attitudes,
Learning to be,
Learning to live together sustainably,
Learning to know,
Learning to do,
Learning to transform oneself and society.

Method

A quantitative study design was used for collecting data in this research. In order to obtain responses from a large participant group, a questionnaire with closed questions was used.

The Questionnaire

The questionnaire Student Survey of Education for Sustainable Development Competencies (SSESDC) was developed especially for this research by the research team directed by Prof. Makrakis in the framework of RUCAS Tempus project. The questionnaire is composed of several parts including attitudes about ESD , and the following five pillars: learning to be, learning to live together sustainably, learning to know, learning to be, and learning to transform oneself and society.

The first part is composed of demographic questions such as gender, and questions about previous experiences related to SD, such as if students have taken a course that relates directly to sustainable development, if students have taken a course that includes some relevant issues to sustainable development, and if students have done a course assignment or project that concerns sustainable development. Also the sources of information about sustainable development used by students were considered, such as newspapers, the internet, university courses, TV etc.; the actions acted during the past month for sustainable development reasons such as switched off unnecessary lights, purchased eco-labelled and fair-trade products, recycled cans, glass or paper, used carpooling, purchased environmentally friendly products etc.

The most frequently teaching and learning methods used in students' courses were considered including lecturing, project-based learning, interactive engagement, case-based instruction, inquiry-based learning, interdisciplinary teaching, problem-based learning, tech-supported instruction, placed-based learning, discovery learning. Also the functions of education most

preferred by students such as to replicate the existing society and culture, to train people for future employment, to help people develop their potential, to encourage change towards a fairer society and a better world were assessed, as well as the attitudes about ESD.

The main part of the survey evaluate the students' ESD competences about the following five pillars: learning to be, learning to live together sustainably, learning to know, learning to be, and learning to transform oneself and society. The last part of the survey concerns the following specific areas Applied Sciences, Educational Sciences, Health Sciences, Business/Economic, Engineering, Social Sciences. A different set of questions was proposed in relation to each area.

The questionnaire was constructed considering the prior literature and used closed questions. In most of the parts a set of statements was presented and participants were asked to express agreement or disagreement on a six-point Likert scale (1=not at all, 2=poor, 3=fair, 4=good, 5= very good, 6= excellent). In order to provide construct validation, a panel of experts were asked to comment on the questionnaire. Revisions based on these comments were included in the final version of the questionnaire.

Participants were 467 students enrolled at the last year in several in degree courses in the University of Padova, a north-east Italian University. Table 1 reports the students' distribution in the five areas.

Area	Social Sciences	Educational Sciences	Applied Sciences	Engineering	Health Sciences
Faculties	Psychology	Education	Science Agricolture	Engineering	Medicine
N. students involved	142	69	102	85	69

Table 1: Students' distribution in the five areas.

Participants were invited to fill the questionnaire at the end of a university lesson, without consulting one another. Participants were informed that the questionnaire would remain anonymous, and they were encouraged to give accurate and truthful answers. The aim of the research was specified as to elicit students' competences about several aspects of ESD. It took an average of 40 minutes to complete the questionnaire.

Results
The collected data consisted of participants' responses to the SSESDC. SSESDC generated quantitative data which were analysed using statistical analysis such as descriptive statistics, and Cronbach's alpha. In these sections are presented only the results in reference to the following six scales which were considered monofactorial: Attitudes, learning to be, learning to live together sustainably, learning to know, learning to be, and learning to transform oneself and society. An ANOVA was also conducted with gender and Faculties as independent variables. For all analyses SPSS 17.00 for Windows was used.

Reliability Cronbach's Alpha
The reliability analyses were determined by measuring the internal consistency of each scale of the 6 scales calculating the Cronbach's alpha. Alpha coefficients ranging from 0.861 to 0.901 were well above the 0.70 standard of reliability with the only exception of the attitude scale which had a Cronbach's alpha of .604. The Cronbach's alphas for the six scales are reported in table 2.

Scales	Alpha
Attitudes	.604
Learning to Be	.861
Learning to Live Together Sustainably	.871
Learning to Know	.891
Learning to Do	.901
Learning to Transform Oneself and Society	.888

Table 2: Cronbach's Alphas for the attitude scale and for the 5 UNESCO Pillars scales.

Since the 10-item attitude scale involves several key sustainability issues and it did not reach the 0.70 standard of reliability, it should be further investigated whether an item reduction would increase the scale reliability while still providing useful information.

ANOVA

An ANOVA was conducted for each of the following scales of the questionnaire: attitudes, learning to be, learning to live together sustainably, learning to know, learning to be, and learning to transform oneself and society. Independent variables were: gender and faculty.

Independent variable Faculty

With regard to the independent variable faculty, the differences between participants resulted in statistically significant differences for the following four scales of SSESDC:

Attitudes: F = 7.91; p< .01 (see figure 1),

Learning to Live Together Sustainably F = 4.59, p<.01 (see figure 2),

Learning to Know F= 3.91; p<.01 (see figure 3), and

Learning to Do F= 3.38; p<.05; (see figure 4).

The results informed us that we had an overall significant difference in means for the five Faculties in the four scales, but we do not know where those differences occurred. A follow-up analysis was performed with the Bonferroni Multiple Comparisons of Means post-hoc test, which allows us to discover which specific means differed assessing the significant differences between faculties for each scale. The following differences were found:

Attitudes scale, statistically significant differences between:

o "Engineering" (mean= 3.1; sd= .65) and "Applied Sciences" (mean= 2.80; sd= .63) (p<.05)

o "Engineering" (mean= 3.1; sd= .65) and "Health Sciences"(mean= 2.77; sd= ,56) (p<.05)

o "Engineering" (mean= 3.1; sd= .65) and "Social Sciences" (mean=2.62; sd=.64) (p<.01)
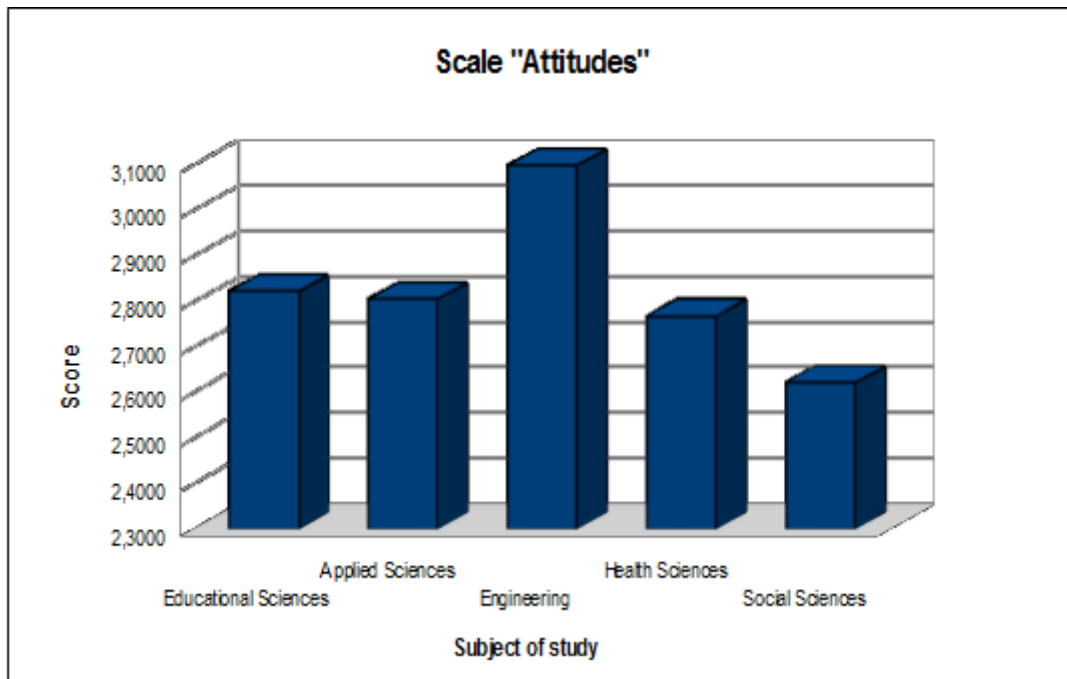
Figure 1: Mean values for students of the five Faculties in the Attitudes scale.

Learning to Live Together Sustainably, statistically significant differences between:
"Social Sciences" (mean= 3.92 ; sd= .83) and "Health Sciences" (mean= 3.46; sd= .76) (p<.01)
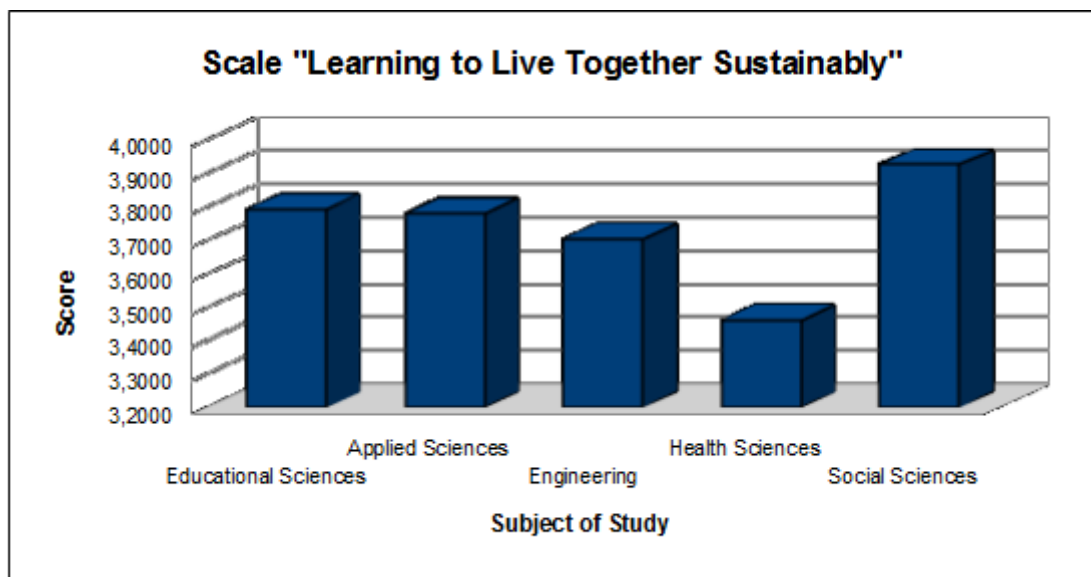
Figure 2: Mean values for students of the five Faculties in the Learning to Live Together Sustainably scale.

Learning to Know, statistically significant differences between:
- "Engineering" (mean= 3.77; sd= .76) and "Educational Sciences" (mean= 3.67; sd= .74) (p<.05)
- "Applied Sciences" (mean= 3.73; sd= .73)   and   "Educational   Sciences"   (mean= 3.67; sd=.74) (p<.05)
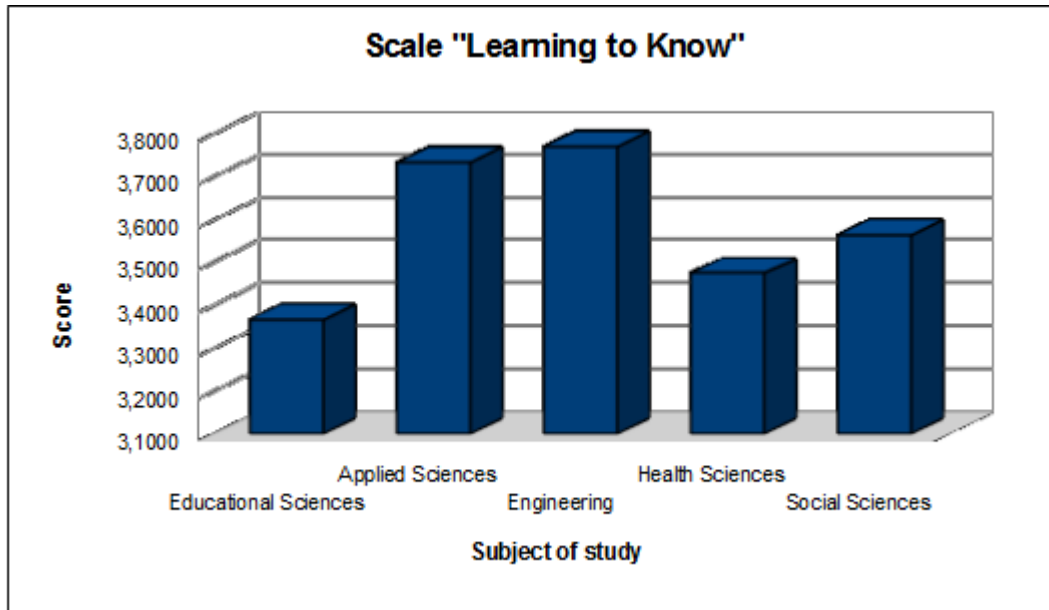
Figure 3: Mean values for students of the five Faculties in the Learning to Know scale.

Learning to Do, Statistically significant differences between:
- "Applied Sciences" (mean= 3.89; sd= .75) and "Educational Sciences" (mean= 3.55; sd= .66) (p<.05)
- "Engineering" (mean= 3.89; sd= .70) and "Educational Sciences" (mean= 3.55; sd= .66) (p<.05)
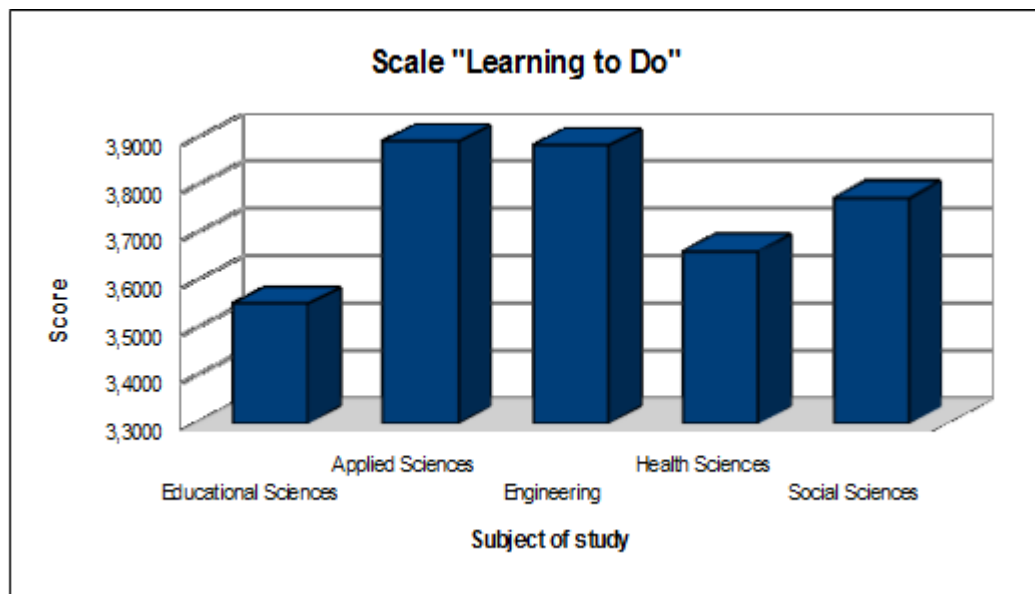
Figure 4: Mean values for students of the five Faculties in the Learning to Do scale.

Independent variable Gender
With regards to the independent variable gender, the differences between participants resulted in statistically significant differences for the following three scales of SSESDC:
Attitudes: F = 15.55, p< .01 with female M= 2.7, SD= .62 and male M= 2,94 and SD= .64 (see figure 5).

Learning to Know: F= 9.54 (p<.01); Female: mean= 3.51; sd= .79; Male: mean= 3.73; sd= .74 (see figure 6);
Learning to Do: F= 4.25 (p<.05) Female: mean= 3.72; sd= .72; Male: mean= 3.86; sd= .71; (see figure 7).
No statistically significant differences have been found for the other three scales.
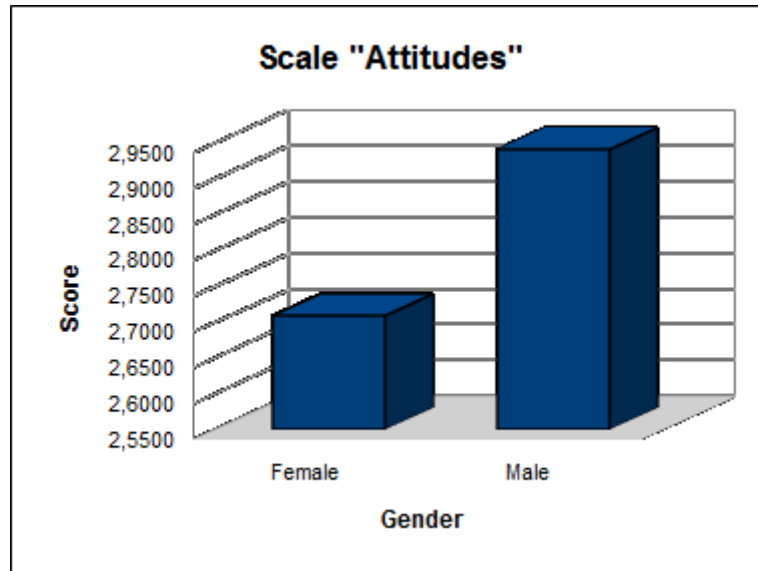
Figure 5: Mean values for Males and Females in the Attitude scale.
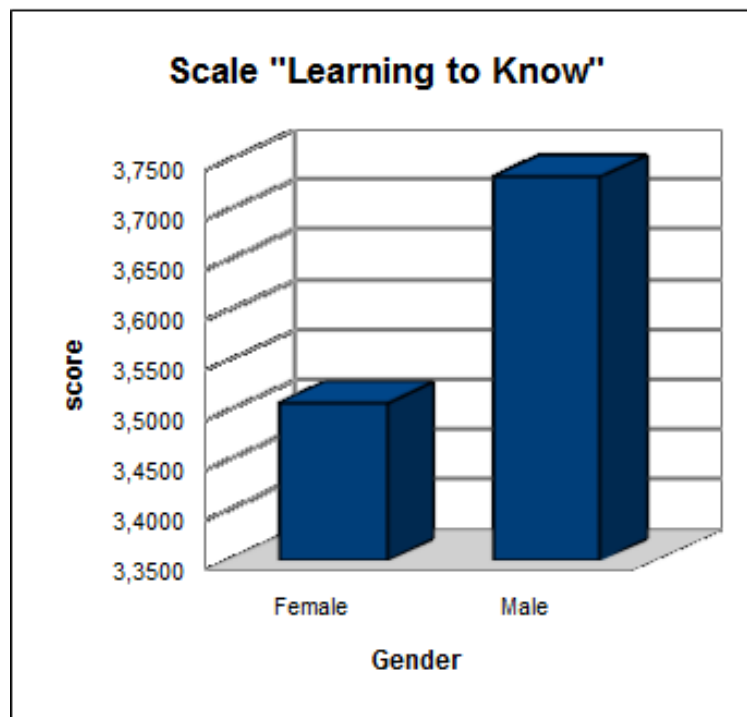
Figure 6: Mean values for Males and Females in the Learning to Know scale.
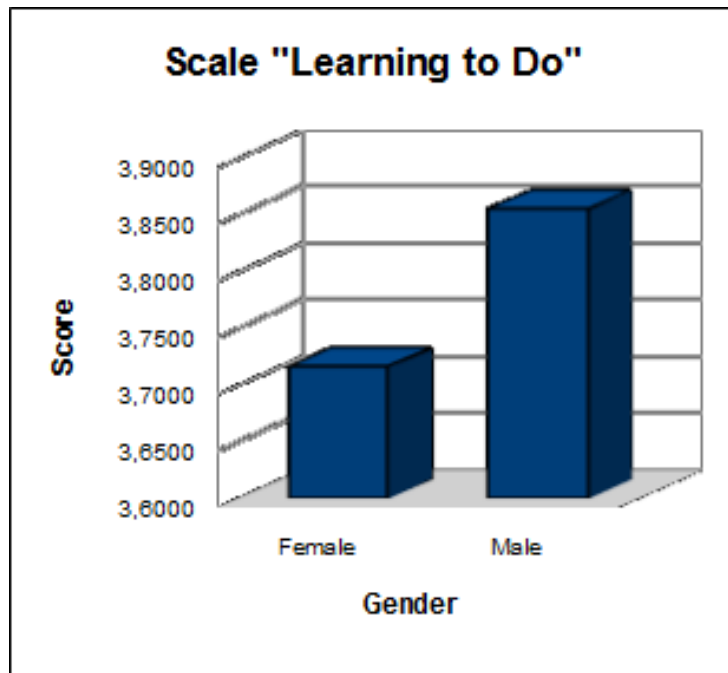
Figure 7: Mean values for Males and Females in the Learning to Do scale.

Discussion

Several significant differences between students of different areas in their competences about Sustainable Development were found.

With regard to the differences between Faculties, it is quite evident a more enhanced pro-sustainability attitude among engineering students who show a significant advantage when compared through the Bonferroni multiple comparisons of means post-hoc test with applied sciences, health sciences and social sciences students. It is worth mentioning that the engineering students who participated in the research have a specific environmental focus and are therefore more familiar with issues of sustainability.

In a similar way, it was to be expected that Social Sciences students would show an enhanced pro-social profile. This is true, although the only group of students who are significantly less socially oriented when compared to Social Sciences students are Health Sciences students.

Educational Sciences students seem to privilege the social dimension over the knowledge and the "to do" dimensions of sustainability when compared to Engineering and Applied Sciences students who score significantly higher on the Learning to Know and Learning to do scales. It must be noted that these Knowledge and Do scales favours technical contents related to global and environmental issues who are less familiar to students of Educational Sciences.

It must be noted that no significant differences were found for the Learning to be scale. Concerning this scale, generally students consider themselves quite able (3.97 on a 1-6 scale) to adopt sustainable lifestyle and to have a concern and an awareness concerning global sustainability issues.

No significant differences were found either for the Learning to transform scale (where students on average rate themselves 3.84 on a 1-6 scale).

Concerning Gender differences, a significant male advantage was found concerning the Attitudes, Learning to Know and Learning to do scales. It must be noted that the Faculties of Engineering and Applied Sciences that scored significantly higher than Education Science Faculty on these scales have also a significant higher percentage of male students.

While the score that students attribute to themselves on a 1-6 scale is relatively low on average for the Attitudes scale (2.78), such self-assessment is more optimistic concerning their ability to live

together in a sustainable way (3.74), to know ESD contents (3.68), and to do (3.86). Beyond the significant differences that were found by this research across faculties, these data support the view that there can be an identity of interest between higher education and sustainable development (Scott and Gough, 2010, p.3743). In addition, they are a significant snapshot of student's attitudes and competences at Bachelor level. How should higher education institution follow-up such scenario and introduce elements of critical thinking and critical pedagogy that are essential to foster responsible attitudes in this field? Buchan, Spellerberg and Blum (2007) show that at postgraduate level, "sustainability education is often embedded within single-discipline subjects, rather than being taught per se as a separate subject (…). There are only a few reports in the literature (Eagan et al., 2002) on subjects which combine the following three features: at postgraduate level; interdisciplinary; and based on an international view of sustainability".

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Can ESD Address Challenges in the Arab Region? Examining Business Students' Attitudes and Competences on ESD: A Case Study from Lebanon of the Tempus RUCAS Project

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Abstract

The population increase together with the unsustainable consumption pattern is putting increasing stress on the planet's natural resources. The increasing realization that humans are harming the environment is taking the form of a global movement intended to change behavior towards sustainability, now recognised as a framework that links humans to nature. Continuous exploitation of natural systems in the Arab region leads to environmental damages that negatively affect human well-being.   This article presents a case study from the *Reorient University Curricula to Address Sustainability* (RUCAS) Tempus project funded by the European Commission. It highlights the results of an empirical study in the Faculty of Business Administration and Economics (FBAE) at Notre Dame University - Louaize (NDU) in Lebanon. The main objective is to assess the need for Education for Sustainable Development (ESD) through an examination of students' attitudes and competences with the aim of reorienting university curricula to address sustainability. A framework designed based on the pillars of learning set by UNESCO was developed to measure ESD attitudes and competences. The main findings reveal the need to reorient university courses to address sustainability issues. Attitudes questions suggest that a relatively high numbers of students are not aware of their responsibilities towards environmental problems, which imply the necessity for a revised curriculum where courses are restructured to inform students of their responsibility towards their environment and the quality of life. The results show that the disciplinary competences are significantly lower than the five pillars of learning (general competences) which indicate that the FBAE needs to reorient its curricula to infuse ESD into its programs; through the development of effective pedagogical approaches, teaching methodologies as well as learning materials.

Key-words: Education for Sustainable Development (ESD), ESD attitudes and competences, Pillars of Learning, Environmental Challenges in the Arab region, Business Students, RUCAS Tempus Project.

Background

Environmental resources, "common" in nature, are being unsustainably used causing a large-scale environmental crisis. Our current global problems are caused by three crises: the financial crisis, food problem and climate change. The world is suffering many problems with serious threats to human well-being and sustainability (Costanza, 2011a). There is a clear need to change the status-quo of the world through sustainable development (SD). Sustainability is an evolving paradigm that necessitates an understanding of the interconnections and interdependencies among ecological, economic, and social systems (Kemp, et. al., 2005; Munier 2005; Schmuck & Schultz, 2002; Von Der Heidt & Lamberton, 2011). The UNESCO definition of SD is "having a different vision of the world" (UNESCO, 2005). Reframing the way humans view nature as an essential component to our social and economic well-being is needed to build a sustainable future for the next generations (Costanza, 2011b). The sustainability paradigm is emerging as a megatrend affecting policies at all levels of governments, businesses as well as educational institutions (Lubin & Esty, 2010). We need a new way to view humanity and the rest of nature, a shift in moral values

and new commitments of the future generations to finding sustainable solutions. With the significant increase in the global threats, education has a fundamental role to play in personal and social development (Delors, 1996). Since education is a motor for change, the great task educators are called for is to provide the new generations-students across all disciplines- with a vision of education that seeks to empower them to assume responsibility for creating a sustainable future, and this is ESD by definition.

ESD: Its Roots, Objectives and Characteristics

According to UNESCO, though ESD can be seen as associated with the many SD-related educations, it has its roots in Environmental Education (EE). The founding documents are the Tbilisi Declaration (for EE) and Chapter 36 of Agenda 21 (for ESD). In October 1977, the world's first intergovernmental conference on EE took place in Tbilisi, Georgia. This event and the subsequent publications continue to provide the blueprint for the development of EE (UNESCO / UNEP, 1977). In June 1992, the UN organised a Conference on Environment and Development (UNCED), the Earth Summit at Rio de Janeiro, Brazil. The outcomes of the Rio agreements were combined in Agenda 21, a major action program setting out what nations should do to achieve SD in the 21st century. There were implications for EE throughout this document, particularly in Chapter 36 that established the basis for action in EE for SD. One of the major outcomes of the Conference for educators is the recommendation that environment and development education should be incorporated as an integral part of learning (UNCED, 1992).

During the post-Rio decade, conferences and meetings which focused on SD and the role of education continue to emphasize the need for capacity-building and continuous engagement in sustainability. In recognition of the importance of ESD, the United Nations General Assembly, through its Resolution 57/254, in December 2002, declared a Decade of ESD (DESD 2005- 2014) and designated UNESCO as the lead agency. Since the launching of the decade, many sustainability issues have been integrated in education. The UNESCO framework of the DESD scheme suggests that ESD requires the integration of all dimensions of SD including social, environmental, cultural and economic. Through ESD plans, students should acquire various skills (critical and creative thinking, communication, conflict management and problem solving strategies as well as project assessment) to actively contribute to the life of society, be respectful of the Earth and life in all its diversity, and be committed to promoting democracy and peace (UNESCO, 2005). To achieve those objectives, the Decade focuses on (a) promoting quality education and encouraging citizens to live sustainably, (b) reorienting educational programs to focus on the development of knowledge, skills, perspectives and values related to sustainability, (c) building awareness of the concept of SD through community education and the media, in order to make it possible to develop enlightened, active and responsible citizenship locally, nationally and internationally, and (d) providing practical training and continuing education to teacher trainers, pre-service and in-service teachers in making SD a reality (UNESCO 2005, Spiropoulou et al., 2007). In addition, the DESD exerts concerted efforts to create synergies with other global initiatives, such as the United Nations Millennium Development Goals (MDGs), the United Nations Literacy Decade (UNLD) and the Literacy Initiative for Empowerment (LIFE). In declaring these global initiatives, the international community clearly recognizes that a change towards SD and a better quality of life start with education.

Rationale: The Need for ESD in the Arab Region

Efforts to ensure SD in the Arab region are challenged by increased demands on already constrained natural resources. If Arab countries maintain their slow trajectory towards SD, an estimated 124 million people in the Arab region will lack access to basic sanitation in 2015, with about half of these living in the Arab least developed countries (UN, 2010). The global environmental challenges in the Arab region are becoming significant obstacles to human well-being, a situation that calls for the redirection of national development policies that highlight

sustainability. Because threats to the environment are threats to development (World Bank, 2012), the growing environmental challenges of the Arab region are negatively impacting sustainability at all levels.

Population in Arab countries is estimated to be about 395 million people by 2015 (UNDP, 2009). The rapid increase in population, together with the changing consumption patterns, put strong pressures on the carrying capacity of already fragile Arab lands (Abahussain, et al., 2002). The population growth problem is accompanied by intensive urban migration, creating burdens on infrastructure and resulting in congested and unhealthy living conditions in many Arab cities. Additionally, population growth and socio-economic development have generated a considerable increase in water demands. While the population in the Arab region accounts for 5 per cent of the world population, this region is the source of less than 1 per cent of the world's renewable fresh water (UN, 2010). Water shortage and deteriorating water quality are the most significant challenges that confront well-being in the Arab region (UNDP, 2009). Population increase, land-use and land cover change, as well as climate change are expected to contribute to accelerated water scarcity and desertification. The majority of Arab lands are dominated by drylands and a major challenge in these ecosystems is desertification. "Desert has swallowed up more than two-thirds of total land area of the region" (UNDP, 2009). This has reduced the availability of arable land, leading to reduction in agricultural production, malnutrition, poor health, poverty and sometimes creating social and political conflicts. The Arab region is already the most water-scarce region in the world, which makes it among the most vulnerable to the impacts of climate change (Arab Climate Resilience Initiative, 2010). Also, poor air quality in many Arab countries has become a significant challenge with its negative impacts on climate change and on the economic and health sectors of Arab population (UNEP, 2009). Climate change may cause problems in many ways; such as worsening of the water shortage problem, reducing agricultural production, intensifying urban migration, causing further losses of biodiversity, reducing levels of economic activity and threatening human well-being (UNDP, 2009).

Facing the increasingly significant environmental problems and in an effort to achieve ESD objectives in the Arab region, the UNESCO Regional Bureau for Education in the Arab States in Beirut (Lebanon) has carried out in the period 2006-07 a study to explore mechanisms to be adopted in order to ensure sustainability in the region. The study identified many challenges that are facing SD in the Arab region and it revealed that Higher Education Systems in the region are facing major problems that are adversely affecting their ability to achieve sustainability (Makrakis et al., 2012). According to the UNESCO report (2007), "there is no evident progress in DESD implementation, be it regional or national, in the Arab region"; an alarming finding for all Arab countries. The sub-global Millennium Assessment (MA) for the Arab region comes out recently to show that the situation is being worsened (UNEP, forthcoming).

Objectives

With a lack of progress in implementing ESD in the Arab region, it is timely that Arab countries regard education as the cornerstone to achieve the goals of sustainability. This article intends to explore ESD-related issues in higher education in the Arab region. The research presents a case study from the FBAE at NDU in Lebanon to assess the need to reorient university curricula to address sustainability. It reports the results of the RUCAS Tempus project. In investigating this topic, this study main objective is to assess the need for ESD through an examination of the ESD students' attitudes and competences in the aim of reorienting university curricula to address sustainability. This objective will be achieved by answering the following research questions:

   a) What are the sources of information about SD students have used?
   b) What kinds of actions have students done lately for SD reasons?
   c) What teaching and learning methods are being currently used in our university programs?
   d) What are the current attitudes and ESD competencies that students currently have?

These research questions will be answered by drawing on the results of an empirical study among 227students at the undergraduate level in the FBAE at NDU, which was designed based on the five pillars of learning set by the UNESCO, as described in the next section.

RUCAS conceptual framework

Based on the UNESCO recommendation that educational programs of universities in terms of curriculum and teaching methods should infuse ESD to sensitize students and other stakeholders towards sustainability, the RUCAS Tempus project was born in October 2010. RUCAS comes at the middle of the DESD and its relevance is strengthened by the Bonn Declaration held in Germany in 2009 in which it was declared that action should be to "re-orient education and training systems to address sustainability concerns through coherent policies at national and local levels" (UNESCO, 2009). The concept of sustainability requires educational institutions to rethink their missions and to restructure their courses, research priorities, community outreach, and campus operations. Within this context, a number of European Higher Education Institutions (HEIs) who have developed expertise in the field of ESD have joined efforts with six HEIs from Lebanon, Jordan and Egypt along with active NGOs to form a consortium whose aim is to revise university curricula to address sustainability. The ESD issues raised by the UNESCO Regional Bureau for Education in the Arab States study fit into the development strategies of the three Arab countries participating in RUCAS. Further, ESD, as an inter-disciplinary area, covers many prioritized disciplines both nationally and regionally. The RUCAS project adopts a multi/inter-disciplinary and systemic approach that aims to design and implement a model that underlines sustainability issues into Higher Education curricula and develop resources to support university teaching staff and management to embed sustainability across curricula in the disciplines of Educational Sciences, Social Sciences, Business and Economics, Engineering and Applied Sciences.

With the evolving and interdisciplinary nature of the concept of sustainability, ESD is based on the principles and values that underlie SD and it deals with four dimensions of sustainability: environment, society, culture and economy (UNESCO, 2007). ESD uses a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills. It is locally relevant and culturally appropriate; it is based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs has international consequences. ESD promotes lifelong learning and engages formal, non-formal and informal education. It addresses content, taking into account context, global issues and local priorities. It builds civil capacity for community-based decision-making, social tolerance, environmental stewardship, and good quality of life. ESD programs reflect the distinctive environmental, social, cultural and economic conditions of each locality. In spite of their differences, all programs should be based on five fundamental pillars of learning to provide quality education and foster SD (four as set out in the Delors report (1996), and a fifth pillar added by UNESCO). Thus, achieving SD requires:

- recognition of the challenge of sustainability (learning to know),
- acting with determination (learning to do),
- collective responsibility and constructive partnership (learning to live together),
- the indivisibility of human dignity (learning to be),
- individual and collective actions (learning to transform oneself and society).

According to the Delors report (1996), *learning to know* emphasizes learning to learn, so as to benefit from the opportunities education provides. Learners build their knowledge, values, cognitive skills and reasoning in order to develop critical thinking, acquire tools for understanding the world and sustainability issues. *Learning to do* entails acquiring the competence to deal with a variety of situations and to work in teams. It is about knowledge, values, and knowing how to actively engage in order to be an actor as well as a thinker, understand and act on global and local SD issues, acquire technical and professional training, apply learned knowledge, and be able to act creatively and responsibly. *Learning to live together* is about developing an understanding of other people and an appreciation of interdependence in a spirit of respect for the values of pluralism,

mutual understanding and peace. This pillar of learning has to do with knowledge, values, social skills and social capital for international, intercultural and community cooperation, in order to work together in increasingly multi-cultural societies; develop an understanding of other people and their histories, traditions, beliefs and values; tolerate, respect, and celebrate difference and diversity in people; respond constructively to the cultural diversity and economic disparity around the world and be able to cope with conflict situations. *Learning to be* emphasizes the development of one's personality and the ability to act with greater autonomy, judgment and personal responsibility. It assumes that each individual has the opportunity to develop his / her full potential and it is based on the principle that education is for enabling individuals to learn, seek, build, and use knowledge to address local and global problems. This pillar of learning relates to knowledge, values, personal skills and dignity for personal and family well-being, in order to see oneself as the main actor in defining positive outcomes for the future, encourage discovery and experimentation, acquire universally shared values, develop one's personality, and be able to act with greater autonomy and personal responsibility. As for the fifth pillar added by UNESCO, *learning to transform oneself and society*, it recognizes that individuals working separately and together can change the world, and that a quality education provides the tools to transform societies, because of the way it equips humans with knowledge, values and skills for transforming attitudes and lifestyles. Achieving SD requires individual and collective actions, active citizenship, future thinking, responsible lifestyles and sharing of resources. ESD empowers people to assume responsibility for creating and enjoying a sustainable future. This reflects a synergy of cognitive, practical, personal and social skills to bring about sustainability, in order to promote behaviors that minimize our ecological footprint; be respectful of the Earth and life in all its diversity; act to achieve social solidarity and promote democracy.

Research Methods

Subjects
Students were selected from the FBAE at NDU for two main reasons. First, FBAE is the largest faculty at NDU in terms of numbers of students and faculty members. Second, it has been suggested in the literature that conventional curricula of business schools reproduce socially and ecologically unsustainable values of affluent consumer society (Von Der Heidt & Lamberton, 2011). Businesses, main polluters and consumers of natural resources, are major causes of unsustainability (IPCC, 2007). To ensure a transition to sustainability requires business graduates to acquire competences as an essential component of a real solution. It is at the university level that graduates can gain these competences.

To examine ESD attitudes and competences for Business students, questionnaires were distributed to different faculty members in the FBAE who teach classes that encompass different business concentrations; mainly economics, finance, accounting, management, marketing and human resources. Thus, a cluster of classes was selected to cover all the students in the FBAE. A representative sample of 250 students was targeted. The response rate was 90.8% yielding 227 usable responses. Respondents were reminded that their responses are totally voluntary and strictly confidential. No monetary incentives were offered.

Study Instrument
A framework to measure ESD student attitudes and competences was developed to be used as a guide for the design and validation of ESD-related competences for students at the university level (Makrakis et al., 2012). The clusters adopted for the general competences were based on the Delors' report (1996), which recognizes four pillars for education: 1) learning to know, 2) learning to do, 3) learning to be and 4) learning to live together. We also added 'learning to transform oneself and society' that has been introduced by UNESCO as the fifth pillar. A pilot test with a group of 177 students from four faculties (Faculty of Business Administration and Economics (FBAE), Faculty of Natural and Applied Sciences, Faculty of Humanities and Faculty of Engineering) was undertaken at NDU to test the clarity of instructions, appropriateness of the

response set, and face validity of the items. The questionnaire was finalized and 3,757 students from the 12 participating universities in RUCAS were surveyed to examine the extent to which ESD attitudes and competences were acquired by students before starting the infusion of sustainability issues in the curricula. This article reports the results of the survey for the sample of undergraduate students at the FBAE at NDU (227students).

The questionnaire consisted of six pages of questions to be completed mainly by Likert-style response statements, yes/no items and ranking questions. It asked about the country and the institution where the survey was conducted, it asked about the student's discipline and gender. It included questions on SD courses taken by the student; asked the student to rank the sources of information related to SD, rank the actions the student has done lately for SD reasons and rank the different teaching and learning methods that are being currently used in the university programs. Additionally, the questionnaire attempts to assess the respondents' preference of the four functions of education, namely to replicate the existing society and culture, to train people for future employment, to help people develop their potential and to encourage change towards a fairer society and a better world. Current students' attitudes towards ESD were measured using ten Likert-type scale items. The five pillars of learning (ESD general competences) were measured using fifty four Likert-type scale items specifically designed for this study to include the five pillars of learning. Finally, eighteen items measure ESD disciplinary competencies (business / economics in the case of this study) that students currently have.

Measurement of Key Variables
Based on the conceptual model, gender, variables that ask students whether they have taken courses or assignments that deal with SD issues, sources of information related to SD, actions students have done lately for SD reasons, and different teaching and learning methods that are being currently used in university programs are all included to explore how these variables are causally prior to ESD students' attitudes and competences. Dichotomous (0, 1) dummy variables were created for gender and variables about courses or assignments that deal with SD issues. As for ranking the sources of information related to SD, students were asked to give a rank of 1 to the most used source. Zero was entered if no rank was given. Students were also asked to select all the actions they have done lately for SD reasons. Here, a dichotomous scale was used where zero was entered if the action was not selected and 1 if the action was selected. For the ranking of the different teaching and learning methods used in university programs, students were given a list of ten methods and they had to rank them from 1 to 10 with one being most frequently used. A value of zero was given in the case of no rank.

Students' ESD attitudes were assessed through a series of items in the survey on a six-point rating scale (strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, and strongly agree). Also, a six-point rating scale (not at all, poor, fair, good, very good, and excellent) was used to assess general and disciplinary competences. Attitude Scales and Competence Scales (for the five pillars of learning) were constructed by adding together all non-missing responses and dividing by the number of valid responses. This resulted in scales in the same range as the original variables (1-6). For all scales, the higher the values, the more the individual adheres to that attitude or competence. The scale was reversed for some attitude items to ensure all items follow the same direction, where a higher score means pro-environmental attitudes. All questionnaires were carefully edited to confirm that there were no obvious outliers. Responses were entered into SPSS statistical data editor. A quality check was conducted and statistical diagnostics that measure central tendencies and dispersion was applied to the data.

Main Findings

Students' Profile and ESD Literacy
The analysis of the data revealed that 49.3% (n=112) of the students were females and 49.3% (n=112) were males. Only three students did not respond to the gender question. The majority of the respondents (58.6%) have taken a course that relates directly to SD. The majority of students

(75.3%) have taken a course that includes some issues relevant to SD. A percentage of 57.3% have done a course assignment or project that concerns SD.

When asked about the sources of information related to SD, the majority of the students (68.7%) ranked the internet as the most used source of information about SD they have used. Thirty percent of the sample ranked university courses as the second most important source of information related to SD. A relatively smaller percentage (27.8%) ranked newspapers as the third source of information about SD. A small percentage (8.4 %) noted that TV is the fourth source. An even smaller percentage (7%) gave an unclassified answer suggesting that publications / brochures and magazines, events such as conferences, fairs / exhibitions and festivals; as well as conversations with friends / family and colleagues might be ranked as the fifth, sixth and seventh source of information related to SD respectively. Radio and special interest groups were ranked eighth and ninth respectively (Table 1).

Source of information	Not ranked (%)	Ranked 1st (most used source) (%)	Ranked 2nd (%)	Ranked 3rd (%)	4th (%)	5th (%)	6th (%)	7th (%)	8th (%)	9th (%)	10th (%)
Newspapers	22.9	10.6	12.8	**27.8**	7.5	6.2	3.1	2.6	3.1	1.8	1.8
The Internet	5.7	**68.7**	13.7	6.6	3.5	0.9			0.4	0.4	
University courses	18.5	22.5	**30.0**	13.7	5.3	5.3	0.4	2.6		1.8	
TV	20.3	20.7	18.1	21.1	**8.4**	4.0	2.2	1.3	3.5		0.4
Publications/brochures /magazines	20.3	12.3	19.4	20.3	6.2	**7.0**	6.2	3.1	3.1	1.8	0.4
Events (conferences, fairs/exhibitions, festivals, etc.)	28.6	4.4	17.2	19.8	4.8	4.8	**7.0**	4.8	4.8	3.5	
Conversations with friends/family/colleagues	21.6	15.9	17.2	12.8	6.6	4.8	4.4	**7.0**	4.4	5.3	
The radio	30.0	3.1	10.1	21.1	4.8	5.7	6.2	6.2	**6.6**	5.7	0.4
Special interest groups (e.g. NGOs)	29.5	6.6	10.1	21.1	2.2	4.4	4.0	4.4	5.3	**11.0**	1.3

Table 1: Sources of information about SD Students have used.

Table 2 suggests that the top three sources of information about SD issues are: the internet (68.7% ranked it number 1), university courses (22.5% ranked them number 1) and TV (20.5% ranked it number 1). When asked about the second rank, this order has changed; university courses have now the highest percentage, followed by TV and then the internet. As for the third rank, it went first to TV, followed by university courses and then the internet.

Source of information	Rank 1		Rank 2		Rank 3	
	n	%	n	%	n	%
The Internet	156	68.7	31	13.7	15	6.6
University courses	51	22.5	68	30.0	31	13.7
TV	47	20.7	41	18.1	48	21.1

Table 2: The top three sources of information about SD - arranged according to those ranked#1.

Actions Students Have Done for SD Reasons

Students were asked to select all the actions they have done lately for SD reasons. Of the nine actions they were asked about, only three sustainable actions were selected by the majority of the students (about half the sample or more). Results show that 74.4% of the students indicated that they switched off unnecessary lights, 67% indicated that they used energy saving light bulbs and about half of the sample (49.8%) indicated that they donated money to charities. A large percentage of students (87.7%) did not refuse to take a plastic bag from the supermarket, 80.2% did not do any form of voluntary work in their community. In addition, 75.3% have not purchased eco-labelled and fair products, 72.2% have not recycled cans, glass or paper. Furthermore, 69.6% have not used carpooling. Also, 54.2% have not purchased environmentally friendly products (Table 3).

Have you done any of the following actions during the past month for SD reasons?	Yes (%)	No (%)
Switched off unnecessary lights	**74.4**	25.6
Purchased eco-labelled and fair-trade products	24.7	75.3
Recycled cans, glass or paper	27.8	72.2
Used carpooling	30.4	69.6
Purchased environmentally friendly products	45.8	54.2
Did any form of voluntary work in your community	19.8	80.2
Donated money to charities	**49.8**	50.2
Refused to take a plastic bag from the supermarket	12.3	87.7
Used energy saving light bulbs	**67**	33

Table 3: Actions done during the past month for sustainable development reasons.

Cross tabulations and Pearson Chi-Square results show that some actions are dependent on gender, mainly purchasing eco-labelled and fair-trade products, donating money to charities, refusing to take a plastic bag from the supermarket and using energy saving light bulbs with males stating that they performed more of these actions for SD reasons (Table 4).

		Gender				X^2-Test	
		Female		Male		Fisher's Exact Test	Significance
		Count	% of total	Count	% of total		
Switched off unnecessary lights	No	24	10.7	33	14.7	0.220	0.110
	Yes	88	39.3	79	35.3		
Purchased eco-labelled and fair-trade products	No	92	41.1	77	34.4	0.029	0.015*
	Yes	20	8.9	35	15.6		
Recycled cans, glass or paper	No	85	37.9	77	34.4	0.296	0.148
	Yes	27	12.1	35	15.6		
Used carpooling	No	81	36.2	74	33.0	0.385	0.193
	Yes	31	13.8	38	17.0		
Purchased environmentally friendly products	No	61	27.2	62	27.7	1.00	0.50
	Yes	51	22.8	50	22.3		
Did any form of voluntary work in your community	No	93	41.5	87	38.8	0.401	0.20
	Yes	19	8.5	25	11.2		
Donated money to charities	No	64	28.6	49	21.9	0.061	0.031*
	Yes	48	21.4	63	28.1		
Refused to take a plastic bag from the supermarket	No	104	46.4	92	41.1	0.025	0.012*
	Yes	8	7.1	20	8.9		
Used energy saving light bulbs	No	43	19.2	31	13.8	0.118	0.059*
	Yes	69	30.8	81	36.2		

Table 4: Chi-Square Test for the different SD-related actions across gender.

Teaching and Learning Methods

The questionnaire included a list of ten teaching and learning methods and students were asked to rank them according to their frequency of use at the university. From their responses summarized in Table 5, lecturing came in first at 66.1%, interactive engagement came in second at 29.5%, project-based learning was in the third place at 20.7%. A careful examination of the percentages shows some kind of competition over the ranks given by the students to the other various methods. This could be due to the fact that students are not familiar with those methods, such as inquiry-based, case-based instruction, interdisciplinary teaching, problem-based learning, tech-supported instruction, placed-based learning and discovery learning. This result was expected and this is why an explanation of the different methods was provided to the students; however, the analysis still shows mixed results about the ranks.

Teaching and learning methods	Not ranked (%)	Ranked 1st (%)	Ranked 2nd (%)	Ranked 3rd (%)	4th (%)	5th (%)	6th (%)	7th (%)	8th (%)	9th (%)	10th (%)
Lecturing	5.7	**66.1**	12.3	8.8	2.2	0.4	0.4	1.8	0.4		1.8
Project-based learning	13.2	25.1	26.4	**20.7**	7.5	2.2	3.1	0.9	0.9		
Interactive engagement	22.0	13.2	**29.5**	15.0	6.6	7.5	2.2	1.3	2.2	0.4	
Case-based instruction	15.9	18.9	26.0	16.3	7.0	**6.2**	2.6	2.6	1.3	2.2	0.9
Inquiry-based learning	24.2	14.1	18.1	16.3	**7.5**	6.6	4.0	3.1	3.5	1.8	0.9
Interdisciplinary teaching	31.7	9.7	17.6	12.3	3.5	4.0	**6.6**	5.3	4.4	1.8	3.1
Problem-based learning	21.6	12.3	19.4	17.6	7.0	4.0	5.7	**6.6**	2.6	1.3	1.8
Tech-supported instruction	29.5	10.6	15.4	13.7	3.5	4.0	5.3	5.3	**7.5**	4.4	0.9
Placed-based learning	**36.1**	6.2	8.4	17.2	3.1	4.4	2.2	1.8	4.0	**9.3**	7.5
Discovery learning	33.0	7.5	7.0	**20.7**	3.5	4.0	3.5	0.9	2.6	7.0	**10.1**

Table 5: Teaching and learning methods used in the courses.

Table 6 suggests that the top three teaching and learning methods listed according to those ranked in first position as the most widely used are: lecturing (66.1% ranked it number 1), project-based learning (25.1% ranked it number 1) and case-based instruction (18.9% ranked it number 1). When asked about the second rank, this order has changed; project-based learning is the first, followed by case-based instruction, and then lecturing. As for the third rank, it went first to project-based learning, followed by case-based instruction, and then lecturing.

Teaching and learning methods	Rank 1		Rank 2		Rank 3	
	n	%	n	%	n	%
Lecturing	150	66.1	28	12.3	20	8.8
Project-based learning	57	25.1	60	26.4	47	20.7
Case-based instruction	43	18.9	59	26.0	37	16.3

Table 6: The top three teaching and learning methods- arranged according to those ranked#1.

To enhance learning about SD issues, different teaching methodologies should be used in the classroom, which does not seem to be the case in the present study. The majority of the students indicated that *lecturing* is the most used teaching method. Lecturing is definitely most helpful to disseminate information quickly to a large audience. However, it should be combined with other teaching methods in order to facilitate students' involvement; develop analytical, collaborative and communication skills and encourage critical thinking- all needed in ESD.

Preferred Function of Education

Students were asked about the four functions of education they prefer most. Noone responded 'to replicate the existing society and culture', 24.2% selected 'to train people for future employment', 41.4% answered 'to help people develop their potential' and 33% chose 'to encourage change towards a fairer society and a better world'. Three respondents did not answer the question. Chi-square test showed no significant difference between males and females responses on that particular question.

These results are interesting in that no one student responded 'to replicate the existing society and culture'. This is a remarkable finding proving that students are conscious about the necessity to transform and change the existing society. Students mostly prefer that education plays a role in helping people develop their potential, followed by encouraging change towards a fairer society and a better world.

ESD Attitudes

Students' ESD attitudes were assessed through a series of 10 items in the survey (Table 7). The majority of the respondents (81.5%) agree that people should be prepared to make sacrifices to improve the quality of life for others. Also, 76.2% agree that everyone should look after themselves rather than rely on the government for help. The answers revealed that a large percentage of the students (59.9%) disagree with the statement 'there is little connection between the protection of the environment and people's quality of life'. Despite the recent global financial and economic crisis and the high level of unemployment, 66.1% disagree with the statement 'economic growth and increased employment are more important than protecting the environment'.

Attitudes	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
	(valid %)					
(Mean=3.99; St. deviation=0.78; range=1.90-5.6; alpha= 0.664)						
People should be prepared to make sacrifices to improve the quality of life for others	3.1	4.0	11.0	26.0	27.3	28.2
Everyone should look after themselves rather than rely on the government for help	4.4	7.9	11.0	16.3	28.6	31.3
There is little connection between the protection of the environment and people's quality of life (R)	36.1	13.7	10.1	13.2	12.3	13.7
Economic growth and increased employment are more important than protecting the environment (R)	22.9	22.9	20.3	15.0	13.7	4.8
There is very little someone like me can do to protect the local environment (R)	16.7	18.5	20.7	18.5	14.5	9.3
What I do in this country has little effect on the quality of life for people in other countries (R)	13.7	15.9	22.0	18.9	15.9	11.9
What other countries do to improve or destroy the environment is none of our business (R)	55.1	17.6	10.6	7.9	4.0	4.8
The third world or less developed countries should deal with their own problems and not look to the world for help (R)	34.4	16.7	15.0	11.0	11.9	9.3
There is very little someone like me can do to protect the global environment (R)	18.9	18.1	22.5	18.9	12.8	7.9
The governments' priority should be to improve the quality of life for people in this country rather than other countries (R)	4.4	4.0	15.4	13.2	18.1	44.1

Table 7: Students' attitudes towards ESD.

A relatively high percentage (42.3%) agrees with the statement that 'there is very little someone like me can do to protect the local environment'. Also, 39.6% of the students agree that 'there is very little someone like me can do to protect the global environment'. Only 51.6% disagree with

the statement 'what I do in this country has little effect on the quality of life for people in other countries'. The results show that a relatively high numbers of students are not aware of their personal responsibilities towards local and global environmental problems. The majority (83.3%) disagree with the statement 'what other countries do to improve or destroy the environment is none of our business'. In addition, 75.4% agree that the 'governments' priority should be to improve the quality of life for people in this country rather than other countries'. And, 66.1% disagree with the statement 'the third world or less developed countries should deal with their own problems and not look to the world for help'. The majority (75.4%) does care for the improvement of the quality of life in their country and does not care for other countries. These findings suggest the need for a revised curriculum, a more effective education process where courses are restructured to inform students of their responsibility towards their environment and the quality of life of individuals in other countries.

The Mean score for the attitudes items was computed. It was found to be 3.924 for the study sample. A one-way ANOVA was conducted to check if there is a difference between female and male students in their ESD attitudes. P-value is found to be 0.017 (<0.05) suggesting that there is a significant statistical difference between the mean attitudes across gender. It is important to note that the higher mean score indicates more pro-environmental attitudes. The females are found to have a higher mean attitude (4.0175; s.d.=0.5841) compared to males (3.8284; s.d=0.5913). While only 5.3% of the sample shows mean attitudes less than 3; 94.7% scored 3 or greater. It was found that 50.2% of the sample shows mean ESD attitudes less than 4, and 49.8% had mean ESD attitudes at 4 or greater than 4.

ESD Competences

Students were asked about their general and disciplinary ESD competences. The survey included twelve items for each of the clusters 'learning to be' and 'learning to do'. Also, it comprised ten items to assess each of the 'learning to live sustainably', 'learning to know' and 'learning to transform' clusters. As for the disciplinary competences, they were assessed by 18 items. The Mean score was computed for the different five pillars of learning items, in addition to the disciplinary business competences. The competences clusters were categorized in such a way that those who have a mean competence greater or equal to 3 are considered to have good ESD competences in the different clusters. It was found that: 98.7% of the total sample of the students shows learning to be competences >= 3; 97.3% shows learning to live sustainably competences >= 3; 97.4% shows learning to know competences >= 3; 97.8% shows learning to do competences >= 3; and 99.1% shows learning transform competences >= 3. As for disciplinary competencies, 97.3% shows business competences >= 3. This classification of the competences was not very insightful. Another way to classify competences was computed, such that Mean Competences less than 2 are considered poor, those between 2 and 3.99 are considered good, and those between 4 and 6 are considered very good (Table 8). Of the total sample of students, only one student (0.4%) showed poor learning to do competences. The majority of the students show 'very good' competences with 82.4% for the learning to be cluster, followed by 75.8% for learning to know, 74.8% for learning to transform, 74% for learning to do and 72.1% for learning to live sustainably. For the disciplinary competences, 68% showed 'very good' competences suggesting that more efforts need to be done to enhance business competences.

Mean Competence (Valid %)	Learning to Be	Learning to Live Sustainably	Learning to Know	Learning to Do	Learning to Transform	Disciplinary Business Competences
From 0 to 1.99 (poor)	-	-	-	0.4	-	
From 2 to 3.99 (good)	17.6	27.9	24.2	25.6	25.2	32.0
From 4 to 6 (very good)	82.4	72.1	75.8	74.0	74.8	68.0

Table 8: Mean ESD competences.

A one-way ANOVA was conducted to check if there is a difference between female and male students in their ESD competences. The means for the two gender groups are displayed in Table 9. ANOVA did not show any statistical difference between the 2 gender groups on the five general pillars of learning. However, P-value was found to be 0.005 (<0.05) for the disciplinary business competences suggesting that there is a significant statistical difference between the mean disciplinary competences across gender. The females have a lower mean business competences (4.21; s.d.=0.78) than males (4.49; s.d=0.72).

GENDER		Learning to Be	Learning to Live Sustainably	Learning to know	Learning to do	Learning to transform	Disciplinary Business Competences
Female	Mean	4.60	4.42	4.44	4.41	4.57	4.21*
	n	112	111	112	112	111	110
	S.D	0.75	0.78	0.77	0.80	0.82	0.78
Male	Mean	4.61	4.46	4.48	4.53	4.55	4.49*
	n	112	112	112	112	112	112
	S.D	0.71	0.75	0.76	0.71	0.72	0.72
Total	Mean	4.60	4.44	4.46	4.47	4.55	4.35
	n	224	223	224	224	223	222
	S.D	0.73	0.76	0.76	0.76	0.77	0.76

Table 9: Cross tabulations of competences across gender.

Finally, among the competence clusters, a paired t-test pairs was performed to find the mean differences of the different competence clusters (Table 10). Results of the paired T-test for the different competences clusters suggest the following significant statistical mean differences:
   a) Learning to live sustainably (4.44) < learning to be (4.60)
   b) Learning to know (4.46) <learning to be (4.60)
   c) Learning to do (4.47) < learning to be (4.60)
   d) Learning to live sustainably (4.44) < learning to transform (4.55)
   e) Learning to know (4.46) < learning to transform (4.55)
   f) Learning to do (4.47) < learning to transform (4.55)
There is no statistical difference between the means for:
   g) Learning to know and learning to live sustainably
   h) Learning to do and learning to live sustainably
   i) Learning to do and learning to know
   j) Learning to be and learning to transform
As for the disciplinary competences, t-tests show clearly that the disciplinary competences are significantly lower than the five pillars of learning, which suggest that the FBAE at NDU needs to emphasize the disciplinary ESD competences in its curricula.

Competence (mean, standard deviation)	Learning to live sustainably	Learning to know	Learning to do	Learning to transform	Business competences
Learning to be (4.60; 0.73)	4.731 (0.000)*	3.721 (0.000)*	3.577 (0.000)*	1.052 (0.294)	5.696 (0.000)*
Learning to live sustainably (4.44; 0.76)		-0.519 (0.605)	-0.706 (0.481)	-2.609 (0.010)*	1.955 (0.052)*
Learning to know (4.46; 0.76)			-0.220 (0.826)	-2.260 (0.025)*	2.932 (0.004)*
Learning to do (4.47; 0.76)				-2.107 (0.036)*	3.119 (0.002)*
Learning to transform (4.55; 0.77)					5.279 (0.000)*
Business competences (4.35; 0.76)					

Table 10: Paired T-Test among the competence clusters.

Implications for ESD Teaching and Learning Methods

The analysis of the teaching and learning methods used at the university seems to imply that only few methods are used; namely lecturing, project-based learning and case-based instruction. It is important to use various teaching methodologies in classrooms in order to improve learning about SD issues. The evolution to hybrid forms of teaching methodologies renders teaching compatible to the ESD objectives and principles. It is true that *lecturing* is most appropriate and efficient when introducing large numbers of students to a particular field of study. It gives students the information not elsewhere available; it summarizes, synthesizes and organizes for the students the content of numerous articles and books helping them to learn listening to the ideas of others; it allows sharing of information, the logical succession of ideas; and eventually promotes the formulation of solutions (Kam-Fai, 1973). However, in order to infuse ESD more efficiently, other teaching and learning methods need to be enhanced in universities.

Project-based learning, for instance, is crucial to address complex SD topics as it is a student-centred experiential learning approach by nature. This method requires the learners' initiatives and independent investigation, it can also involve the local community and mobilise its resources (Frey, 1986; Scoullos & Malotidi, 2004). *Case-based instruction* is an active, learner-centered model that is used to facilitate the development of reasoning skills and to connect classroom teaching to real world scenarios. This method can be used to teach content, engage students with factual data and provide opportunities for learners to position themselves in professional decision-making situations. Through this process, they develop analytical, collaborative and communication skills (Hartfield, 2010). *Inquiry-based learning* offers many opportunities to examine the complexity of SD issues. This method stimulates students' curiosity and encourages them to actively explore and seek out new evidence to support their own response to the problem (Kahn & O'Rourke, 2005).

As the nexus between society and environment becomes more apparent, so the notion of integration across disciplines becomes essential. *Interdisciplinary learning* methods help students collaborate with other professions that 'see' things from a different perspective. Many reports indicate that these methods are necessary to approach the most critical current global challenges; including climate change, sustainability, energy and public health (Borrego & Newswander, 2010). Interdisciplinary learning methods require cooperative learning and are based on the principles of constructivism and experiential learning, by which learners experience working across many disciplines and construct new ideas and concepts. These methods greatly promote

many of the core ESD principles as they advocate pluralism of ideas and methods and bring learners out of the "box" of their discipline to develop an appreciation for diverse ways of thinking.

As for *problem-based learning,* it is used to engage students in becoming active in the learning process. It is characterized by learning via contextualised problem setting based on real conditions. Complex problems from the real world are used as a stimulus for learning and developing personal competences (Scoullos & Malotidi, 2004). *Information and Communication Technologies (ICTs) or tech-supported instruction* encompasses a very large spectrum of information handling tools, including traditional tools like radio, television, and telephone up to the most sophisticated satellite, internet and wireless technologies (Reddi, 2004). ICT-enabled learning brings about implications within the ESD framework with regards to the shift from a teacher-centred approach to a learner-centred approach. E-learning brings about the appreciation of multi-disciplinarity and of cross-fertilisation between different disciplines and technological know-how.

Placed-based or service-learning integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities (Seifer & Connors, 2007). While servicing their communities, students increase their academic achievement, apply scientific knowledge, develop communication skills, foster social responsibility attitudes, and develop active citizenship in areas such as public safety and the environment. Service-learning method is a transformative process as it can provide students with 'transformational learning experiences'. The integration of ESD techniques in service learning is a common practice within formal education.

Discovery learning involves an instructional model that focuses on active, hands-on learning opportunities for students (Dewey, 1916/1997; Piaget, 1954, 1973). With discovery learning, students are actively seeking new knowledge and they are engaged in practical activities that are real problems needing solutions. This method motivates learners and allows them to seek information that satisfies their natural curiosity (Castronova, 2002). Bicknell-Holmes & Hoffman (2000) describe three main characteristics of discovery learning as 1) exploring and problem solving to create, integrate, and generalize knowledge, 2) encouraging students to learn at their own pace, and 3) integrating new knowledge into the learner's existing knowledge base. Discovery learning allows students to interact with their environment by manipulating objects and wrestling with controversies. ESD aims at developing the meta-cognitive skills and motivation which are main principles of discovery learning strategy. Applying discovery learning promotes substantially ESD.

Conclusions

The study results indicate that participants, FBAE students at NDU, consider the internet as the most used source of information about SD. University courses were ranked second with only 30% of the students giving them this rank. Only 22.5% of surveyed students gave the university courses the first rank as a source of information about SD issues. If we acknowledge that HEIs are among the key institutions that can contribute to proposing solutions for the future sustainability (Saadatian et al., 2011), the findings of this study suggest a real need to reorient university curricula to improve ESD, so that courses featuring the development of sustainability skills are seen as providing information for students, rather than as a redundant fashionable option.

The findings of this study suggest that students do not perform actions for SD reasons. Male students are more likely 'to do' SD-related actions than female students. In making SD a reality, it is essential 'to do' actions related to sustainability. Reinforcing knowledge about SD is important in education; however, it is also important to help students move from 'knowing' to 'doing'. One of the learning pillars, *learning to do,* focuses on the ability of the learner to put what is learned into practice. It is about knowing how to act for active and responsible engagement in order to take actions related to global and local SD issues. Reorienting existing university curricula to address ESD, emphasizing the five learning pillars, is necessary to equip graduates with knowledge, skills, perspectives and values of sustainability and to assume responsibility for creating a sustainable

future. By integrating sustainability into major activities of educational institutions, universities can help prepare students to take actions to face the complex, dynamic and uncertain future. New curricula need to promote a sense of both local and global responsibility so that students reflect on new lifestyles (new actions) which combine well-being, quality of life and respect for nature and other people.

The analysis of the ESD attitudes shows a mean attitude of 3.924 for the study sample with the females having a slightly higher mean attitude than males. The attitudes mean ranges from 2.4 to 5.3. If we consider those who have an attitude mean of 4 to have favourable ESD attitudes, we can conclude that about half of the sample (50.2%) shows mean ESD attitudes less than 4, and 49.8% had mean ESD attitudes at 4 or greater than 4. Additionally, the results show that a relatively high number of students are not aware of their personal responsibilities towards local and global environmental problems. These findings suggest the need for a revised curriculum to address sustainability, a more effective education process where courses are restructured to infuse ESD and enhance students' responsibility towards their environment and the quality of life of individuals in their local communities as well as in other countries.

The analysis of the general competences reveals that the majority of the students show 'very good' competences ranging from 72.1% for the *learning to live sustainably* to 82.4% for the *learning to be* cluster. The results of the paired T-test for the different competence clusters suggest that *learning to live together sustainably* has the lowest mean *and learning to be* has the highest mean. Revised curricula are needed to enhance the *learning to live together sustainably* competences. This pillar highlights the interdisciplinary nature of ESD. It addresses the critical skills that are essential for a better life where all have equal opportunity to develop themselves and to contribute to their well-being. As for the disciplinary competences, 68% of the sample showed 'very good' competences suggesting that more work needs to be done to enhance disciplinary competences. The results of ANOVA show that female students have a lower mean for the business competences than males. Additionally, t-tests show that the disciplinary competences are significantly lower than the five pillars of learning. We acknowledged earlier that students and academicians are or will be the future leaders of the society. If we admit that business schools are responsible to prepare students for careers tailored towards a greener economy; thus, business schools need to reorient their curricula to infuse ESD into their programs; through the development of effective pedagogical approaches and learning materials.

Generally, the results obtained from this study suggest that it is time that Arab countries realize the profound association between the environment and development. The many environmental challenges in Arab countries can well put this region of the world beyond its resource limits, threatening its long-term ability to support life and contributing to increasing human vulnerability. It is important for governments in the Arab region to develop national educational strategies for SD to help new generations face the complexities of the global challenges. "Education for Sustainable Development is not an option but a priority" (UNESCO, 2005). ESD is transformative education at heart and it aims to influence education towards effectively addressing global challenges. ESD has many drives including empowering learners to realize their individual potential as well as contributing to social transformation. Education is asked to create a balance between environmental, societal, cultural and economic considerations in order to ensure a better quality of life. The UN system sees an alternative future out of the crisis in terms of a "green economy" with ESD as the best educational framework for addressing global problems (Von der Heidt & Lamberton, 2011). The Interagency Statement of 25 June 2009 on "Green Economy: a Transformation to Address Multiple Crises" clearly states that "the shift towards a green economy requires ESD" (UNESCO, 2010). Creating green economies and sustainable societies requires more than technological advancements, it necessitates a 'transformation' in attitudes, competences and behaviors to prepare younger generations for a sustainable future.

Humans will not be able to solve today's problems with the same approaches that created them. Einstein argued that we cannot resolve problems from within the same mindset that created them (Irwin, 2012). What kind of future should education prepare learners for? ESD has a lot to contribute answering this question. The results of this study are insightful in that when asked about the function of education students prefer, no one answered 'to replicate the existing society and

culture'. The most selected students' responses to this question went for 'to help people develop their potential' and 'to encourage change towards a fairer society and a better world'. This is an interesting implication confirming that students are aware of the need for a change, for a societal transformation in our world. In order to achieve this, we need to put the world on a more SD path. A holistic and ecological worldview is needed to create sustainable solutions. Expanding information, expanding involvement: these are keys to comprehend the complexity of this world, and to 'change'. Working together, as educators, governments, businesses, and citizens, we can deepen our understanding of sustainability issues and enable the present generations to participate in passing along a safe, healthy world to our children and grandchildren.

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ESD: Assessment of the Current Situation at the Faculty of Engineering of Notre Dame University – Louaize

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Abstract

There is a growing need to incorporate educational sustainable development (ESD) principles into engineering education. This paper identifies engineering competencies within the Faculty of Engineering at Notre Dame University-Louaize and the means to shift towards sustainability. ESD tools are used to carry the analysis, keeping in mind the Faculty of Engineering accreditation system ABET requirements. A survey of the current situation was conducted based on seven key areas: curriculum, research and scholarship, operations, faculty and staff development, outreach and service, student opportunities, administration, mission and planning. The survey revealed some weaknesses that the Faculty needs to address for a successful implementation of sustainable practices. ESD is integrated in two selected engineering courses. At the beginning of the course, a questionnaire is used to assess the knowledge, behavior and attitudes of students. Results show that students currently understand the importance of ESD, but they have a weak knowledge of the relationship between the environment and sustainable future, and a bad understanding of sufficient living economy principle. The analysis showed also the need to introduce new courses of sustainability. Nevertheless, the proposed amendment to the curriculum ought to be carried in conjunction with the Faculty of Engineering accreditation system ABET. A wide dissemination of ESD throughout the entire engineering program will help promoting sustainability. Besides, the infusion of ESD can be implemented within a common engineering course i.e. Introduction to Engineering, a mandatory course for all engineering students following ABET amendment procedures.

Introduction

The world is facing current and future environmental and social challenges. Over the past decade sustainability strongly emerged as the new paradigm of development. Climate change, energy resources, water scarcity, air and water pollution are among the new challenges for humanity. In this context, higher education can be the tool for achieving sustainability (UNESCO, 2006). The institution of higher education is the central forum where leaders and decision makers can exchange views. Therefore, profound changes in higher education programs are necessary to integrate the concepts of sustainability in the programs and prepare the new generations to deal with a rapidly changing and less predictable global system. The reoriented programs must take into consideration the many and complex facets of local environmental, economic, and societal conditions. However, it is a challenging task to redesign curricula to achieve sustainability by preparing graduates with the necessary knowledge and values, a capacity for critical thinking, and the motivation to deal with diverse problems associated with unsustainable situations. At the heart of this challenge is the lack of understanding the concept of sustainability as a basis, and the need to develop curricula based on concepts related to sustainability rather than the traditional set of concepts related to each discipline (Sibbel, 2009). In order to raise the education for sustainable development to this level, the academic structure of study must be changed to introduce sustainable development as a transversal skill in all majors, defining the skill as the students' capacity to internalize and apply sustainable solutions to all aspects of their professional life: technological, environmental, and social aspects (Sipos et al, 2008).

In this context, Notre Dame University – Louaize (NDU) has engaged in partnership with a number of higher education institutions from Greece, Ireland, France, Jordan, Lebanon, and Egypt

in a radical reorientation of the curricula in order to enable the new generation of professionals to be more efficient in operating the transition toward a sustainable society, and act to influence it. The project, called Reorienting University Curricula to Address Sustainability (RUCAS) consists of developing resources to involve faculty members, review of curricula, capacity building and establish a network for support. The areas of curriculum revision are Educational & Social Sciences, Engineering, Information Technology and Applied Sciences. For each discipline, students' competences are developed and will be validated after. The support system consists on an education for sustainable development (ESD) curriculum review toolkit, a virtual center for curriculum reform in each partner institution, and a series of seminars aiming at training faculty members to implement ESD into their own courses. The target is to reach more than 40% of the study program to address ESD in every partner institution [RUCAS, 2011].

This paper describes the advances achieved at the Faculty of Engineering (FE) of NDU-Louaize, and discusses some ideas for future action. At the FE, students' competencies to address ESD have been assessed. A survey based on the approaches developed by University Leaders for a Sustainable Future was used to analyze the current situation, and to point to some challenges and strategies for integrating sustainability into the curricula [ULSF, 2009]. Finally, two engineering courses were selected for a pilot study on infusing sustainability concepts. The students' knowledge, attitudes and skills before attending these courses are measured, and will be used to assess the students learning at the end of the course.

Competencies for Engineering in Addressing ESD

Engineers have a major role to play in the enhancement of sustainable future. Most of these challenges require engineers to be able to design and construct sustainable systems that address current needs, without compromising future generations. Traditionally, engineers have been at the vanguard of social development. So it is their responsibility to contribute to the solution of food shortage, water management and decent shelter for the world population, while using the least amount of existing resources. This cannot be accomplished using the current conventional techniques. It is true that some little progress in conservation, recycling and awareness has been reached yet, the path to reach the above goal is long if a breakthrough in clean technology is not made soon.

Traditional method of engineering education is deemed to fail if not substantially reshuffled and rethought. The outcome of an extremely slow process of modernization will certainly create new revolutionary method of education, transforming the existing to obsolete ones. A holistic approach comprising a wider knowledge base in the social, political, and life sciences in addition to physical sciences and mathematics must be entailed (Chau, 2007). However, integrating learning experiences addressing these goals in engineering programs involves many challenges, including stating operational learning outcomes for sustainability knowledge, skills and attitudes for a particular program, making a contextualized interpretation of the concept, curriculum design issues such as creating separate courses on sustainability and integrating such topics in other courses (Wedel, 2008). In order to produce the change in this direction, there is a growing interest in the "competence approach" as change agents to implement ESD, and assess the progress of its implementation, and to advance thinking and practice of cross-boundary transformative sustainability in higher education [Mochizuki, 2010].

Within the framework of RUCAS project, there is an opportunity to address students' competence as part of the well-known five general pillars (UNESCO, 2006): Learning to be, learning to live together sustainably, learning to know, learning to do, and learning to transform oneself and society. However, the project gives each discipline a foundation to develop its own specific set of competencies. In the meantime, the competencies defined for engineers can allow for a more creative educational thinking process.

Certain courses are more prone to incorporate the notion of sustainable development than others. However, introductory courses can include a general knowledge of sustainability and sustainable development in engineering. The objective is to induce all graduates, especially in fields far from

SD, to carry this valuable luggage during their practice, and train them to the notion of learning to live together sustainably.

Ethical responsibilities are part of a professional track. Graduates in developing countries have a serious challenge in facing corruption. The awareness of the importance to be dedicated to the professional and ethical responsibilities should be cultivated in the spirits of the emerging generation. Regardless of the type of practice, the first line of defence to counter corruption is the personal virtues related to ethics. Nevertheless, this skill needs to be nurtured in school, due to its complexity and multiple faces. Engineers will then need to nurture the notion of transforming themselves and their entourage, in order to inculcate ethical behaviour around.

Engineers have always been dealing with leadership skill. The type of engineering profession does include design and execution. The execution part is mainly a skilled management process. Academic engineering programs aims at building up future leaders, cultivating the notion of leadership skills for sustainable engineering design to counter-balance the loss of our resources.

In designing systems, engineers need to promote the application of environmentally friendly technology versus resource intensive technology that used to pollute, create social injustices and disrupt communities. Eco-friendly solutions are given priority in industry research and development, as well as academic research. Use of the techniques, skills, and modern engineering tools necessary for environmentally sound engineering practice needs to be given priority in teaching, to live together sustainably.

Several engineering schools are seeking program accreditation from the Accreditation Board for Engineering and Technology (ABET), either in preparation for a first assessment or renewal. Per ABET standards, designing a system, component, or process to meet desired needs is achieved within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability (www.ABET.org). Learning to know and to conceive such system needs to be imbedded within our teaching.

Team work is also the issue to be promoted within ABET guidelines. Working in multidisciplinary teams in engineering practice is also encouraged among students, to adapt current technology to sustainable lifestyles. This effort is mainly pursued among senior students developing their final year projects. Their teaming together is a mean to learning to do things together with a happy joint efforts, and combat individualism and selfishness.

While engineering education gets busy focusing on technical features, the system often encourages faculty and students to omit addressing the global picture of understanding the impact of technology on society and nature, and learning to transform oneself and society. This is mainly due to the type of teaching cloistered within classroom walls. Besides, understanding how different cultural, social and political contexts impact design is also part of the technical teachings. It also includes the analysis of the impact of engineering and technology on individuals, organizations and society, including ethical, legal, security and global policy issues after implementation. Engineering education needs to incorporate the formation of future engineers capable of listening closely to the demands of citizens and other stakeholders, in order to let them have a say in the development of infrastructures. Also the discussion of social and psychological aspects of environmental behaviour change (e.g. why and how people change or don't change) in relation to engineering practices is useful. Finally, engineering students should be introduced to the UN Millennium Development Goals at an early stage, as being the framework to plan their future. The engineering educational system which is unsuccessful in training its students to become visionaries is a stagnant one doomed to failure.

Current Situation at the Faculty of Engineering at NDU

Within the framework of the RUCAS project, the FE has conducted a study to investigate and understand the current practices and policies related to sustainability. The aim was to document the environmental sustainability of teaching, research and operational practices at the Faculty level. A questionnaire survey based on the approaches developed by the University Leaders for a Sustainable Future (ULSF) has been carried out. Seven key areas were examined: curriculum,

research and scholarship, institutional operations, faculty and staff development and rewards, outreach and services, student opportunities, and institutional mission and structure. The main outcomes of the assessment show the following:

Curriculum: The program includes several courses related to sustainability. Most of these courses are offered by the Department of Civil and Environmental Engineering (DCEE). Undergraduates are required to take more than one course on issues related to environmental engineering or sustainability. However, the number of courses addressing sustainability compared to the total number of offered courses is relatively small. Minimum effort is made to educate students about the role of the institution in its social and ecological systems.

Research and scholarship: It is roughly estimated that around 20% of faculty members are doing research on sustainability issues. The estimated percentage of faculty members that would be interested in doing more teaching and research is considered to be around 50%. Examples of research activities in this area are journal and conference articles on water pollution, and on integration of renewable energy in buildings. The Faculty has also an affiliated research centre, the Water Energy & Environment Research Center (WEERC) which aims are to investigate the water and energy resources, and the state of environmental situation in Lebanon and the MENA (Middle East and North Africa) region. However, the interaction between the center's activities and the students' education at the Faculty needs to be strengthened for a better interaction among disciplines, and for facilitating interdisciplinary research. Public policy issues in particular are not considered to be well addressed by the Faculty of Engineering.

Operations: Current practices at the Faculty in terms of implementing sustainability in operations are very limited. A campus energy audit and proper retrofits are inevitable. Although some recycle bins for papers do exist, they are not efficiently used, and the cleaning staff lack awareness and training. Indeed, many of them are usually collecting and mixing papers with the regular trash. However, few signs showing the commitment of the Faculty of Engineering to sustainability can be visualized at NDU-Louaize. They include green space and trees, recycle bins, and non-smoking signs inside buildings. But many current practices show unsustainable behaviors: lots of cars on campus, lights left on in empty classrooms and offices, students smoking inside buildings and inadequate heating and cooling regulation within the edifice. In general, there are very few efforts to integrate operational practices related to sustainability into educational and scholarly activities. A recent project consisted of designing a sustainable extension to the Faculty building and laboratories. In this project, staff from physical plant worked directly with students.

Faculty and staff development and rewards: Current criteria for hiring and promotion for faculty are mainly focused on teaching, scholarships, and services. Sustainability is only explicitly considered as a criterion for some relevant positions, such as the need to recruit for an environmental engineering faculty member at the Department of Civil and Environmental Engineering. In recruiting or promoting staff, the contribution to sustainability is not directly recognized. Professional development opportunities to enhance understanding, teaching and research in sustainability do exist. Seminars and conferences are organized by the student chapters of engineering professional societies, in addition to the distribution of available soft and hard copies of journals of renewable energy, energy efficiency, and movies on sustainable construction and air pollution.

Outreach and service: Few examples of partnership between the Faculty and other local and international faculties and organizations exist. Participation of faculty members to a European project on renewable energy in developing countries (Ressol-Medbuild) can be cited. Also faculty members are teaming up at the University level with other colleagues in reorienting the program to address sustainability, in collaboration with international partners (the RUCAS project is a vivid example). The Faculty also participates occasionally in organizing conferences on sustainability; a conference on renewable energy for developing countries (REDEC 2012) is a recent example (www.ressol-medbuild.eu). Raising awareness through participation to public events (e.g. Marine biodiversity day at NDU) can also be viewed as an important activity to serve the community (www.cbd.int/idb/2012/celebrations/lb/).

Student Opportunities: Student chapters of international professional engineering societies (IEEE, ASME, SCE…) promote sustainability by organizing student events and inviting speakers on

campus to address environmental issues. The extent of involvement of student groups in sustainable initiatives is dependent on the interests of the executive committees and their mandates.

Administration, mission and planning: Sustainability is an integrated part of the mission and vision of the Faculty of Engineering. Yet the Faculty is not clearly implementing sustainability in its strategic planning. The Faculty needs to reinforce its commitment by first acting as a role model to students, and creating for example a task force in place to facilitate sustainability, or by dedicating some positions for sustainable practices. Current visibility of sustainability in the Faculty is limited to organizing seminars, inviting guest speakers, and projecting target movies on environmental topics.

Finally, the faculty building is a negative example for energy efficiency and green construction, and represents a weakness in terms of educating for sustainability. A green renovation needs to be planned in order to offer students a live demonstration of sustainability.

Pilot Study: Infusing Sustainability into Two Engineering Courses

Sustainability can be viewed as a woven focus of engineering education compared to other disciplines. Therefore the Faculty is in a strategic position to play an important role at the University level in that area. Engineers with environmental background are a valuable asset to the Faculty. The best way to prepare engineering students for a sustainable future is to provide them with a fundamental education in basic sciences, engineering fields, society, and the important systemic understanding of the broad linking amongst them (Chau, 2007). Redesigning the curricula at the Faculty to incorporate sustainability is not an easy task, since the existing one is very condense, and the addition of new material might require sacrificing other essential material. The shift in the program should be made in a way to introduce sustainability concepts in a generic manner. The students should be made aware of the significance of environmental constraints in any design activity.

Within the framework of the RUCAS project, the chosen strategy by the FE is to infuse appropriate sustainability concepts into existing courses. Two typical courses were selected first for a pilot study: an introductory course (CEN 220: Soil Mechanics), and a design course (CEN 330: Concrete Design I).

Traditionally, the course Soil Mechanics, an introduction to Foundation Engineering, used to incorporate applications related to structural foundations. To infuse sustainable development, examples from groundwater and soil pollution are introduced. For example, hydraulic conductivity of soil is now related to the propagation of pollutants in soil and groundwater, with discussions on the methods of remediation. A part related to geohydrology covers applications on water management such as dams and groundwater wells.

The Concrete Design course is conventionally oriented towards the safety and the economy of the design. A research-based project on sustainable concrete material and/or techniques is added to the course, to provide students with the opportunity to learn about alternative sustainability principles that can be applied to engineering design.

A questionnaire developed for the RUCAS project was used to survey the students' knowledge, understanding, attitudes and skills at the beginning of the two courses, using a 5 levels score (Highest = 5, Medium = 3, Lowest = 1). The questionnaire tries to investigate 5 main topics:

- Environment and its relationship to sustainable future,
- Consumption and sufficient living,
- Good citizens in democratic society,
- Value of different cultures and
- Education for sustainable development

The questionnaire was distributed to 71 students during the first lecture. The analysis of the results of the first forms revealed the following:
- Medium to low score is obtained for the part on the relationship between the environment and sustainable future [Figure 1].
- Medium to low score is also recorded on the part of sufficiency principle.

- Medium to high score for the democratic society and the cultures of other societies parts.
- Medium to high score for the ESD part.
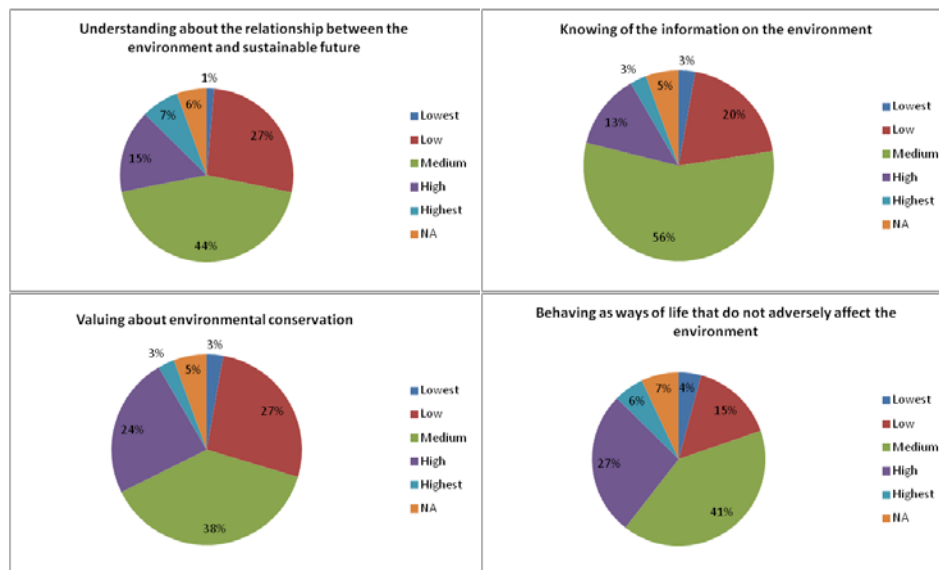
Figure 1: Results of questions surveying students' knowledge and skills of the environment.

Therefore, we can estimate that there is a need to focus on a better integration of environmental knowledge, values and ideas in the selected courses and to develop a pre-requisite course that introduces the students to this topic. Another focus should be the integration on the concepts for sufficiency of living economy principle. As for the parts related to democracy and respect of other cultures, the score can be explained by the multiethnic nature of the Lebanese society where the cultural interaction between 18 religions is very dynamic, and the relatively democratic nature of the Lebanese system. The result concerning ESD is a good sign that shows an acceptable level of students' awareness to the importance of sustainability in education., and their willingness to acquire the skills needed for SD. The challenge for the faculty is in developing the courses and the teaching methods of these concepts. To assess this first step, the same questionnaire will be redistributed at the end of the course to the same sample of students. This will help to evaluate the degree of success or failure of the infusion of sustainability in the selected courses, and to fine tune the method used for a better infusion in a wider pool of engineering courses.

Conclusion

Most of the traditional engineering curricula are designed to provide students with a strong scientific knowledge, focusing mainly on the safety and efficiency of design. The Faculty of Engineering of NDU-Louaize is not an exception. However, this approach in engineering education is deemed to fail if not substantially reshuffled and rethought. Some courses related to sustainability are offered in the program of the Faculty, but they do not form an integrated part of the undergraduate education. The need to incorporate better the sustainability concepts within the curricula is a major concern to the Faculty which is also seeking the ABET accreditation. Within the framework of RUCAS, the infusion of the principles of sustainable development into engineering education has been started at the Faculty, and will be improved and expanded in the near future, taking local and regional characteristics into account. A survey of the environmental sustainability of teaching, research and operational practices at the Faculty reveals many weaknesses and shows that there is a need to revise the current practices and policies related to sustainability. The analysis of the questionnaire that was given to students shows that in addition

to infusing sustainability concepts, there is a need to develop a new core course that introduces the engineering students to the basic environmental knowledge, values and ideas. In conformity with ABET requirements, the course will be developed as a result of extensive students feedback, rubrics analysis and outcomes, alumni and employers feedbacks.

To conclude, NDU - Louaize along with its partners in the RUCAS project has the opportunity to lead the way in developing the strategies and tools for infusing sustainability concepts in education, and to provide a benchmark for other Lebanese Universities. The work described here is only a part of long on-going process at NDU-Louaize to improve ESD.

Acknowledgement:

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Education for Sustainable Development at Notre Dame University-Louaize: Environmental Science Curriculum: A Pre-phase to the RUCAS Project on ESD

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Abstract

The Faculty of Natural & Applied Sciences at Notre Dame University-Louaize, conscious to the need of experts in the emerging field of sustainability and to the role that an educational institution plays for the service of the community, introduced into the University curricula a major in Environmental Science. This paper will present the program's components, goals and implementation.
The curriculum encompasses natural, social and managerial sciences, given the interdisciplinary nature of environmental Science. Topical courses on water/soil/air pollution, environmental impact assessment and environmental ethics were designed. These integrate theory and practice. The graduates are prepared for managerial, communication and most importantly ethical competences to be able to implement best practices in environmental protection and play an active role in the community, especially the public, private, industrial and educational domains.
At an inter-faculty level the program was successful in offering General Education Requirements courses on environment, sustainability and ethics, which helped in raising sustainability awareness among the students' population and strengthened the inter-faculty community relationships.
To the present, the main focus of the program was on education and preparation of graduates for the job market. Research, community outreach and campus sustainability practices need to be further addressed. Therefore primary efforts should be exerted to improve the outcomes at these domains, especially that the University now joined the international educational program: RUCAS-Tempus project (Reorienting University Curricula to address sustainability), which emphasises development and improvements at all the institution sectors.

Key-words: Notre Dame University-Louaize**,** Education for sustainability**,** BS in Environmental Science, Students' competences**,** RUCAS-Tempus project.

Introduction

Environmental science is by definition the study of the interactions between the biological and physical components of the environment and how humans are affecting the earth's natural systems (Miller, 2007). Being a part of the earth's support system, and a major role player on the globe make it clear that sustainability and environmental concerns should become a major responsibility in our social and professional lives to be able to face the recent local and global environmental challenges. The natural potentially non-renewable resources are being degraded through deforestation, desertification and wildlife habitat destruction. The mineral, energy and water resources are being poorly managed and depleted. The air, water and soils are being polluted through industrialization, modern agricultural practices and toxic waste production. Climate change and Ozone depletion are threatening globally the human population and the natural ecosystems. Most importantly these changes are having severe impacts on our health as to life quality, morbidity and mortality.
In Lebanon, the local situation is not any better than on the global arena. Furthermore, in a country that suffered for more than thirty years from a civil war, the impacts on the environment were unfortunately well marked on most of our environmental assets, (Ministry of Environment (MoE)-Lebanon, 2001). Solutions for a sustainable management of the natural resources and protection of

the environment and human health necessitate professional intervention besides seeding the eco-citizen concept through awareness.

The Faculty of Natural & Applied Sciences (FNAS) at Notre Dame University-Louaize (NDU-Louaize), conscious to the need of experts in this emerging field and to the role that an educational institution plays for the service of the community, introduced into the University curricula a major in "Environmental Science".

The program effectively started in the academic year 1996-1997 (NDU-Louaize catalogue 1996-1997, p. 251). The originality of the program at this year lied in the fact that it was new in Lebanon as it addressed more comprehensibly **environmental science** rather than solely **environmental health** compared to the curricula offered at different Lebanese Universities. The strength of the program lies in the fact that our graduates have a comprehensive and well-balanced discipline-specific knowledge, have a sound multidisciplinary science foundation that allows them to pursue advanced studies in Lebanese universities or abroad and are ready for a wide job market range. To the present, the focus though is on developing the curricula and promoting the program. Research, community outreach and campus sustainability practices need to be allocated further engagement.

In the year 2010, Notre Dame university-Louaize joined the RUCAS -Tempus project on "Reorient University Curricula to address Sustainability". An interdisciplinary team from the different faculties was called upon by the University research board to prepare for the implementation of the project policies at the university. In this respect, this paper will elaborate on the program's components and its current implementation and it will serve as a baseline for comparative assessment of the pre-and post-phases of the RUCAS project on Education for Sustainable Development (ESD) at NDU-Louaize. At the present this paper does not present an assessment of the program as a whole. Though the number of the graduating students is still limited, our graduates are placed successfully at various environmental agencies. Within the University the program showed a major success through the offered General Education Requirements courses, where multiple sections were opened each semester and the popularity of the environmental science courses encouraged the Sciences Department to continuously introduce new courses in this category.

Program's Components

Environmental Science is by nature interdisciplinary integrating nature, technology and culture (Cunningham, 2005).

Therefore the curriculum encompassed courses in:

- Natural sciences: Biology, Chemistry, Physics and Geology.
- Environmental Science: Water/Soil/Air pollution, Environmental Impact Assessment, Solid waste Management and Sustainable development. Capstone courses as field work and Senior Project are also required. The students in the major can choose an elective course in Environmental Science as: Ecotourism, Environmental Health, Environmental Natural Hazards, Wastewater Management, Energy Resources, Environmental Law and Conservation of Natural Ecosystem.
- Information technology sciences: Computer Science, Geographic Information Systems (GIS) and Statistics.
- Social and managerial sciences: Ethics, Law and Economic and Communication skills

NDU-Louaize adopts the credits system of education and is committed to the philosophy and standards of the American model of liberal arts education (NDU-Louaize, 2012/a). Therefore the curricula are designed to offer a rich variety of General Education Courses (GER) pools addressing social and cultural studies, philosophy and religion, citizenship and communication skills. The student is given freedom to choose from the GERs pools as assigned by his/her major besides two free electives to his liking.

The BS in environmental science requires the completion of 92 credits.

Most of the courses of the major integrate theory and practice through laboratory and field work components. The students are equally encouraged to join training programs in public and private sectors and Non-Governmental Organizations (NGOs), (NDU-Louaize, 2012/b).

Program Mission

The mission of the environmental Science program at NDU-Louaize is to provide high quality education in Environmental Science through rigorous interdisciplinary approach that emphasizes the study of interactions between environmental processes and human behavior, in addition to environmental problem solving. This is in consistency of both mission statements of NDU-Louaize and the Faculty of Natural and Applied Sciences. The FNAS commits itself to meet the needs of undergraduate students in the respective scientific disciplines and to improve their scientific education emphasizing on theory, laboratory work and research. Through quality teaching, research and outreach activities the FNAS is keen to develop and spread scientific and technological knowledge.

The FNAS guides students to be ethical, innovative and lifelong learners, who will be leaders in their professions and communities, (NDU-Louaize, 2012/c).

Program Objectives

The Environmental Science Program at NDU-Louaize endeavours to reach the following objectives:

- To provide students with theoretical knowledge about the relationship between environmental processes and human behaviour through an understanding of basic sciences including biology, chemistry, geology, physics and statistics, as well as environmental science various topics including pollution, health, law, resources conservation and management and environmental impact and risk assessment.
- To assist students in developing practical skills in field surveying and laboratory work, including analysis of environmental problems, data collection and analysis and modelling of human-environment systems.
- To offer a multidisciplinary learning environment promoting high-level cognitive thinking skills including critical thinking, problem-solving skills and integrative skills.
- To train students to be effective communicators, with computer literacy and managerial/leadership skills.
- To prepare graduates for a successful career at various sectors: Industrial, governmental/private and educational.
- To prepare Environmental science graduates for advanced study and research.
- To cultivate in students high moral and ethical standards and values as integrity, responsibility, compassion and community service.

Program Students Learning Outcomes/Competences

Competences are defined as a cluster of related knowledge, skills and attitudes that affect a major part of one's job (a role or responsibility), that correlates with performance on the job, that can be measured against some accepted standards, and that can be improved via training and development, (Parry, S.R., 1996 in CDC, 2001). Competences express the four pillars of education for the 21'st century (learning to know, learning to do, learning to be and learning to live together) as stated by Delors (1996) in the UNESCO report: Learning: the Treasure Within. Another pillar with a sustainable development dimension is added: learning to transform one-self and society (UNESCO, 2011) based on the fact that to achieve sustainable development individual and collective actions are needed. The key competences as perceived by Brundiers et al. (2010) fit in

three cluster categories: The strategic knowledge cluster encompasses the knowledge-based strategies that enable the transition from the current to a future sustainable state. The practical knowledge cluster covers the implementation competencies that can bridge knowledge and action necessary for the transition towards a sustainable development. The collaborative cluster is team-based and fundamental for developing collaboration with the various stakeholders in academia, decision-making agencies and civil society. Success in finding solutions for environmental problems lies in a sense of strong bond with the people and the environment, which in the words of Brundiers et al. (2010), referring to previous researchers, needs engaging the heart along with the head and the hands. Mochizuki and Fadeeva (2010) point out that the institutions of higher education along with their stakeholders are developing an increasing interest in competence-based approaches in education, which can be the key to educational as well as societal changes towards sustainability.

Competences reveal what the students should know and do after completion of the learning process. Therefore competences should be Subject-specific and generic in nature. The subject-specific competences are the basis for the professional development. The generic competences on the other hand are common to all disciplines and address abilities that can be further acquired through experience and training (CDC, 2001and PHAC 2008). Accordingly, the Competences in the Environmental science program at NDU-Louaize are categorised as follows:

- **Subject-specific competences:**

Knowledge of:

- Key concepts about the environment through creative interdisciplinary approach: knowledge of basic concepts in Biology, ecology, geology, hydrogeology, physics, chemistry, geographic information systems and statistics.
- The ecological systems and relationships between environmental processes and human behaviour; as well as local, regional and global perspectives of environmental problems and their solutions.
- Sub-fields of environmental sciences including environmental pollution, environmental impact assessment, sustainability, resources conservation and management, environmental health and geo-environmental hazards/risk assessment.

- **Analytical/research competences/skills:**
- Strong analytical ability with an understanding of theoretical and applied knowledge.
- Research skills (desk and field): Analysis of environmental problems, assessment of environmental components, research plan.
- Field analysis: Field surveying, data collection, modelling of human environment systems (GIS).
- Laboratory analytical know-how, compliance with international standards.
- Problem-solving skills to be able to propose sustainable solutions aiming at pollution prevention, environmental protection and natural resources conservation.

- **Managerial Competences:**
- Demonstration of leadership skills and ability for collaboration in team-based projects, given the multidisciplinary nature of environmental science.
- Design environmental assessment studies based on extensive research, field observation, data collection/analysis, monitoring, find appropriate integrated solutions, execution with a good time management.
- Data processing and representations and records compilation.
- Assessment of the effectiveness of the implemented procedures on the ecosystem and human health.

- **Communication skills:** effective communicators.
- Computer skills, good use of technology.
- Appropriate reading and writing capabilities.
- Ability to converse using appropriate scientific terminology.
- Scientific advice to the policy and decision makers.
- Data dissemination.

- Public speaking: awareness campaigns, education, training to be able to involve the community in the implementation.
- Good listening to the public concerns.
- **Ethical competences:**
- Development and demonstration of values such as integrity, responsibility, compassion and service.
- Contribution to the protection and conservation of natural systems from any aspect of environmental degradation as pollution, disintegration of ecological functions and resources depletion.
- Application of solutions that combine ecological, economical, social and ethical considerations, while respecting the local culture and values of the concerned communities.
- Motivation and services to the local community by initiating and participating to Non-governmental organizations (NGOs) and spreading awareness on environmental issues
- Respect of the others' cultures.
- Self-commitment to the sustainability principles in one's own actions
- Active role in the community by being a responsible citizen: Ecocitizen by excellence.

Program Implementation: Teaching/Research/Outreach

Teaching: Major Courses and GERs

The Environmental Science curriculum was continuously reviewed to fine-tune with the University requirements on one hand and with the government educational regulations on the other. The teaching/learning materials were updated to reflect the latest scientific understanding of sustainability and to keep pace with the dynamism and scientific advancement of this emerging science. The focus besides content was also on the teaching methods; Information technology and well equipped laboratories are major pillars in the teaching process.

The major courses alongside with the theoretical part include a laboratory component. Field work and trips are organised to combine theory to practice. Field visits to nature reserves, research centres and private or public agencies are planned to provide hands-on experiences on the management of different environmental industries in the country, which gives a clear understanding of the realities of sustainable management with its implementation successes or difficulties.

Experts, government and private officials are invited to introduce innovative research in the field and to convey their own experiences. Figure 1 (a & b) shows varied student activities as field trips to protected areas and visit to a solid waste treatment facility in Lebanon.

Figure 1a: Field trip.   **Figure 1b**: Visit to a solid waste treatment facility

Capstone courses as Environmental Impact Assessment are based on a field application. The senior projects, which are a major output of the students are research-oriented on environmental

topics in the country. Numerous projects were presented and published at local and international conferences.

At an inter-faculty level the program was successful in offering General Education Requirements courses (GERs) on Environment, sustainability, society and ethics, and sustainable development. These courses are offered each semester for more than two hundred students from all the different University faculties (Humanities, Arts and Engineering). This helped in raising awareness on sustainability among the highly heterogeneous students population. The objectives of the courses are for students to learn about environmental protection, develop a sense of belonging and appreciation for nature, be aware of daily practices and habits and become conscious about health protection. They are to apply the principles learned in class in everyday life. Van der Pluijm (2006) has drawn the attention to the fact that this category of courses provides the students with an early interdisciplinary knowledge that can help them decide on a major and plan for their future career. This was witnessed, especially by some civil engineering students that got specialized in disciplines related to sustainability issues and protection from environmental hazards as earthquakes engineering, mass wasting prevention and renewable energies, after they were introduced to these topics and their relevance to the country.

The students' projects targeted discovering the link between their major and environmental science. They are to integrate their discipline specific skills to promote the concepts of sustainability. Therefore the student is to invest his know-how in service of environmental issues. The interdisciplinary nature of the themes tackled strengthened the inter-faculty community relationships as public presentations and poster sessions were organised at the university level, which also enlivened the campus life, created strong cooperation among the faculty members and allowed for a wider projects' exposure to Students' population, faculty and staff.

Below few examples of students projects are listed:

Graphic design students: Posters for an antismoking campaign on campus. The posters used Arabic proverbs having suggestive meanings or lexical plays to insinuate the smoking dangers, Figure 2. The administration financed the printing of the posters and they were posted all over the campus. Other in class projects included:

Fashion design: Remodelling old clothes and furs to trendy designs.

Environmental Psychology: Redesign the classrooms to a friendlier environment.

Computer science: Design of a website for the environmental science major.

Mechanical/civil engineers: Renewable energies: Hydropower/solar/wind/geothermal energies.

Advertising marketing: Public campaign for awareness on global warming.
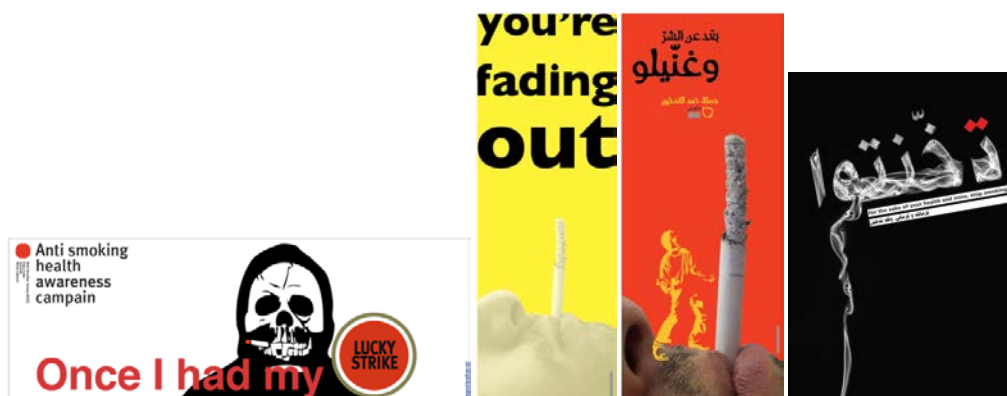
Figure 2: Posters for an anti-smoking campaign on campus, prepared by Graphic design students**. (**Red poster translation**:** stay away from evil and sing for it. Black poster translation: You have smoked but trespassed).

The Faculty of Sciences offers also service courses to the other faculties among which a course on physical geology for the civil engineering students. Presently, the University joined the Tempus-Rucas project, whereby sustainability concepts are to be infused within the course materials. A questionnaire, as conceived by the Rucas project was distributed at the beginning of the course to

assess the students' knowledge, understanding and behaviour regarding sustainability, economic consumption, good citizenship in a democratic society, living together in a multicultural community and importance of education for sustainable development. The students' population consisted of 40 students. The results showed that a high percentage of students perceive the environmental awareness and its relationship to sustainable future as "low", though they value environmental conservation. Also a high percentage does not perceive the importance of production and consumption according to the sufficiency economy principle. Good citizenship, democracy, tolerance to others are respected. The importance of education for sustainable development is regarded as essential, figure 3. Based upon these survey results, the need to infuse sustainability concepts also into the core courses is important and the students realize the role of education in this respect. Accordingly, the projects in the course were oriented towards sustainability issues related to geological concerns of relevance to civil engineering. This pilot study will be complemented by an another survey at the end of the course for post assessment.
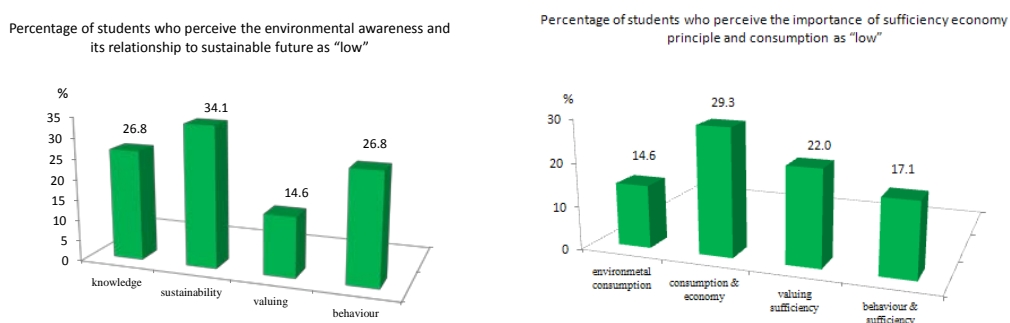
Figure 3: Percentages of students, who perceive the environmental awareness and its relationship to sustainable future and the importance of sufficiency economy principle and consumption as "low".

Research

The research conducted is mainly on water resources, environmental pollution and its impact on health and Geoenvironmental hazards (Khalaf-Kairouz et al., 2005, Khalaf-Kairouz et al., 2006, Moarkech & Khalaf-Kairouz, 2007, Khalaf-Kairouz & Shaban, 2008). A major current project is on air pollution. The research is conceived to generate data on the quality of the air in the neighbourhood of the University campus, where a major fuel-fired power plant is located. This research is cross-disciplinary: A statistical analysis on the respiratory health of children in the area and a Geographical Information System GIS study to spot the most representative sampling spots preceded the sampling phases. An interuniversity collaboration is initiated for a wider areal coverage. Student assistants participate to the project. Additional epidemiological studies will follow. Research projects on pollution that is clearly perceived as having an impact on health is convincing to the local community and it paves the way to its involvement especially in terms of support and funding, as in this case the industrial sector, which generously contributed to financing the research. The long term goal of the research is to establish along with other Universities in the country a national air quality research unit to continuously monitor and disseminate information about the air pollution status. The resulting research findings will help the decision-making in improved resources conservation, better land-use planning and health protection as they are relying on evidence-based data.

In order to address the local status of global environmental issues, the Department of Sciences at FNAS organized a conference on "Climate Change in Lebanon in the year 2010. Lebanese scholars and experts in this field at various sectors were invited: water, health, forestry, media and NGOs (NDU-Louaize, 2010)

Further the FNAS hosted the 18'th International Science meeting of the Lebanese Association for the Advancement of Sciences (LAAS) from the 22'nd to the 24'th of March 2012. The meeting included a major track on environmental issues (NDU-Louaize, 2012/d).

Outreach

The outreach activities comprised development of public awareness. Public presentations and discussions were held for local communities and NGO's. These included reflections on quality of life, preciousness of nature, environmental conservation, ethics and sustainable development in relation to the local culture. Matsuura (2009) emphasizes on the importance of traditional values and knowledge of the indigenous people as bases for achieving sustainability. Breidlid (2009), based on the African experience, states that local knowledge is important for the people self-esteem, it can contribute fundamentally to the education for sustainability in the developing countries in comparison to the western countries where the focus is on instructing the society to deviate from consumerism.

Schools were visited to elucidate to students the importance of an unpolluted environment and to instil in them at young age the eco-citizen culture. Schools were encouraged to create "Green clubs". The high schools were equally visited to promote the major of environmental science of the University, brochures were distributed and clarifications about the course of studies were communicated.

The schools' students were invited to the university campus to attend environmental exhibitions and get introduced to the University facilities in order to attract them towards higher education for sustainability.

Community outreach was also mediated through our students who attended the GER courses in sustainability. We can take pride that some students established environmental clubs in their districts, held lectures based on the courses materials they acquired in class and communicated environmental knowledge to their clubs or scouts aided by audio-visuals borrowed from the university. They organised social events as trips to nature reserves. They aimed at raising awareness through an educated community, not only based on mere enthusiasm.

Discussion

The program of Environmental Science at NDU –Louaize is designed meticulously to equip the students with a solid background to become successful professionals. Therefore our graduates can be recruited as consultants, environmental officers, academicians and researchers in the following domains:

- **Public agencies:** Ministries of environment, water resources and electricity, tourism, urban planning and municipalities.
- **Industrial sector:** Water and food industries, waste management, wastewater treatment, pollution remediation and environmental auditing.
- **Engineering companies:** Environmental impact assessment, remediation techniques, protection from environmental hazards, mining and energy.
- **Environmental and Health institutions:** Human environmental health and safety.
- **Wildlife protection associations:** Nature reserves, forests, wildlife management, recreational parks and ecotourism.
- **Educational and research institutes**: Universities research centres and schools. Having prospects to continue in the educational field, NDU-Louaize offers a teaching diploma in sciences as currently the environmental science discipline is implemented in the high-schools teaching programs.

In fact, though the number of our graduates is still little, they are successfully occupying careers in major Lebanese or foreign environmental agencies, in engineering firms, in the ministry of environment and in schools, which is reported trough the alumni communications.

This ample range of working sectors makes it imperative that the graduates possess wide-ranging

skills and qualities, which define their proficiency at the work place. The role of education is to enhance the development of students' competences which assure a successful professional career. Underwood (2008) stressed also that institutions are to prepare well the students for "employment and citizenship in a world defined by environmental challenges". Therefore, the competences targeted by the program ranged from subject-specific and analytical competences, to management and communication skills to ethical. The competences and objectives of the program are equally in line with the 5 pillars of UNESCO for education in sustainable development and cover the essential characteristics of ESD as defined by UNESCO (2005).

The mission and objectives of the program are compatible with the Bologna process (ARENE, 2007) requiring that education prepares for employability and citizenship. The social dimension is met by the FNAS mission of lifelong and student-centred learning, research and innovation.

Interdisciplinary integrated sustainability curriculum is proven very successful with respect to combining environmental, social, technical and economic aspects (Bacon et al., 2010). Van der Pluijm (2006) described the experience of the University of Michigan in introducing "The global change Curriculum" and a minor as very successful due to the interdisciplinary nature of the included courses, which captures students' interests. Copeland (2009) pointed out that the environmental science programs are proliferating in American universities; the number of students enrolled is equally growing as more and diversified careers opportunities are available. Therefore the campuses are working on their green images on and off-campus in terms of research, ecological restoration, and environmental responsibility to the surrounding community and solutions development to pressing environmental challenges. Scores from several categories, including course offerings, environmental practices and policies are compiled. Some institutions take on projects outside their campus and make strategic long-term plans that render the campus virtually having a carbon-neutral footprint (Underwood, 2008). Comparatively, this makes NDU-Louaize and the FNAS specifically successful in terms of curricula and courses development. Research, community outreach and campus sustainability practices on the other hand should be further addressed. Students' involvement can be more active and engaging through service learning projects to the community. This fosters the students' ethical and social responsibilities and reveals to them the relevance of technology for the service of society (Chen et al., 2006). Students' output at NDU is revealed in the senior projects of the students majoring in Environmental Science. These tackled various topics on local environmental concerns. With regard to students' opportunities, they are to the present limited to timid shares in research assistantship. The social life on campus gave the chance for a green club to be founded, which in fact had an intermittent output totally dependent on students' engagement. On the other hand the students with different backgrounds who have registered in the GER courses showed good commitment and enthusiasm to projects related to sustainability as assigned by their registered courses.

The administration support to the program has been full at the level of the faculty deanship, especially that the dean carries on the responsibility of convincing the administration of the university to introduce the program into the curricula. In this respect the higher administrative body, in turn, showed full support. Krizek et al. (2011) allocate a major importance to "the visionary campus leader" in the phases of evolution of sustainability initiatives on campus. The leader with the clear understanding of the principles of sustainability will executively give priority to sustainability in the University goals and strategic plans. Hopkinson & James (2010) while illustrating the case of the University of Bradford in embedding ESD into the sciences curricula, referred to the importance of having the professionals and accreditations bodies perceiving seriously the importance of education in sustainable development.

The environmental research at the university is being equally supported at both the financial level and with respect to upgrading the sciences laboratories and purchasing equipments specific for environmental research.

In the year 2010, the University joined the international educational program: RUCAS-Tempus (Reorienting University Curricula to Address Sustainability). The project emphasises development and improvements at the following institution sectors: Curriculum, research and scholarships, operations, faculty and staff development and rewards, outreach and service, students'

opportunities and administration mission and planning (ULSF, 2009). The dimensions discussed above represent the Faculty of Natural and Applied Sciences. The discussion did not include the achievements regarding sustainability education in the other six faculties of the university, which is beyond the scope of this paper. Therefore the sustainability accomplishments of the FNAS, though they reflect to some extent those of the institution, do not alone represent the university as a whole. In this respect and from the perspective of the FNAS, in terms of the curriculum a major step has been achieved. As to research and scholarships, outreach and service and students' opportunities dimensions, these can be improved by the university administration support. Major efforts should be exerted at the level of planning, faculty and staff development and rewards. Krizek et al. (2011) recommends this approach as it lifts the spirit of the organisation and improves its execution. Greening the campus with respect to Campus operations and practices also needs more executive procedures. These domains can become implemented solely by a decision at the University administration level.

Conclusion

The program of Environmental science at NDU-Louaize offered by the Faculty of Natural and Applied Sciences prepares graduates for a successful future career; train them to acquire skills at the personal, managerial and information technology levels with emphasis on ethics and values. The program provides them with a sound foundation in the natural and socio-economic sciences with an application to solving environmental problems.
It allows for concentration flexibility as the students can choose elective courses from different disciplines, enabling to build concentrations within the major or at the interdepartmental level. Hands-on experience is gained from laboratory work, research projects and field trips and practical experience is acquired from training in environmental organizations and volunteer extracurricular activities with NGOs. The environmental science graduate is able to implement best practices in environmental protection and play an active role in the community. Our graduates have been placed effectively in varied environmental agencies. General education requirements courses served at raising environmental awareness among the non-major students' population. Sustainability is equally addressed in the service courses.
To the present the main focus of the program was on education and preparation of the graduates for higher studies and the job market. After that NDU-Louaize joined the RUCAS-Tempus program, it committed itself to the embodiment of the sustainability at many levels. Key achievements have been already accomplished in curricula development and teaching. Research, outreach and student opportunities need to be further addressed. Major efforts are to be exerted at the level of campus practices, faculty and staff development and planning. At the academic level the university has achieved a major step. This success can be sustained though by a further engaged campus-community and planning in order to render the education for sustainability sustainable.

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Reorienting an Educational Psychology Course to Address Sustainability: A Case Study

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Abstract

Due to the rapidly changing knowledge, teachers are supposed to teach their students ways of thinking and gathering information, not certain contents that would change shortly, in this sense, sustainability which in part means the preparation of an individual who has the ability to practice critical thinking and to find creative solutions to the problems he faces, is considered a must.

This paper focuses on the integration of sustainability in curricula, specifically ways of introducing it to students in higher education institutions that provide highly specific and specialized knowledge and skills. So, this study presents a framework for reorienting a university course in the field of physiological psychology to address sustainability. The results of the quantitative analysis showed significant differences at the level of 0.001 between the pre and post testing of students' knowledge of and attitudes towards sustainability in favor of the post test. While results of qualitative analysis showed positive transformation of students' practices health wise.

Keywords: educational psychology, physiological psychology, ESD, higher education, teaching, active learning, green intelligence, health

Key-words: educational psychology, physiological psychology, ESD, higher education, teaching, active learning, green intelligence, health

Introduction

After long centuries of human's life on earth, it is evident that the devastation of both natural ecosystems and the whole mankind is largely due to humans' interference (Wargo, 2009). It took many initiatives and legislations trying to prevent the conflict between human's developmental activities and the well-being of the planet, till the World Commission on Environment and Development was held in 1987. It defined the concept of Sustainable development (SD) as the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).

The debates that followed the presentation of the sustainable development concept led to defining three main aspects of SD:

- economic: to produce goods and services on a continuing basis, to maintain manageable levels of government and external debt, and to avoid extreme sectorial imbalances which damage agricultural or industrial production.
- Environmental: To maintain a stable resource base, avoiding over-exploitation of renewable resource systems or environmental sink functions, and depleting non-renewable resources only to the extent that investment is made in adequate substitutes. This includes maintenance of biodiversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources.
- Social: To achieve fairness in distribution and opportunity, adequate provision of social services including health and education, gender equity, and political accountability and participation (Harris, 2003).

But due to globalization, there have been threats to cultural diversities and identities of different countries all over the world. In addition to the increasing awareness that the protection and

promotion of cultural diversity is vital to universal human rights, fundamental freedom along with securing ecological and genetic diversity (Nurse, 2006).

Also, some researchers and institutions have pointed out that a fourth dimension should be added to the dimensions of sustainable development, since the triple-bottom-line dimensions of economic, environmental and social do not seem to be enough to reflect the complexity of contemporary society. In this context, the Agenda 21 for culture and the United Cities and Local Governments (UCLG) Executive Bureau lead the preparation of the policy statement "Culture: Fourth Pillar of Sustainable Development", passed on 17 November 2010, in the framework of the World Summit of Local and Regional Leaders – 3rd World Congress of UCLG, held in Mexico City (UCLG, 2010).

It is notable that these four aspects are not independent, they are interrelated, and they affect each other's. In this sense, learning activities should address these four aspects whether separately or connectively to attain the objectives of education for sustainable development.

Theoretical Framework and Literature Review

One of the most significant outcomes of the Earth Summit was Agenda 21 that called for "a global partnership for sustainable development" (UNESCO 1992).

Agenda 21 held responsible all the countries of the world for the wellbeing of the planet. There were many suggestions for promoting sustainable development; chapter 36 of Agenda 21 was titled "promoting education, public awareness and training". However, Mckeown (2002) stated that despite the repeated emphasis from the commission of sustainable development (CSD) on the importance of education in achieving sustainable development, education for sustainable development (ESD) was not advancing more rapidly.

There was a need to plan education to focus on sustainable development, so Delor's (1996) proposed the main pillars of ESD as follows:

1. **Learning to know**: means the ability to: learn to learn, acquire a taste for learning throughout life, develop critical thinking, acquire tools for understanding the world, and understand sustainability concepts and issues.

2. **Learning to do**: means the ability to: be an actor as well as a thinker, understand and act on global and local sustainable development issues, acquire technical and professional training, apply learned knowledge in daily life, and be able to act creatively and responsibly in one's environment

3. **Learning to live together**: means the ability to, participate and co-operate with others in increasingly pluralistic, multi-cultural societies, develop an understanding of other people and their histories, traditions, beliefs, values and cultures, tolerate, respect, welcome, embrace, and even celebrate difference and diversity in people, respond constructively to the cultural diversity and economic disparity found around the world, and be able to cope with situations of tension, exclusion, conflict, violence, and terrorism

4. **Learning to be:** means the ability to see oneself as the main actor in defining positive outcomes for the future, encourage discovery and experimentation, acquire universally shared values, develop one's personality, self-identity, self-knowledge and self-fulfillment, and be able to act with greater autonomy, judgment and personal responsibility

Since Delor's report's publication in 1996, a small UNESCO task force has been working on follow up activities to the report that led to the fifth pillar:

5. **Learning to transform oneself and society**: means the ability to work toward a gender neutral, non-discriminatory society, develop the ability and will to integrate sustainable lifestyles for ourselves and others, promote behaviors and practices that minimize our ecological footprint on the world around us, be respectful of the Earth and life in all its diversity, act to achieve social solidarity, and promote democracy in a society where peace prevails (UNESCO, 2010).

Education for sustainable development utilizes the five pillars in planning and implementing educational and training activities to accomplish its goals.

Since psychology is the science of studying behavior modification and how people can adapt new ways of thinking, learning and living, there are many applications in psychology for educational for sustainable development (Simpson, 2005).

The study at hand attempts to address sustainability with its four main aspects through the infusion of some topics that reflect these aspects; the environmental aspect as well as the cultural one will be reflected in the study of the Nile basin treaty crises and its consequences upon Egypt's share of the Nile water and the security of peoples' needs. Attracting students' attention to the Nile crises should be reflected in the students' writings on the topic and the suggested solutions they might reach.

This problem of the Nile treaty also reflects to some extent the economic aspect of SD, in the sense that the treaty affects the amount of water allocated to Egypt, while almost 90% of the consumed water in Egypt comes from the Nile River. Students would also express their concerns about the consequences of the treaty in an economic sense through writing about the problem.

The social aspect of SD will be infused through introducing the concept of green intelligence which was proposed by Wargo (2009) to attract the attention to the fatal effects of environmental hazards on human health especially children.

In a review that summarizes knowledge of associations between child health and development outcomes and environmental exposures, the author included lead, methylmercury, polychlorinated biphenyls (PCBs), dioxins and related polyhalogenated aromatic hydrocarbons (PHAHs), certain pesticides, environmental tobacco smoke (ETS), aeroallergens, ambient air toxicants (especially particulate matter [PM] and ozone), chlorination disinfection by-products (DBPs), sunlight, power-frequency magnetic fields, radiofrequency (RF) radiation, residential proximity to hazardous waste disposal sites, and solvents. The adverse health effects linked to such exposures include fetal death, birth defects, being small for gestational age (SGA), preterm birth, clinically overt cognitive, neurologic, and behavioral abnormalities, subtle neuropsychologic deficits, childhood cancer, asthma, other respiratory diseases, and acute poisoning. Some environmental toxicants, notably lead, ionizing radiation, ETS, and certain ambient air toxicants, produce adverse health effects at relatively low exposure levels during fetal or child developmental time windows (Wigle et al, 2007).

Based on the students' knowledge of the previous facts, they would be motivated to look for further information about the bad/unhealthy practices that they do and that also contribute to a less green life.

An example of reorienting the curriculum towards sustainability, the Spanish acronym for Curriculum Greening of Higher Education (ACES) works in cooperation with universities that are aware of the concept of curriculum greening and that have previous experience in tasks related to this issue. Since 2000, this network carried out the project "Orienting Curriculum of Higher Education Studies towards Sustainability: Designing interventions and analyzing the process" (ALFA Program, European Union, 2001-03).

The institutions worked at three levels of action: subject matter, syllabus design, and institutional participation. The A C E S model is the first step in a long process for orienting higher education towards sustainability.

Also, in a paper titled "infusing sustainability across the curriculum", Church and Skelton (2013) emphasis that sustainability can provide a context for classroom projects, allowing students to apply academic knowledge and skills in order to solve real problems and provide authentic community service. They argue that infusing sustainability into the curriculum can result in students becoming more engaged in classroom learning, building twenty-first century skills, and connecting to their community (Church & Skelton, 2013).

RUCAS (Reorienting University Curricula to Address Sustainability) is yet another example of the projects that attempt to reorient the university curricula to address sustainability. It was motivated by the fact that Higher Education Institutions (HEIs) in the Arab region face challenges related to the slow progress regarding the implementation of the UN Decade (2004-2015) of Education for Sustainable Development (ESD). In RUCAS, six HEIs from the European Union led by the University of Crete (UNESCO Chair ICT in ESD) joined efforts with six HEIs from the Arab region along with UNESCO Regional Office. The overarching goal of the project is to help partner

HEIs reorient their university curricula to address sustainability through capacity building of university staff, curriculum revision and implementation.

Statement of the problem

Higher education institutions play a vital role in teaching and training most of the professionals who work after graduation in the various governmental and private institutions. But higher education institutions have specific programs with specific course materials that produce a graduate with certain characteristics.

When SD was recommended to be infused through education, it was not possible to change the courses' content altogether, so reorientation of the existing curricula to address sustainability seemed to be the possible answer.

The process of reorientation was used in many studies and had positive outcomes. In 2000, as part of the initiative undertaken by the International Network of teacher-education institutions associated with the U N I T W I N / U N E S C O chair to reorient teacher education to address sustainability, Down (2007) introduced the concept of infusing education for sustainable development in the existing literature program in the largest teachers' college in Jamaica.

The Literature program is for student teachers who were preparing to teach English literature and language to secondary school students. The infusion process introduced major issues of sustainability and focused on that of violence in Jamaican society.

Students found the program meaningful and valuable. They commented that approaching literature in terms of sustainable development deepened their understanding and extended their knowledge of global and local issues.

SD encompasses a vision that integrates environment, economy, society and culture

Reorienting education also requires teaching and learning knowledge, skills, perspectives, and values that will guide and motivate people to pursue sustainable livelihoods, to participate in a democratic society, and to live in a sustainable manner (Mckeown, 2006).

Based on the previous definition, the researcher attempted to infuse some aspects of ESD that influences students' daily practices that affects their health in a bad way and guide them through the process of transforming those practices to be in line with the sustainable livelihood.

As UNESCO proposed a number of ESD characteristics that can be implemented in many culturally appropriate forms; the researcher chose the following as basis for the process of reorienting the course:
- Using a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills.
- Promoting lifelong learning.
- Being locally relevant and culturally appropriate.
- Addressing content, taking into account context, global issues and local priorities.

Research questions

The study at hand attempts to answer the following questions:
1. What is the impact of implementing an educational psychology course that was reoriented to address sustainability upon students' knowledge of SD?
2. What is the impact of implementing an educational psychology course that was reoriented to address sustainability upon students' attitudes towards SD
3. What are the malpractices -health wise- that prevailed among the students?
4. What is the effect of the reoriented course of physiological psychology on changing the malpractices of the students' health wise?

The aim of the study

The study at hand aimed at reorienting the physiological psychology course that is taught to the second year students who major in psychology in the faculty of education, Suez Canal University. Then the impact of applying the reoriented course upon students' knowledge of and attitudes towards sustainable development will be measured. The process of reorientation focused on one of the important local issues which is the Nile treaty, it was introduced to the students in the context of studying emotions and their consequences. Students were also required to write about their emotions of threat or fear and explain its physiological basis.

The study also aimed at introducing the students to the concept of green intelligence that focuses on the hazards that affects students' health and how to control the intake of the hazardous substances. Utilizing the gained knowledge about green intelligence, the study aimed at transforming students' malpractices –health wise- into healthy ones.

Methods

Experimental design

The study at hand used the pre-post one experimental group design; in which a purposive sample was chosen, the instruments of the study were implemented before the application of the reoriented course and then the instruments of the study were implemented one more time after the application process.

The study also utilized the qualitative analysis in the observation checklists where the students gathered information about their healthy and unhealthy practices as a basis for transforming the malpractices into good ones.

Students were asked to fill in the observation checklist with all the malpractices they thought were doing, after that the researcher coded their responses and calculated the frequencies for all the responses. The responses with the highest frequencies were chosen to be the items of the second observation checklist.

Students were asked to fill in the checklist on daily basis and reported their progress at the begging of their weekly lecture.

At the end of the course, quantitative analysis was carried out to determine the differences between the measures at the beginning and the end of teaching the reoriented course.

Profile of the participants

Purposive sampling was used to select participants of this study as they were enrolled in a compulsory course taught at the Faculty of Education by the researcher. The sample consisted of 4 male and 6 female students with the age varying from 17 to 18, 19 years old.

Procedures of the study

The reorientation of the course included using active learning strategies where students were involved in carrying out researches and collecting the content of the course materials. It also included environmental, economic and cultural topics related to the local cases in Egypt and its relation to the global level.

In the formal content description of the course, students were to learn about five major topics:
1. The sensory organs, its anatomy, physiology and malfunctioning and abnormalities.
2. Cognitive processes those are responsible for learning, thinking styles, and processing information.
3. Emotions of various natures, its physiology and its disorders.
4. Theories of emotions.
5. Sleep nature, physiology, and disorders.

The process of reorientation of the physiological psychology course to address sustainability was divided into two main approaches; firstly, the infusion of the health aspect of sustainability and the infusion of the cultural and societal aspects of sustainability.

Infusing the health aspect of sustainability (fostering green intelligence)

No doubt that there were side effects of the twentieth century prosperity, among which the change of the chemistry of the human body. People are exposed to thousands of chemicals that are recognized by the governments of the United States and European Union to be carcinogens, neurotoxins, reproductive and developmental toxins or endocrine disruptors that mimic or block human hormones (Wargo, 2009)

In 1999 the U.S. Centers for Disease Control and Prevention (CDC) reported that most individuals carry in their bodies a mixture of metals, pesticides, solvents, fire retardants, and by products of fuel combustion. Furthermore, Children often carry higher concentrations than adults (Sexton, Needham & Pirkle, 2004).

Green intelligence as a concept was introduced in Wargo's book that holds the same title; it examines the effects of various pollutants on human health, potentials and abilities.

Many studies were carried out to examine the impact of environmental hazards on human health, for example Lead poisoning has been associated with a significant increase in high school dropout rate, and an increase in criminal behavior (Markowitz, 2000).

In a study conducted in Shebin Elkom, Monofia governorate in Egypt to assess the environmental lead level, to determine blood lead level (BLL) among primary school children, and to find out the relationship between BLL among studied children and their IQ, complete blood picture (CBC), hearing impairment and school performance, results showed that the mean value of environmental lead ($\mu g/m^3$) in urban schools air was significantly higher than that in rural areas. BLL had a significant negative correlation with hemoglobin level and IQ; it was positively correlated with the hearing threshold. With increasing BLL, the school performance of children decreased significantly. The researcher concluded that exposure to lead would deteriorate IQ, school performance and hearing level of school children. Even in the absence of overt clinical manifestations of lead toxicity, lead intoxication should be among differential diagnosis in children presenting anemia, intellectual impairment, poor academic performance and hearing impairment (Abdel Rasoul, et al, 2012).

After explaining the previous facts to the Students, there was an open discussion about the concept of green intelligence and how environmental influences may promote or hinders one's genetic abilities.

Participants were asked to keep a checklist in which they write down their eating habits, sleeping habits and their knowledge about what is healthy and what is not from their daily practices.

For a whole week students were observing their behaviors and writing down their practices health wise.

After collecting the students' responses, they were classified into healthy and unhealthy ones. After calculating the frequency of each response, the malpractices that got the highest frequency were:

1. Not having breakfast in the morning before going to the university.
2. Consuming excessive amounts of chips and soda
3. Not practicing any kind of sports (especially girls)
4. Staying up late
5. Not having regular times for the three meals of the day
6. Spending so much time on video games (mostly boys)

As students were already learning about physiology of sleep and sleeping disorders in the course of physiological psychology, they were keen to know about their bad habits and motivated to change them into good ones. Same goes for the eating habits and their influence on their activeness and well-being.

An observation checklist with the six main misbehaviors was distributed among the students, students were asked to fill in this checklist every day before going to bed, checking if they had done any of the mentioned behaviors.

At the beginning of the weekly lecture with the students we had a 10 minute discussion in the feedback of each checklist and came up with recommendations for those who were not progressing as the others.

The students' evaluation of the six practices at the end of the semester was positive in general, but the change that was reported by most of the students to make them feel better was having breakfast before leaving home to the university. Most of the students reported being more active both physically and mentally throughout the day.

The infusion of the cultural and social aspects of sustainability

The process of reorienting the content of the physiological psychology course also took place through the infusion of materials that are driven from the local knowledge and the environmental aspect of sustainability.

As sustainable Learning should not only be about learning sustainability issues, the term should be widened and broadened to include methods of sustaining our abilities to learn and sustaining the knowledge we learn. In this sense students were asked to write research papers that demonstrate, how to collect data, how to gather knowledge about certain topic, how to analyze the collected knowledge and how to reach conclusions.

Students were to learn about various types of emotions and their physiological symptoms. To accomplish that objective, students were asked to write down their emotions and bodily sensations during hearing the following essay:

In March 2011 (short after the Egyptian revolution), Burundi signed the Nile Basin Initiative (NBI), as the sixth country to sign. The agreement came into force without Egypt's approval, thus depriving Egypt from its right in determining and approving all the projects that controls water on the river banks.

Egypt's population of some 85 million draws about 90 percent of its water needs from the Nile. Officials, for their part, warn that the alternative water agreement would be unable to provide Egypt's growing population with its water needs beyond 2017.

Students reported feeling various emotions like worry anxiety, shock, fear, and unjust.

Students also reported feeling various bodily sensations like speed breathing, heartache, headache and sweating.

Students were asked to read this equation and think about the symptoms they felt trying to check if they were anxious or not:

A threatening situation+ knowing that you can't handle it= anxiety

Students were asked to answer the following questions in written research papers:

- **What can Egypt do to stop worrying about the Nile water?**
- **Is it fair that Egypt takes the largest portion of the Nile water while other Nile basin countries suffer from draught?**
- **What are the best ways to achieve equity and sustain it between the Nile basin countries?**

Instruments of the study

Closed sustainability questionnaire

The study implemented a 20 item self-reported questionnaire that assessed the students' knowledge of (12 items) and attitudes towards (8 items) sustainability, the questionnaire used Likert's scale of 5 responses: strongly agree, agree, undecided, disagree, and strongly disagree. The questionnaire had acceptable degrees of validity and reliability (alpha=0.88).

Reliability coefficients	
N of cases = 10	N of items = 20
Alpha = 0.8786	

Table 1: Reliability coefficients of the closed sustainability questionnaire.

Observation checklists

Two observation checklists were designed and used in the study at hand; the first checklist was an opened one that was used to observe and write down the healthy and unhealthy behaviors students did.

The second checklist contained six behaviors that had the highest frequencies from the total responses of the students to the first observation checklist; students were asked to check if they were doing them.

The reoriented course

The physiological psychology course is an compulsory course for the second year students who major psychology. The course was reoriented to address sustainability through infusing some of the local problems and fears Egyptian society faces and also through infusing the health aspect in an attempt to transfer students' behaviors towards having green intelligence, through eliminating the hazards of the environment they live in. students are lectured about the dangerous hazardous around them and how they should respond to them, and what the best practices are towards becoming more healthy.

Results of the study

Results of the first research question

In reply to the first question that was: What is the impact of implementing an educational psychology course that was reoriented to address sustainability upon students' knowledge of SD; Statistical package for social sciences (SPSS) was used to investigate the differences between the pre and post degrees of the students in the questionnaire that assessed the students' knowledge of SD.

The results showed significant differences at the level of 0.001 between the pre and post testing of students' knowledge of sustainability in favor of the post test.

The following tables show the results of mann-whitney non parametric test to investigate the differences between students' scores in the pre and post test of the closed sustainability questionnaire.

Group	N	Mean rank	Sum of ranks	Z	Sig
Knowledge 1	10	5.50	55.00	-3.811	0.000*
2	10	15.50	155.00		
Total	20				

Table 2: Mann-Whitney analysis of the differences between groups in their knowledge of sustainability.

The table above shows differences in students' knowledge about sustainability prior to and after implementing a reoriented course to address sustainability in favor of students' knowledge in the post test. This result suggests that the reoriented course was effective in acquiring students more knowledge about sustainability.

This finding goes in line with similar results from studies that utilized the process of reorientation towards sustainability (Down, 2007, Church& Skelton, 2013).

Results of the second research question

In reply to the second question that was: What is the impact of implementing an educational psychology course that was reoriented to address sustainability upon students' attitudes towards SD; Statistical package for social sciences (SPSS) was used to investigate the differences between the pre and post degrees of the students in the questionnaire that assessed the students' attitudes towards SD.

The results showed significant differences at the level of 0.001 between the pre and post testing of students' attitudes towards sustainability in favor of the post test.

The following tables show the results of Mann-Whitney non parametric test to investigate the differences between students' scores in the pre and post test of the closed sustainability questionnaire.

Group	N	Mean rank	Sum of ranks	Z	Sig
attitudes 1	10	5.50	55.00	-3.798	0.000*
2	10	15.50	155.00		
Total	20				

Table 3: Mann-Whitney analysis of the differences between groups in their attitudes towards sustainability.

The table above shows differences in students' attitudes towards sustainability prior to and after implementing a reoriented course to address sustainability in favor of students' attitudes in the post test. This result suggests that the reoriented course was effective in acquiring students more positive attitudes towards sustainability.

Results of the third research question
In reply to the third research question that was: What are the malpractices -health wise- that prevailed among the students?
Results of calculating the frequencies of students' observed malpractices showed that students adapted many malpractices in their eating habits, sleeping habits and other behaviors. The researcher gathered the practices with the highest frequency; they were in total six behaviors.
1. Not having breakfast in the morning before going to the university.
2. Consuming excessive amounts of chips and soda
3. Not practicing any kind of sports (especially girls)
4. Staying up late
5. Not having regular times for the three meals of the day
6. Spending so much time on video games (mostly boys)

Results of the fourth research question
In reply to the fourth research question that was: what is the effect of using an observation checklist on changing the malpractices of the students' health wise?
Students were asked to report the frequency of practicing the six behaviors in the checklist. There was feedback from the researcher, using encouragement, reinforcement, and appreciation of commitment from the students to transforming their malpractices into good ones.
Results of Wilcoxon analysis for the differences between measures of related samples showed that there were significant differences at 0.01 between the pre and post measures of malpractices in favor of the pre measure, which means that students reported practicing fewer malpractices by the end of the course.
The following table shows the results of Wilcoxon analysis:

	N	Mean rank	Sum of ranks	Z	Sig
Health2-health Negative ranks Positive ranks ties Total	10a 0b 0c	5.50 .00	55.00 .00	-2.844	0.004*

Table 4: Wilcoxon analysis of the differences between groups in their healthy practices.

a. Health2<health1
b. Health2>health1
c. Health2=health1

The table above shows differences in students' healthy practices prior to and after implementing the reoriented course to address sustainability in favor of students' practices in the post test. This result suggests that the reoriented course was effective in encouraging students' transformation towards more healthy practices.

Key findings

- The application of the reoriented course to address sustainability had a positive impact on students' knowledge about SD and ESD.
- The application of the reoriented course to address sustainability had a positive impact on students' attitudes towards SD and ESD.
- Raising the students' awareness of the healthy practices had a positive impact on the students' good practices health wise.

Conclusion

Higher education institutions are considered to be important agents of change towards sustainable world. But due to the fixed programs and curricula in most of the governmental universities, the suitable approach to address sustainability is reorienting the course towards sustainability not changing it.

This case study attempted to reorient physiological psychology course to address sustainability, with the focus on the health and the cultural social aspects of Sustainable development. Results showed enhances in students' knowledge of SD, and in students' attitudes towards SD. Results also showed that raising the students' awareness of the healthy practices helped in their transformation towards adapting better behaviors health wise.

The results of the study at hand should be carefully interpreted due to the small size of the sample. Other studies should be carried out to verify the influences of applying reoriented courses in various fields of specialization upon students' knowledge about and attitudes toward SD and ESD.

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Education in the New Era: The Dissemination of ESD in the Political Science Programs Case Study: Notre Dame University (Faculty of Political Science)

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Abstract

Sustainable Development is continuous process of change requiring painful choices resting on political will. This paper examines the developments needed to engage with sustainable development in the field of political science through the following: (1) the necessary reform in political science programs to cope with the need for sustainable development in terms of governance, advocacy, and other related issues. (2) The need to use a holistic approach in education; (3) The reexamination of the prevailing ideologies and market oriented economies(4) as an example, the paper examines the introduction of ESD at the of Faculty of Political Science at Notre Dame University in terms of a global approach of education, curricula design, teaching, and implementation

Introduction

The world has been confronted with very serious social and environmental challenges over the past 50 years. These include climate change, poverty and inequality, high consumption lifestyles and a growing world population. However, Governments have been extremely slow to address these issues. One of the obstacles to change has been the unwillingness or inability to integrate social and environmental concerns in the development of policies and practices. Sustainable development is a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland Commission, 1987). The term became more used in the prevailing public policies during the past 10 years. The three pillars of sustainable development are considered to be environment, economy, and society. There is solid correlation between political science and ESD. For the latter, it is a major tool for adoption of new ideologies and public policy for the promotion of sustainable development. Political science programs can play a major role in the promotion of the concept of sustainable development and of a new way of thinking that incorporates these pillars and provides at least a starting point for a new stage of political change.

Nowadays, education is a prime lever for social change as described by UNESCO in the implementation plan for the Decade of Education for Sustainable Development (ESD) in the following way: 'It means education that enables people to foresee, face up to and solve the problems that threaten life on our planet.' (UNESCO, 2005).Thus, there is a need to re orient education towards sustainable development. (UNESCO, 2008).

The focus of this paper will be on the dissemination of ESD in the Faculty of Political Science, Public Administration and Diplomacy at Notre Dame University and on how Politics as a discipline can contribute to ESD and vice versa. Education for Sustainable Development requires a comprehensive approach to educational reform and the integration of the objectives, concepts and learning experiences of Education for Sustainable Development into syllabuses and teaching programs as well as interdisciplinary inquiry and action. The infusion of ESD in political science programs of the Faculty involved the adoption of a number of steps mainly: Clarification of the boundaries between political science and sustainable development, the review of the theoretical and ideological framework of Political Science, the challenges of infusion of ESD in political science programs, redefining the vision and the values of the Faculty, the review of the Faculty courses, syllabi re-writing, new teaching methodologies, and the introduction of new degrees and minors oriented towards sustainable development.

Scope of Political Science and SD

The term Politics is derived from the Greek word **polis** which means *city-state.* The modern view of Political Science lays emphasis on its being the study of power and *authority'* and the political system. Politics, as a process, seeks to allocate resources authoritatively and setting up public policies. The American Political Science Association (2012) defines Political science as the study of governments, public policies and political processes, systems, and political behavior. Political science subfields include political theory, political philosophy, political ideology, political economy, policy studies and analysis, comparative politics, international relations, and a host of related fields. On the other hand, the concept of SD is rooted in a kind of system thinking that calls on us to look at the world a whole through time and space.

Politics and SD have had little interaction, to the detriment of both. Yet there is little evidence of this within ESD literature. This is perhaps a reflection of a certain malaise within the education community generally where there seems to be tangible reluctance to engage with political change. In the case of SD, we would argue that SD advocates need to have a good knowledge of political science because this is essential for implementing change. SD supporters should be able to influence existing political ideologies, use the political process to influence the legislative branch, and learn how to act as a pressure group to influence public policies. It should be mentioned that ESD is not considered as a discipline in its own right but rather as a cross disciplinary field.

Political Obstacles to the implementation of ESD

From a political perspective, it is possible to identify several obstacles to the implementation of ESD. These include: the political time frame and elections, the vertical structure of governments, the public policy process, political will, and the contradiction between international agreements and national interests.

Politics and elections
The political time frame is short. Governments tend to plan and decide with the next election in mind and the prospect of being re-elected. It is difficult for Governments to take decisions that would be perceived as harmful politically in the next election. Thus, such difficult decisions are often delayed or modified in order not to upset the electorate. For example, a decision banning logging or fishing, which may be needed for reasons of sustainable development are not adopted or considered during elections due to unemployment risks. Also, voters are well known for their short memory and their desire to see the immediate results of political decisions.

Structures of central governments
Another obstacle is the vertical structure of Governments, which is divided in departments, each performing a specific mandate. For example, the Ministry of the Environment is in charge of protection environment while at the same time, the Ministry of Natural Resources is concerned with the exploitation of natural resources, and the Ministry of Agriculture is in charge with agriculture. Often, their prerogatives are contradictory and in conflict with each. Moreover, they compete for funding by decision makers. Each Ministry pursues its specific mandate but Ministerial Departments do not have a global strategy as it should be the case in sustainable development.

Understanding Public Policy
Public Policy is another obstacle to SD. In modern democracies, politicians face competing and sometimes contradictory interests that require a process of mediation, or a search for compromise as a response to a perceived problem. The result of this political process is that the change is almost always progressive. On the other hand, sustainable development requires major changes

and even dramatic reversals, a sort of change of direction. But politicians adjust public policy to their constituent interests and not necessarily to what need to be done. Thus, public policy is embodied in laws, regulatory measures, and funding priorities that has a strong impact on any issue.

Political process

In public administrations and agencies, most change is incremental because of competing of conflicting interests. Incremental change is slow and limited in terms of goals and objectives. A typical case is the attempt to pass a legislation to protect endangered species. Governments are lead to conclude reasonable compromises among the various conflicting interest groups. This is an example of the impact of politics on sustainable development policy initiatives.

Comparison between Political Science and Sustainable Development

ESD	Politics
SD is interested in win-win situations SD is concerned with long term policies : Leaders work for future generations Importance of planning Interdisciplinary	There a no permanent friends there are permanent interests Political leaders are concerned with next elections Change is incremental Independent discipline Win lose situation
SD is based on the principles of equity, social justice, fair distribution of resources and community participation, and promotes a shift in mental models; Is based on local needs, but acknowledges that fulfilling local needs often has international consequences; promotes life-long learning addresses content, taking into account global issues Environmental concerns and quality of life; Uses a holistic, as opposed to linear, approach;	Separate local from international perspective Short term goals Addresses expected results for the nation Economic results Case by case approach and division by topics, or issues, or geographic location

The infusion of ESD in political science programs

The infusion of ESD in political science programs requires a fundamental ideological shift and not vernacular changes. This infusion of SD in the FPSPAD program was focused on: ideology, the understanding of the nature of political institutions, the role of pressure groups in passing legislations, and public policy making. All these elements exercise a significant impact on the prospects of sustainable development.

Ideological shift
*I*deology is a keystone to ESD for ideology is a comprehensive vision, and a set of structured ideas proposed to society. Currently, SD pays only limited attention to ideology and power relations. Or, change takes place within the framework of ideology. Moreover, SD requires a fundamental ideological and paradigmatic shift in development thinking from a market economy to a sustainable development model. Academic program of the Faculty -specially the new major and courses such as Regulatory Politics and the Social teaching of the Catholic Church- were reviewed in order to reflect an ideological shift towards sustainable development against the prevailing models and theories based on market-oriented policies, competition, mass production policies, maximizing consumptions, expanding industrialization, privatization, deregulation, and globalized consumerism.

The focus on understanding the nature of political institutions and the legislative process
SD is limited in its understanding of the nature of power in the political system. Change requires understanding the nature of political and government institutions at the national and international levels. The kind of dynamic inherent to SD is in many ways outside the normal framework of political discourse. SD is based on long term goals and objectives. On the contrary, politicians do not tend to think for the long term. Their actions are often shaped by the requirements of the electoral cycle. Understanding the nature of the political system and specially the legislative process can offer a remedy for the quest of change. After all, change has to be embodied in laws at the national and treaties international levels. The understanding of the legislative process, the power relations between the three branches of government, and the nature of the legal and administrative barriers to change facilitates the passing of SD legislations. After all, it's all about legislations.

Understanding the public policy process
The policy process is another challenge to SD. Both Politics and SD are concerned with change at the level of policy and practice. SD promotes action plans and helps in setting up public policies and is more action orientated in addressing the key challenges of our times such as poverty reduction in the context of climate change. Yet, SD is limited in its understanding of power relations. and the nature of barriers to change. For example, there are still many tensions evident both within policy and practice between environmental and development issues. Politicians seem unwilling to grasp the implications for our future way of life. Yet, in modern democracies, the existence of such competing and contradictory interests requires a process of mediation, or a search for compromise. The result of this political process is that the change is almost always progressive and step by step. On the other hand, sustainable development requires major changes and a change of direction. In fact, Governments are resistant to change and implement a small number of policies during their term.

Understanding the role of pressure groups and social movements
Understanding the role of pressure groups and social movements in shaping the policy process is essential. Political science offers to SD knowledge into the factors that govern the ability of pressure groups and social movements to pressure decision makers. Laws are always the end result of pressure groups and lobbying. These instruments include skills in lobbying, advocacy and developing policy papers, a better communication of policy issues, and a greater participation of citizens in the policy process. Public pressure is a valuable tool for influencing politicians and forces them to act upon it. At this stage, the implementation of SD still requires a considerable amount of political will, and public pressure in favor of sustainable policy decisions therefore becomes is needed. An example of pressure group is provided by the case of a number of NGOs who lobbied Governments to fulfill their commitments at the international level through the United Nations Commission for sustainable development (CSD), which was set up to monitor the progress of Agenda 21. The support of some Governments has allowed the adoption of the UN decade of Education for Sustainable Education 2005-2015 initiative.

The FPSPAD experience in ESD infusion

The Faculty of Political Science, Public Administration and Diplomacy at Notre Dame University (FPSPAD) consists of three Departments: The Department of International Affairs and Diplomacy, the Department of Political Science, and the Department of Public Administration. The PSPAD offers programs leading to the degrees of Bachelor of Arts in International Affairs and Diplomacy, Master of Arts in International Affairs and Diplomacy, Master of Arts in International Affairs and Diplomacy – International Law Emphasis, Bachelor of Arts in Political Science, Bachelor of Arts in Political Science – American Studies, Bachelor of Arts in Political Science – Euro-Mediterranean Studies, Bachelor of Arts in Political Science – NGOs Emphasis, Master of Arts in Political Science ,Master of Arts in Political Science – Human Rights Emphasis, Master of Arts in Political Science – NGOs Emphasis, Master of Arts in Political Science – Comparative Law Emphasis, Bachelor of Arts in Public Administration, Bachelor of Arts in Public Administration - Criminal Justice Emphasis, and Master of Arts in Public Administration.
Moreover, the Faculty offers General Education Requirement courses for the other university disciplines.

New vision and values
The vision of the Faculty was completely reviewed to match ESD goals and objectives. The following new principles were added: sustainable development, community service, and an approach based on human solidarity, conflict resolution vs. win-lose principles prevailing in international relations. This approach required a change of mind and a different look on the role of political in society. "***The Mission of the PSSPAD is to provide quality education that helps build in our students the characteristics*** *of high intellect, moral integrity, enlightened citizenship, human solidarity, and responsible leadership in the public and private sectors. We serve our community by enhancing awareness about human rights, the common good,* **sustainable development***, and other basic precepts of democratic governance; and by connecting it to the rest of the world through educational networks of cooperation and original applied research."*(Notre Dame University, 2012a).
On the other hand, the Faculty values were redefined and were based on " *academic excellence, integrity, individual initiative, intellectual freedom and at the same time responsible citizenship and accountable leadership, human solidarity, conflict transformation and peace building, diversity, dialogue, and cooperation, subsidiarity, and Catholic Social Theory.* " (Notre Dame University, 2012b). Also, a mission statement was provided for every major in light of the faculty vision statement.

Curriculum reform
A complete review of all courses syllabi were conducted based on the following principles: Infusion of the 5 pillars of ESD, interdisciplinary approach (Political Science and Human Rights joint degree), strategies for influencing the institutional process and public policy, conflict resolutions courses (win-win approach and not win lose) and a focus on timely issues. Also new majors were introduced such as: a joint degree in Political Science and Human Rights, a minor in Gender Studies, a Law degree oriented toward Advocacy and Civil Rights. Also, a certain number of courses related to ESD such as environmental laws and regulations, modern ideologies, diversity, citizenship, and social and economic teaching of the Catholic Church. Moreover, ESD is being infused in every new course or major.

Example of Syllabi Review **SYLLABI** **IAF 641: Public International Law** **Notre Dame University, Faculty of Political Science,** **Public Administration, and Diplomacy** **Spring, 2012**	
Instructor:	Dr. Georges Labaki

Before	**After**
Course Description: The course deals with the sources and development of international law, with special emphasis given to current trends and problems. A critical evaluation of contemporary problems of world order is provided, covering legal issues, war, and economic development. **Course Objectives:** Highly interactive, this course endeavors to help students accomplish the following learning objectives: 1. To provide a solid background in Public International Law and to become familiar with the strengths and weaknesses of public international law as an instrument of social organization.	**Course Objectives:** The course deals with the sources and development of international law, with special emphasis given to current trends and problems. A critical evaluation of contemporary problems of world order is provided, covering legal issues, war, and economic development. Topics include: the role of the state in the current international legal system, treaties, peaceful solutions of problems, the preservation of natural resources, the law of the sea, the law of war, ethics, and state credibility in the international system. This course aims at providing the following learning objectives: -Identify the sources, principles, concepts and law-making procedures which underpin the international legal system;
2. To provide ample opportunities for relating theories to realities through numerous case studies.	- Identify the techniques and procedures to further improve compliance with international environmental obligations at national level; -Understand the international environmental law negotiation process; -Examine and interpret the content of environmental l laws treaties. -Differentiate the role of main factors involved in the development of international environmental law; -The understanding of major legal challenges faced by the international community today. -The study of the latest theories in public international law. -To analyze the distinctive norms/rules which regulate the international legal system and differentiate it from domestic law?

	- To examine and evaluate the practical application of international law and its response to contemporary international issues.
- Develop skills in critical, logical and structured reasoning within the context of public international law - Understand the interplay between legal rules and politics.	Upon successful completion of this course, students will be able to: **Learning Outcome 1** Demonstrate a good knowledge of the nature of the basic institutional structure of international society and of the nature of Statehood; **Learning Outcome 2** Explain how international law is made and the relationship between international law and municipal law; **Learning Outcome 3** Demonstrate an awareness of the political, social, economic and other factors that affect international law-making processes; **Learning Outcome 4** To be able to explain what procedures are available for seeking to ensure that States comply with international law? **Learning Outcome 5** Demonstrate the ability to explain how the rules of public international law would apply to a particular case and to critically examine questions about a substantive area of international law. **Learning Outcome 6** To be able to analyze and critically evaluate the principles, sources and vocabulary of international law, and to use the special terminology of international law **Learning Outcome 7** Demonstrate, when discussing and writing about any particular rule of international an ability to say whether the rule in question derives from a treaty or custom; **Learning outcome 8** To be able to appraise and discuss the major influencing factors which have determined the scope and nature of international law as a legal system. **Learning outcome 9** To evaluate the practical international legal implications on current events.

Teaching methodologies

- A focus on system thinking;
- Uses a holistic, as opposed to linear, approach;
- Enhances the student's ability to manipulate symbols;
- Enhances the student's ability to acquire and utilize knowledge;
- Encourages students to work in teams;
- formal, non-formal and informal education
- Uses virtual teams around the world;
- Use new technologies breaking the boundaries of space and time.

Reviewed topics in Weeks

1	**Introduction** - The Nature and Sources of International Law - Development of Law Among Nations - Relationship Between International Law and Municipal Law
2	**The Community of Nations** State credibility Case Study
3	**Recognition of Sates and Governments**
4	**State Succession** **Rights of International legal Persons**
5	**Duties of States** Respect of environmental treaties Obligations to abide by treaties fighting air, marine pollution, nuclear testing, and hazardous waste
Test 1	
6	**Jurisdiction Over Persons** **Individuals under State Law** **Extradition**
7	**International Criminal Law** Case studies: The International Criminal Court: The Special Court for Lebanon

8	Title to Territory	
9	Agents of International Intercourse	
10	Law of the Sea Exclusive economic zones, conservation zones	
Test 2		
11		International Agreements
12		Peaceful Settlement of Disputes
13		The Use of Force Modern War, Commencement Effects, Termination
14		Laws of War
15		War Crimes Conclusion
Final Exam		

Major teaching guidelines

The new teaching guidelines are focused on the importance of systems thinking when attempting to understand global economic, political and social issues. Systems thinking promote holistic change and look primarily at process, relationship, pattern, and context, and looks at the world as a whole. Also, there was an emphasis on using a variety of pedagogical techniques that promote critical thinking, and participatory learning.

Team work was also recommended for it engages stakeholders in sustainability issues and actions and enhances the student's ability to manipulate symbols and to acquire and utilize knowledge. Finally, the use new virtual technologies help in breaking the boundaries of space and time.

Conclusion

The introduction of ESD in the Faculty curricula is a continuous process requesting a change of Mind and the breaking the academic bunker mentality and program segmentation. The present generations have the responsibility to improve the future generations' life in order to achieve an economy in equilibrium with the environment by challenging the notion of the supremacy of the economy over other areas of social activity. Yet these constraints call for a strong cooperation between ESD and Political Science in terms of innovative course development, interdisciplinary approach, a critical examination of prevailing economic theories, and a broader use of political decision making tools in the shaping of public policy.

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Training and Supporting Education in Sustainability by the Use of an ICT Tool

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Abstract

In this paper we will present ColLab, a collaborative computerized tool to facilitate dialogue about concrete issues in sustainability. The tool is powerful in stimulating the inquiry in complex issues by constantly forcing the user to shift focus between the particular and the holistic. The design of the tool is theoretically founded in philosophy and knowledge about the psychological mechanisms, like cognitive biases, that are involved in decision making. It is based on the assumption that people are not making judgments in isolation, but rather in social settings. The main advantage with such a tool is that it supplies a shared platform in which an analysis can evolve organically, even in collaboration with competing parties. It is suitable for using in learning environments and for educational purposes as well as for formulation of sustainability policies.

Introduction

Sustainability is an issue that requires collaborative action. It affects us all and we are all stakeholders, with different levels of impact, in the decisions that have to be made. Moreover, sustainability is very closely related to ethics as it is about what is good and right. Important decisions about environmental policies are usually preceded by debates and naturally the opinions of decision makers are of course affected by the severity of the content matter. However, we know from psychological research that also the way that arguments are presented is very important (see e.g. Sunstein, 2005). Regardless of which position that is held, the point with a debate is to bring the public and the decision makers to hold the same understanding of a situation as the advocate for a certain action. This calls for a good attitude and personal mental skills in order to successfully convince others to realize the severity in one's message. In this paper we will present a computerized tool which purpose is to facilitate both the internal and the external dialogue around complex issues, of which sustainability is a good example. Keep in mind that this paper is not discussing sustainability problems in ICT specifically — this we have done elsewhere (Patrignani, Laaksoharju & Kavathatzopoulos, 2011) — but rather how ICT can be used as a means to improve the understanding of sustainability issues generally and to formulate sustainability policies needed in solving problems and achieving desired goals. Hence, a tool which is suitable for education purposes.

The relationship between sustainability, ethics and ICT

Issues about ICT, sustainability and ethics are closely related in many different ways (Kavathatzopoulos, 2011). Constructing and running effective and efficient systems is one of the main challenges in ICT, but how to succeed with that is not at all simple and, rather often, is not even understood as a problem by the people involved. Evidently there is no obvious answer to problems regarding design and use. Of course there are valid general principles, for example on how to design usable ICT systems, but the concrete features of a system have to be decided during the systems development process, separately for each new system, and in accordance to prevailing conditions. Furthermore, there are several "right" solutions to each design problem as well as to the way one should implement or use a system. There are always many different ideas on how to

do all this the best way, depending on the priorities of different groups, such as users with varying needs or skills, budget frames and design concerns.

In a similar way there is no generally accepted truth about issues of sustainability. In general terms most of us do agree on what should be done but when we move closer to concrete projects like road construction, location of production plants and the like, conflicting opinions or dilemmas take over. Often most of the arguments are based on very good sustainability grounds although they are not compatible with each other. Eventually we will stand in front of the same problem as the one in ICT, i.e., to find a solution that works with the concrete project at hand and which may differ to the solution for another project.

Regarding ethics there is no question about lack of general principles. Moral principles are something we all have and believe in, some more strongly than others. We defend them the best we can when we feel that they are threatened, and we try to follow them in our life. Still, it is very difficult to generalize well-functioning solutions from one problem to another, or to successfully apply generally accepted values and principles. We may be able to find satisfying solutions to concrete problems in real life despite us upholding different or even conflicting ideas, interests and values, but it is impossible to export the same solution to other problems or even to similar problems in other contexts and under different circumstances. We are confronted with the same difficulty during any effort to create general principles as well as interpreting and applying them to reality. In any case, suitable skills, tools, and methods are necessary to achieve a working solution (Sunstein, 2005).

Questions of sustainability are similar to ethics because there can be no assessment of right and wrong after the fact. Surely it is possible to evaluate whether goals were fulfilled but it is impossible to know if those goals were reasonable to begin with. Neither can we know what would have happened in an alternative scenario.

Handling problems of sustainability

Questions of sustainability are also special because they are affected by the mere existence of an analysis. Analyses are political messages. If we assume that advocates for sustainability have no hidden agendas, i.e. their sole incentive is to promote sustainability, what follows is that they are interested in finding out the truest possible consequences from different strategies. Nevertheless, such analyses will be perceived as ideologically founded by those that feel threatened.

We can learn from history how to conduct efficient argumentation. One of Socrates' techniques in order to convince his opponents that they have no logical arguments for their position is to first make the premises explicit by establishing agreement on the formulation of their current idea and then deriving absurd consequences from that position, often by the aid of analogies and metaphors (Platon, 1981). Still today, analogical reasoning is a powerful tool for persuasion in situations where the right course of action is not easy to determine. By comparing to other situations and by using metaphors it is possible to argue for something that we in fact cannot be certain about. This is however a double-edged sword, as Socrates own destiny is a proof of. There is a risk that the arguments will be disregarded as idealistic propaganda if they are uncomfortable and not founded in agreed-upon premises.

As we all know, Socrates was sentenced to death, despite lack of strong arguments for such a decision. It is ultimate irony that he showed how weak the arguments against him were, yet voluntarily accepted his death sentence. By this he made apparent that his beloved Athenian democracy is not interested in what is logically right but instead in what is familiar and least effortful. This is a fundamental human tendency that needs to be taken in account when delivering messages about sustainability. Although most people today are aware of the risks of e.g. global warming, most of them are not letting this awareness impact their daily lives. Analogical reasoning can be used to illustrate consequences from different policies but it has to be rooted in agreement on the premises and the ultimate goals, and most importantly: it has to incorporate concrete action. Sustainability as a goal is a matter of ethical values. In the short run, people can choose to disregard the need to address environmental and other issues regarding sustainability. We believe

that when scrutinizing current situations, the factual claims that are made about these should not be orthogonal to those made by opposing parties. Disputing the credibility of organizations that deliver data is common, but we argue that such debates are on a lower level of argumentation and are the result of failure to establish premises. What is important is to reach the level of discussion when we can start talking about which actions will lead to desired, and which will lead to undesired, outcomes. The perspective to the situation can of course differ and most likely also the conclusions that are drawn from the same data. Nevertheless, to reach the higher level of policy making, consensus has to be established about what exactly is being debated.

Education for sustainability

To promote sustainability, educators need to find strong arguments to persuade people to change their behavioral patterns, not only their expressed values. Since education for sustainable development targets students who are likely to be future policy makers, it is very important that these learn to argue well for a position that is based on current research. But first, and in order to be able to be successful in this educational effort, the educators themselves have to be trained in the right way.

Education has to support participants' independent, systematic, self-critical, analytical and holistic thinking. This is in essence philosophical thinking, based on classical philosophy (for example Platon, 1992; Aristoteles, 1975; and Kant, 2006) and on the findings of empirical psychological research on ethical problem solving and decision making (Piaget, 1932; Kohlberg, 1985). In common sense, transmission of "right" values and policies is understood as the only proper way to educate in ethics or sustainability. Because this view is so predominant, we underline the importance of the philosophical dialogue skills on both intrapersonal and interpersonal levels.

The focus of such an education is on training procedural skills, such as dialogue on all levels, to achieve satisfactory solutions to important real-life sustainability problems. Any instruction has to be directed toward the zone of proximal development, also known as the extension of cognitive schemata, by continuous cognitive coordination between trainer and trainee and by allowing trainees to judge how successful instruction and proposed tools are to achieve working solutions (Vygotsky, 1962; Piaget, 1962; Kavathatzopoulos, in press).

In this educational process, ICT can contribute in many ways. We can use it to train the skills of philosophizing; to facilitate cognitive coordination, communication, coordination and dialogue; to achieve learning and internalization by simulating solutions before their application in reality (Kavathatzopoulos, 2003).

ColLab: a computerized tool

The online decision-making tool ColLab, http://interact.it.uu.se/collab, is designed to be a platform for collaborative and democratic decision making (Laaksoharju, 2012). The design and development of it is based on the assertion that a decision maker needs to have an understanding of the influences that a decision has on all the involved stakeholders and their respective interests in order to make good decisions (Kavathatzopoulos, 2003). The tool follows three different steps to deepen an analysis. First, a graphic representation of a situation and the stakeholders that are involved is created (see Figure 1).
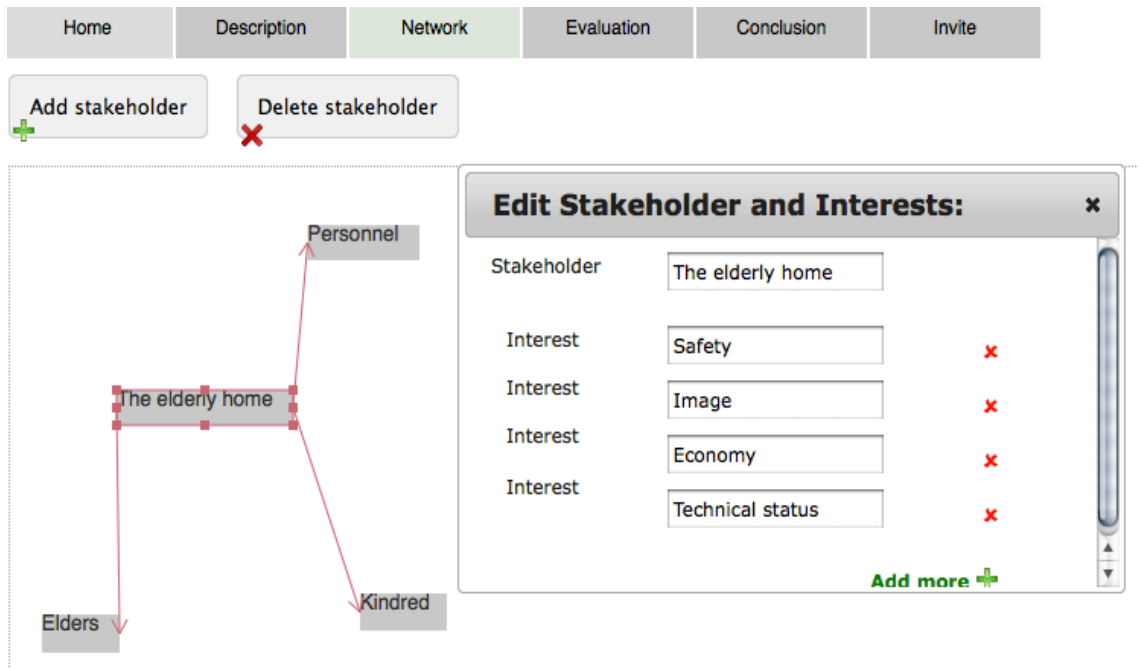
Figure 1: Screenshot showing the interface for the stakeholder network during the analysis of surveillance in elderly homes conducted by a group of students.

Second, it offers a matrix representation over stakeholder relations and third and most importantly, it allows the formation of an overview over how decisions would likely affect each stakeholder (see Figure 2). This iterative analysis requires the users of the tool to gather information about the situation, i.e. about the involved stakeholders and what their interests and connections to each other are. All the stakeholders that are involved in a situation have interests that are either affecting or affected by the dynamics of it. Furthermore, they form complex relationships to each other, which may create problems that make the situation difficult to fully grasp and consequently will make it difficult to determine which courses of action are sustainable. Any decision implies a risk of harming or threatening the interests of a part of the stakeholders. However, by investigating how a policy or a decision appears from the point of view of other stakeholders, and by getting an understanding of how their respective interests may be affected, the likelihood increases that the decision that is made is less biased and thus more likely to both be accepted by others and have the desired impact (Laaksoharju, 2010; Rawls, 1999). By gaining an understanding of the implications from one's decisions, the chance increases to follow Immanuel Kant's maxim to act in a way that can be accepted as a universal law, i.e. sustainably (Kant, 2006).

		Introducing the camera system in the elderly home X. Only used for surveillance.	Camera system in the elderly home used for surveillance, and by the personnel as help tool.	Camera system us... surveillance and by personnel as help t... Downsizing person...
Personnel	Safety	If personnel is wrongly accused of misstreathing an elderly, he/she can be proved guilty or not guilty by reviewing the surveillence video. ☑	If personnel is wrongly accused of misstreathing of an elderly, he/she can be proved guilty or not guilty by reviewing the surveillence video. The personnel can view the surveillence video to monitoring the elderly and preventing that dangerous situations occurs. ☑	If personnel is wrongly accused of misstre... he/she can be proved guilty or not guilty b... surveillence video. The personnel can view... to monitoring the elderly and preventing th... occurs. There can be a safety risc for the...
	Integrity	May feel uncomfortable being watched and feel pressure to perform perfectly. This can have negative effects on their performance and health. ☑	May feel uncomfortable being watched and feel pressure to perform perfectly. This can have negative effects on their performance and health. Personnel might monitor each others performance. ☐	May feel uncomfortable being watched an... perform perfectly. This can have negative... performance and health. Personnel might...
	Use Value	Unchanged ☐	Could easier get an overview of the elders which could ease their workload. ☑	Could be more dependent... surveillance system due to... personnel.
	Economy	Salary could be increased or decreased depending how the investment is performed and the business effects of it. ☑	Salary could be increased or decreased depending how the investment is performed and the business effects of it. ☐	Salary could be increased... depending how the investm... performed and the busines...
Kindred	Safety	Could feel safer when knowing there are a surveilance system in the building. ☑	Could feel safer when knowing there are a surveilance system in the building. ☐	Could feel safer when knowing there are a... system in the building. Can feel unsa... less personnel caring for the elders.
	Economy	Cost could be increased or decreased depending how the investment is performed and the business effects of it. ☑	Cost could be increased or decreased depending how the investment is performed and the business effects of it. ☐	Cost could be increased or... depending how the investm... performed and the busines...
Elders	Safety	Could feel safer when knowing there are a surveilance system in the building. ☑	Could feel safer when knowing there are a surveilance system in the building. ☐	Could feel safer when knowing there are a... the building. Due to lack of personnel the... unsafer when there are less personal car...
	Integrity	May feel uncomfortable being watched, and robbed of their privacy. ☑	May feel uncomfortable being watched, and robbed of their privacy. ☐	May feel uncomfortable b... watched, and robbed of...
	Use Value	Can be helped in situations when they are alone and in need of help. ☑	Can be helped in situations when they are alone and in need of help. Can get less social stimulation, due to less interaction with personnel. ☐	Can be helped in situations wher... and in need of help. Can get less... stimulation, due to less interactio...
	Economy	Cost could be increased or decreased depending on how the investment is... ☐	Cost could be increased or decreased depending on how the investment is... ☐	Cost could be increased or... depending on how the inve...

Figure 2: Overview of possible solutions and how they affect relevant interests and values, an example of a student group working with ColLab.

ColLab is collaborative, which means that it allows multiple invited parties to edit a situation analysis. They can contribute equally as the initiator by for example adding new stakeholders and interests, suggest decisions, and participate in the analysis of consequences that these may have. The tool is formative, as it directs focus on interests and values of involved stakeholders, including sustainability as a value, but not normative as it does not determine what conclusions are correct. With our approach we follow Piaget (1932) and advocate the philosophizing process by not focusing on the moral righteousness of the particular conclusions that are the outcome from an analysis but rather by focusing on the *way* that decisions are made. In other words, we avoid fixating value judgments and only focus on supporting and visualizing the deliberation process (Laaksoharju, 2010). The tool is theoretically founded in moral psychology and philosophical ethics and will serve as a facilitator in discussions where the aim is to balance considerations, for instance sustainability and fairness with interests like utility and growth. As such it is implicitly a facilitator of democratic, i.e., participatory and inclusive, dialogue (Kavathatzopoulos, 2010).

Conclusion

We have experienced that the tool is remarkably powerful in stimulating the inquiry in complex issues by constantly forcing the user to shift focus between the particular and the holistic. The design of the tool is theoretically founded in philosophy and knowledge about the psychological mechanisms, like cognitive biases, that are involved in decision making. It is based on the

assumption that people are not making judgments in isolation, but rather in social settings. Problems that involve many people, a trait that questions of sustainability share with ethics, can only be solved by answering questions about how these are affecting the problem situation and how these are affected by any proposed solution.

The main advantage with such a tool is that it supplies a shared platform in which an analysis can evolve organically, even in collaboration with competing parties. Policy makers can get help to understand how arguments have been applied in concrete situations and how people and values can be affected by different courses of action. The structure of the tool invites to a proactive, concrete, solution-oriented dialogue where premises are made explicit and thus possible to address.

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Rethinking ICT's Contribution to Sustainability and Education

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Abstract

The open education system based on Information and communication technology (ICT) can provide great opportunities for people to learn regardless of resident area, language, gender, age and so on. Currently people use it actively and build up new social networks as learning communities or study groups on the Internet. Shared knowledge and the process of sharing knowledge established through online communication are considered as key elements in the context of strengthen the individual and the country. In other words, creating the open education platform and content plays a role of designing a culture and society. However, it is not easy to realize the ideal concept of "open education" because people have many differences in language, culture, political system, ideology, thought, deployment of ICT et cetera. In order to create the open education system, which has a high degree of usability and effectiveness, we need to closely examine social roles and difficulties of the ICT-based education system in designing sustainable societies. And also the ICT-based educational system is established through the continuous human-computer interaction. Therefore, all participants get involved with developing the open education and each of them assumes a responsibility for making the open educational contents more abundant.

Key-words Culture, Information and Communication Technology (ICT), Open education, Social responsibility, Sustainability

Information and communication technology and education

Information and communication technology (ICT) has developed and deployed rapidly since 1980's. Until now ICT has been considered as one of the most important infrastructures in living in the present globalized society. Many people enjoy the access to the Internet and use tremendous information on websites. Along with diffusion of personal computers and highly leveraging information on the web, the way of learning has been changing gradually. ICT provides greater possibility to understand the realm where people have interests and want to learn. Hundreds universities, institutes and companies constructs and releases the "open education" platform based on ICT, for example iTunes U, Youtube, MITOpenCourseWare (MITOCW), TakingITGlobal and so on. These open education platforms are basically open for everyone who wants to learn by using contents on the website for free in so far as they can access the Internet[1]. And also the movement toward the construction and use of ICT-based education platform is supported by international organizations, such as the Centre for Educational Research and Innovation (CERI) in OECD, UNESCO's project "the Virtual University and e-learning" et cetera.

It is possible to interpret the term "open education" multiply and this term embraces multiple dimensions in educational activities. However this term has been constituted based on the simple and strong belief that *education can be improved by making educational assets visible and accessible and by harnessing the collective wisdom of a community of practice and reflection* (Iiyoshi & Kumar, 2008). This thought is very related with sustainability, and refers to great possibility to lead individual knowledge to collective knowledge contributing to make

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[1] MITOpenCourseWare open more than 2,000 courses for free and the number of visits around the world counts more than one million per a month on average (MITOpenCourseWare, 2011). And also iTunes U which service has launched by Apple in 2007 provides 350,000 lectures offered by over 1,000 universities all over the world, and runs at the rate of 300 million downloads a year (BBC News 2011).

communities and societies better.

Basically the open education platform could provide and extend people's educational opportunities. Given a society well established Internet infrastructure, ICT makes it possible for people to make social networks and virtual communities through social media, and to utilize such a network and shared knowledge to enjoy an affluent daily life. In other words, ICT is considered as a key element in the context of developing the individual and the country, for example United Nations emphasize the importance of ICT in developing countries and active utilization of ICT in the educational arena to empower people. Needless to say, education is a significant factor for sustainability. Therefore, in order to achieve sustainability in the present world where ICT is positioned as a vital commodity in every social dimension, it is inevitable to collaborate between education and ICT. This study explores social roles and difficulties of the ICT-based education system in designing sustainable societies.

A new medium of participation for sustainability

How does the open education system contribute to sustainability and affect the educational arena? At the present, people use social media and connect with others actively through it, and some people join in study groups or study communities on the web. These people have much interest in a certain topic and positive attitude toward sharing information and knowledge among community members. In many cases, open education platforms provide educational contents freely and support educational interaction between users, not grant any degree or credit. Given this situation, participants are required strong motivation and initiative to keep studying. The platform could provide to motivated people for opportunities to learn and communicate with each other actively if it prepared interesting and attractive contents on the web.

And also it would greatly help them find a teacher or a partner who teaches them what they want to learn, through using contents on the platform and attending virtual communities. Moreover, it is possible for them to expand their relationship online into the real space, for example leading more chance to get a job and earn money based on what they learnt on the web. Because they can show their education experiences and careers in detail as well as social skills to construct the relationship with others, through attending online learning communities. In other words, positive activities in the virtual space could create chance to make the real life better and richer.

In this context, the open education platform provides greater chance to enhance the quality of life and survive in the competitive world, beyond boundaries between the virtual and real spaces. Thus the open education platform could function as a new medium of participation in the civil society, in order to achieve sustainability. However, it is not easy to realize the ideal concept of "open education" because people have many differences in language, culture, political system, ideology, thought, deployment of ICT et cetera. The way of understanding and interpreting contents is *socially constructed through conversations about that content and through grounded interactions around problems or actions* (Brown, 2008). Therefore, in constructing the platforms and its contents, we need to consider those not only from the perspective of "what we learn" and also from the perspective of "how we learn". Furthermore, if we aim that the open education platform functions effectively and sustainably, the perspective of "why we learn" is also needed in order to motivate people to participate and use contents continuously.

Difficulties in designing "open education" on the web

The open education platform provides opportunity for education greater, and is expected that its contents ignite people's passion for learning. However, there is a social risk generating big disparities between users with high ICT literacy and users with little ICT literacy, and between *information haves* and *information have-nots*. Worse, even if people have ICT literacy well, in some countries, the free access to the websites is restricted or not allowed by governments. Why do these inaccessible situations exist while many people and organizations recognize that open

education contributes to fostering a richer society and sustainability? Because the concept of "open education" has been originally constructed based on Western thoughts and ideologies such as "freedom of expression"; "academic freedom"; "the right to receive education"; "human rights"; "democracy" et cetera (Umeda & Iiyoshi, 2010). In the case of China and some Islamic countries, the governments shield people's free access to information on the web in order to keep their ideologies and social orders "properly", due to fears of "what people learn" and "why people learn" through the web. Additionally, the open education platform would not develop and work well in the society where the government infringes on the intellectual property right and put censorship on contents routinely. How to construct and use platforms and contents depends on a political regime and thought. In other words, constructing the open education platform and content plays a role of designing a culture and society.

Active interaction among people through the web reconfigured people's roles in the Internet. In the early stage of the digital age, almost people had been only spectators or audience at the arena where information was exchanged by a few other users those are familiar with ICT. However, the popularization of personal computers and Internet access has changed people from spectators to creators, in other words, from *passive spectators* to *active participants* (Jenkins, 2006; Balsamo, 2011). This shift enriches open educational contents with a myriad of knowledge of others. However, whenever there are drastic changes, difficulties always follow. First, it is unavoidable to experience difficulties in the translation tacit knowledge into explicit knowledge, as well as language translation. Every participant has different experiences, knowledge and cultural contexts, and sometimes it is difficult for them to express those in words or to transfer explicable knowledge for others. Secondly, not every information and knowledge are useful and educational. Some of participants might try to assert the particular thought or idea and inculcate it upon others, for example extreme ideas, false information, demagogic messages and inflammatory observation. However, what is right/false and which idea is moderate/extreme are different depending on the culture and society. Of course some parts would be similar to others' thoughts but people rarely have completely same thoughts as the others ones. The third difficulty is there, that is, the most of open education platforms run in the certain languages at this moment, run by big companies, organizations or universities mainly in western countries, and the most of contents are distributed in English even if not westerners create it. Therefore contents makers and users are affected more or less by western thoughts. As proof of this, some countries control and shield the people's access to particular websites, no matter what the reason there might be, for example blocking the access to Facebook and YouTube, sometimes Wikipedia, in China.

In constructing web services in non-English speaking countries, it would be easier for contents' makers to design and construct contents in their own languages because of usability and accessibility for local users (Umeda & Iiyoshi, 2010). And they could be well aware of the needs of users easier and ascertain the reactions of users toward their contents directly. However, given the characteristics of the Internet, the universal access makes open educational contents richer and gives people more chances of learning regardless of languages, locations and so on. In the situation that English is used commonly and globally, it is quite expected that many of the open education platforms and contents are run in English in order to be "open". On the other hand, in order to respect cultural differences and harness diversity, we need to approach "open education" from the local perspective.

Social responsibility as educators and learners

Constructing the education platform on the web is very much related with designing the culture and societies, of course with sustainability. And also education programs definitely empower people both on the web and in the real space. However, especially on the web, no matter how many good educational materials and tools are open and usable for free, it is very difficult for a single person to use those thoughtfully and effectively as an educator or a learner. Because only one person does not have enough practical knowledge to fully utilize other people's knowledge alone and by oneself (Umeda & Iiyoshi, 2010). Practical knowledge is fostered through the real

educational practice, and which belong to tacit knowledge. Therefore, in getting involved in education on the web, it is required to devote sustained efforts to express and open knowledge in order to be understandable for others.

In other words, educators are required sustainable efforts to develop skills to convey information and knowledge to learners. Sustained efforts blur the boundaries between educators and learners, and all participants get involved with developing the open education after all. In this context, every user assumes a responsibility for making the open educational contents more abundant. Whereas participants themselves contribute to make their knowledge visible and explicit, the platform and content suppliers need not only to construct the platform and content but also to develop the support tool to transform tacit knowledge into explicit knowledge. This means that the ICT-based educational system is established through the continuous human-computer interaction.

The open education systems are developed by many suppliers and users, especially the quality of contents depends heavily on each user. Hence, it is unavoidable to consider the problem of "many hands" in the process of construction and operation of the open education system. The problem of "many hands" might pose the absence of responsibility when the system causes a problem socially. In particular, since education is considered as the essential foundation for the prosperity and sustainability of the society, the open education distributors and contributors assume great social responsibility. In order to develop the open education systems for sustainability, we need to evaluate and operate the quality of the system constantly and accurately. And we could evaluate it from three different points: the quality of contents, media, and the information system (Murata, 2005). The quality of contents is evaluated based on reliability, purposiveness, accuracy, coherency, integrity and currentness. The quality of media is assessed by adequacy and appropriate access control. The quality of the information system is evaluated from the viewpoints of reliability, usability, consistency, maintainability, flexibility and confidentiality. Through those evaluations and continuous human-computer interaction, the open education system can contribute to empowerment of people and realization of the sustainable society.

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New Technologies and Instructional/Learning Design for ESD

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Introduction

In recent years, the word "digital" has become very widely used, leading to a renewed interest by the political authorities in education and training issues. This has been reinforced by the proliferation of new roaming communication tools, including digital tablets and smartphones, as well as the development of social networks.

This increasing digital connectivity in all aspects of our society, particularly the education and training sector, extends and strengthens earlier approaches developed using ICTs in two different but complementary ways: the use of information available on educational websites, like virtual or open universities, and access to web-based information collected via search engines.

ICTs offer every country the opportunity to capitalise on knowledge and know-how to promote sustainable human development and, more particularly, to meet the challenges facing many educational systems, including a shortage of teachers, the inadequacy or lack of facilities, or even inadequate teacher training.

Furthermore, new information and communication technologies represent a vital, continuously available resource for training and acquiring new knowledge, enabling students, teachers, researchers, and the population as a whole to benefit from the best possible education, thus meeting not only their own needs, but also those of the society to which they belong. This is particularly true in the case of sustainable development, as it involves a multiplicity of topics and disciplines, requiring a global, interdisciplinary approach that does not correspond to the teaching methods generally implemented in educational establishments.

Awareness of the challenges and opportunities of ICT has led government institutions, as well as various public and private organisations, to launch programmes and projects aimed at spreading and developing computer and internet applications on a national and international level. This is also the reason why distance learning has been launched via virtual universities and many countries have introduced e-learning in their education systems. One of the best examples is certainly South Korea, where a 2010 UNESCO study revealed that 80% of establishments had adopted this approach for school and university courses, aimed at both teachers and students

Major technological advances are not the only factors to be taken into account in describing the new technologies used, as it is also necessary to consider young people, known as "digital natives", who were born and have grown up in a digital world, and whose cognitive activities, awareness of reality, intellectual capacities, and social vision have been fundamentally transformed by their digital environment.

Digital technologies are certainly one of the key factors in the emergence of new teaching practices to facilitate users' access to knowledge in initial training, school, and university, as well as in-service training and, more widely, all young people and citizens in the context of life-long learning for all. This emergence should not only take technological changes into account, but also the parallel changes in the young generation brought up in the digital world.

The consequences of digital development

Today, governments, as well as the various institutions that drive our society, consider that access to the digital world for their population represents an important stage in responding to the multiple environmental, social and economic demands of development, to such an extent that this has become a component in the key challenges discussed at major international meetings.

- **on a political level**

Governance in the digital universe will be one of the key international concerns in the near future, in particular the integration of technological innovations in regulations and legislation. The rise of the digital economy has modified market structures and led both governments and major economic operators to modify their governance to meet digital challenges.

- **on a social level**

On a social level, the sweeping changes brought about by social networks (Facebook, Linkedin, Twitter, etc.) seem to offer a new space for expressing democratic freedoms, giving ordinary citizens the opportunity to play a new role on a supranational level. This trend once again raises the issue of freedom of expression and universal access, as witnessed during recent events in North Africa and the Middle East.

- **on an economic level**

The move of large swathes of economic activity to the digital world has led to the emergence of new players. The transfer of the importance and influence of these new digital players, together with the reorganisation of infrastructures towards content and services, has emphasised another strong trend that has modified market structures. Consequently, we have witnessed the emergence of a new economy, with very different rules, values, and impact. The growing importance of the digital economy is a driving force for innovation and rapid changes that challenge the equilibrium of our society.

- **On a technological level**

Innovations follow one another at a rapid pace, with three
strong trends.

- First, the proliferation, individualisation, and customisation of connection terminals via smart systems (Smartphones, tablets, etc.), which have led to an explosion in mobility based on the use of internet and the technical innovations in education resulting from the use of these smart, mobile systems (tablets and smartphones). The widespread adoption of these systems offers an excellent opportunity to study the way students use them, both inside and outside school, and how teachers design new learning situations. They also offer an opportunity for research programmes focusing on data gathering and use via these systems.

- The emergence of the "internet of things" (IoT) has made it possible to identify physical and digital objects and integrate them into networks, so that they can communicate directly with one another and process information. The internet of things extends internet connections to objects and places in the physical world. Whereas the internet usually stops at the frontiers of the electronic world, the internet of things is designed to extend to the real world, by combining coded labels (eg: barcodes), with radio-identification (RFID) tags or internet addresses (URLs) and attaching them to objects or places. These labels may be read by wireless sensors, which should promote the emergence of augmented reality, or information systems capable of superimposing a virtual 2D or 3D model on our normal perception of reality in real time. The internet of things will impact our lifestyles in the near future.

- Finally, the dispersion of data processing and storage by implementing Cloud Computing. Cloud computing consists of moving computer processing and data that would normally be hosted on local servers or users' computers to remote servers, located anywhere in the world. In "cloud computing", users do not know where in the world their data are stored, which results, de facto, in their being dispossessed and losing control of some of these data on both an individual and a national level.

- **"digital natives"**

"Digital natives", who will represent over 30% of the population in under 5 years, are people who have grown up in a digital environment, featuring computers, the internet, mobile phones, and MP3 players, in contrast to digital immigrants, who grew up outside the digital environment and adopted these systems in later life. Scientific studies of "digital natives" have revealed that their cognitive activities, awareness of reality, intellectual capacities, and social vision have been fundamentally transformed by the digital environment. While people in their forties may, a

priori, perceive "Digital Natives" as superficial, not respectful of authority, lacking in morality and hope, this study also showed that, above all, they did not have the same motivations or representations as older people. The influence of the digital world had brought about a radical change in their relationship to time, space, information, morality, authority, and brands. These differences foreshadow a radical change in our socioeconomic environment and highlight the strategic challenges of the digital generation for all business sectors. Consequently, they must be taken into account in education and training.

Search tools and engines

In the field of education, a great deal of data is obtained from the internet using a variety of tools, both traditional, like desktop computers, or more modern roaming tools, equipped with tools for finding information, such as search engines.

Roaming tools
With 26 million tablets and 1 billion smartphones sold worldwide, roaming tools have been adopted in all parts of society and, of course, in education, which raises the following key issues:
How do roaming tools change users and everyday behaviours?
Roaming tools include tablet computers, smartphones (42% penetration in Europe), Netbooks, and laptops. Tablets (particularly the Ipad, which has a market share of approximately 50 %) are the subject of a special focus, as they both accelerate and revolutionize usage. These tablets exist thanks to the vast amounts of high-quality content and the ergonomics of constant access from any location, which epitomise mobile media.
The success of tablets in businesses and universities has initiated a collaborative digital strategy to facilitate access to knowledge and their attractiveness has reinforced capitalisation on knowledge and contributed to innovation in teaching:

- Continuously accessible information and optimised efficiency thanks to the ease-of-use of tablets, which are so much lighter, less bulky, more connected, and need recharging less often, as well as featuring user-friendly- touch screens.
- They are quick to operate, accessible, and high-performance facilitate added value data by more dynamic, and more easily-updated presentations.
- They facilitate learning and capitalising on knowledge, as well as accelerating innovation in universities and advanced educational establishments that have integrated the use of tablets in their courses. These entities launched research to analyse the component impacting education (fragmentation of working hours, web 2.0, and collective intelligence) and adapt e-learning content and formats.
- These teaching methods change the relationship between professors and students and oblige product publishers to adapt their documents to the constraint of tablets, thus further accelerating innovation.

Search engines
Information search tools share some strong features that reflect the complexity of the internet world:

- first their volatility: one example is that functions are eliminated due to the cost of maintenance, like Google's wonder wheel, which was replaced by a new version of the search engine; other search engines, like "universal search", launched in 2007, carried out internet searches via Google or another search engine and displayed information from different data bases on a single web page. Another example is "image search", launched in 2011, based on the simple principle that, instead of typing key words into the search window, you put an image by copying its url if it is on the internet or importing it from your hard disk.

- the "black box" effect: even if the general principles behind the various search engines are known, the way they function is increasingly opaque and never disclosed, mainly for financial reasons.

These specific characteristics raise didactic issues and call for a multidisciplinary approach: information science to study their function and implementation and human sciences to investigate the construction of usage. It is somewhere between a top-down view of "information science" with frontiers that are still largely fuzzy, and a bottom-up view referring mainly to "open" practices, which may be considered similar to emancipation.

The digital world and education in sustainable development

As digital systems open up the possibility of interactive learning, the aim is not simply to provide improved photocopies, but to develop resources, including learning activities and interactive teaching tools, that represent a real added value in the learning experience. This requires a great deal of effort to develop, share, and disseminate innovative learning tools and processes (interactive modules, role playing, case studies, simulations, etc.), designed to enable students confronted with an issue in a complex virtual context to assess the state of their knowledge, simulate a situation, and develop cross- functional skills. This is the aim of innovative teaching projects that offer new training and teaching tools adapted to the complexity of environmental issues.

New technologies in distance learning should make it possible for students to add to their classroom learning by means of tools, digital teaching resources in this case, as well as enabling teachers to enrich their courses with relevant content. New technologies are not intended to replace existing teaching methods but rather to support students in their acquisition of knowledge and provide teachers with reliable, scientific teaching materials.

New technologies facilitate access to knowledge but do they enable uninitiated users to choose the right resources? How is it possible to ensure that a resource is scientifically reliable? What approach should we choose?

In this search for an appropriate information search methodology, Web 2.0 appears to be a representative of these new technologies. It is above all a system for sharing information, based on open databases, accessible to multiple users. In fact, Web 2.0 leads users towards new ways of finding and accessing content. They become players, by reacting to published articles, or authors, by publishing daily posts on a blog. Web 2.0 also incorporates improved technology, user-friendliness, and semantics that have made it a highly flexible tool.

Users become authors but not, however, specialists in copyright law. Most users, both teachers and students, are relatively unaware of the elementary rules of intellectual property and copyright.

The internet no longer exists in a legal void - if it ever did. The law is, therefore, also applicable to Web 2.0 and it is important to remind teachers of the recommendation that they should use Creative Commons licenses if they decide to build their courses around data sourced on the Internet and then publish their material online. These licenses govern the conditions for reusing and distributing online multimedia content.

What are the strategic issues?

Four strategic issues may be considered in the area of implementing and developing digital tools and, more particularly, those concerning ESD:
- supporting digital innovation to maintain greater control over changes in our society, particularly those concerning the development of the digital economy and entrepreneurship among young people in this field;
- building an open, transparent, democratic information society: electronic government and citizen participation, promoting open data, digital security and trust;
- developing digital intelligence in the service of diversity and sharing: digital resources and emerging issues, internet governance, legislation and regulation;
- producing, disseminating, and protecting digital common goods: producing and

promoting digital content and means of expression, shared between the academic and public spheres, shared heritage of knowledge or reserved knowledge.

Each of these four axes is complementary and must be considered not only with regard to the institutional players in education, training, and research, but also all the stakeholders considered in the broader context of these various partnerships.

ICTs offer each person the opportunity to overcome the many challenges that face many educational systems, such as a shortage of teachers or adequate facilities, as well as inadequate teacher and instructor training, by capitalising on the knowledge and know-how necessary to educate and train schoolchildren and students, who represent an important part of the population. Furthermore, by providing access to knowledge to the largest possible share of of the population, online training is a major tool for promoting sustainable human development.

To achieve this, several aspects need to be strengthened immediately:

- training teachers in new technologies;
- developing digital content;
- broadening access to ICT tools in schools and higher education establishments, with a particular focus on hardware, content, and training programmes;
- basic teacher training;
- implementing a quality-control approach;
- monitoring and assessment mechanisms.

In addition to providing content and courses, e-learning should mobilise all the players who contribute to access to knowledge, so that everyone can have the possibility to continue learning at any time and any age via modern e-learning technologies.

Teachers and, more widely, instructors, need to review the way they present their knowledge and integrate e-learning into their teaching approach, so that they can benefit from this opportunity to exchange with their learners.

Teaching platforms are a good example and capitalise on a number of consequences of courses and activities provided by teachers for their students. These platforms cannot simply be considered tools for storing documents but are organised to offer users distance learning functions. For example, Moodle integrates a number of interactive activities and learning pathways, customisable to suit the learner's needs, together with synchronous and asynchronous communication tools (chat, forums, etc.) that offer more rewarding exchanges with students…

DWS

A digital workspace (DWS), digital working environment, "virtual office", or "service portal" is a collaborative work environment that meets specifications drawn up in the context of ICTs. They were initially developed in secondary education, and then extended to universities. This platform must coordinate with existing platforms in the French national education system, academic authorities, local authorities, and educational establishments. As this involves reconfiguring teachers' and students' workspaces, it is important to develop groups of teachers who produce resources, as well as methods for designing and sharing these resources.

Your DWS enables you to access digital services and tools, depending on your profile, from any location (campus, home, etc.), at any time.

DWS make it possible for users to work outside their school under optimum conditions, in their own personal workspace or in a group. They also facilitate the organisation of school life, by promoting the use of ICTs and facilitating the autonomy of each establishment, reducing assistance and maintenance costs, influencing changes in teaching practices, and making establishments more open to all members of the school community (parents, guidance counsellors, maintenance workers, etc.).

Furthermore, DWS is an instrument for decompartmentalising learning activities:

- temporal decompartmentalisation: articulating classroom time with other activities (learning continuity);
- spatial decompartmentalisation: the freedom to work anywhere within the establishment and even anywhere with an internet connection;
- social decompartmentalisation: a structure that connects all its users to each other.

Consequently, DWS promote the implementation of combined offers involving several services or products and services. However the associated issues are relatively unconnected with teaching.

A DWS may be hosted by an ASP or Application Service Provider offered by an IT Engineering Service Provider or a state-run (university, local/regional authority), or even local (school, enterprise) IT department. This server requires an information system technician and system, network, database, and internet administrators.

Canal-U and digital video libraries

Canal-U, the higher education digital video library, supported by the French National Education Ministry, has been set up to disseminate audiovisual productions designed to support staff and students in their teaching or learning activities at bachelor's and master's degree level.

This video library offers free access to thousands of videos covering the following eight topics of the

Digital Theme-based University:
- Law, economics and management;
- Environment and sustainable development (approximately 300 audiovisual resources);
- Letters, arts, languages and civilisations;
- Health and sport sciences;
- Human, social, education, and information sciences;
- Fundamental sciences;
- Engineering sciences and technology.

Two types of access, streaming and downloading, are proposed, depending on the content of teaching resources. Slide shows, maps, and bibliographies are associated with each of the videos.

Social networks

Social networks and group working areas that have appeared massively on the internet in recent years are now used in education and distance learning. Teaching techniques have become more collaborative and social learning is a reality.

More than ever before, students access these environments in both their personal and university lives, which promotes sharing and joint development of knowledge. Content on sites like iTunes U and Wikipedia is constantly growing, contributing to enhance the students' learning experience. The Knowtex social network is the benchmark in France in terms of scientific and technical culture related to the environment and sustainable development. It is a space for discovering, sharing and organising knowledge about science, research, and innovation. The site offers a large number of links on varied topics in different formats, posted by members of the community. Knowtex, created in 2009 by the French agency UMAPS, now has over 1,300 members and lists over 62,000 links.

Serious games

"Serious Games" are applications developed on the basis of advanced video-game technology, with similar design and know-how to classic games (real-time 3D, simulation of objects, individuals, environments, etc.), which go well beyond the dimension of entertainment."

Many serious games focusing on SD have been recently developed in the educational field. They are mainly free access and free of charge, like Clim'City. Using a virtual environment, Clim'City illustrates how to move towards ways of life that would be sustainable for the Earth and its

inhabitants in an industrialised western country. A teacher's guide is downloadable from the website for teachers and instructors, to add a more serious dimension to the game in class sessions.

Conclusions

New technologies must mobilise all stakeholders who must work together to provide information and training in the right conditions for the benefit not only to students but also to all citizens. It is a common challenge for higher education to be able to offer an educational complement for sustainable development:
- combat academic failure and social inequality
- Promote the use of digital technology to the benefit of educational innovation
- Enhance the digital educational resource repository in SD. and in a broader, more partnership-based manner :
- foster a strong pooling between training institutions
- favour access to knowledge
- contribute to lifelong learning

All institutions must consider how they can benefit from the opportunities that the new information and communication technologies have to offer, especially in the fields of SD.

Uncovering Pre-service Teachers' Assumptions about Social Exclusion in Education: An Action Research Study

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Abstract

With social exclusion emerging as an acute issue in educational discourses, the education system faces the need to prepare teachers to recognise the importance of its reduction in the classroom. The paper responds to this need by recounting a fragment of a broader action research study conducted in the context of initial teacher education with an aim of exploring pre-service teachers' assumptions about social exclusion in education. Data were gathered in Google-doc environment via an electronic survey containing Lickert-type and open questions aimed at uncovering the research participants' conception of social exclusion. Qualitative content analysis suggests that pre-service teachers tend to adopt a rights-based approach and consider social exclusion as a cumulative and dynamic process impacted by the teacher, family and pupils' peers. In addition, the participants highlight self-exclusion and its possible causes and admit that building social ties such as friendship is an important coping mechanism. The study concludes that pre-service teachers consider social exclusion an acute educational problem and begin to realise their professional responsibility to prevent it. This raises implications for teacher education in terms of enabling future teachers to develop the necessary knowledge, skills, attitudes, values and other qualities for dealing with exclusion in their classrooms.

Key-words: Social exclusion, Education, Pre-service teachers' assumptions, Action research

Introduction

Education has a crucial role in child's development, which makes it a precondition for successful socialisation and life activity (Klasen, 2001). Therefore, inability of the education system to provide equal participation and access to quality education for all children (UNESCO, 2009) functions as a source of exclusion. In contemporary policy discourses social exclusion emerges as an issue of concern as we question whether the system of education enables social cohesion and integration, helps learners gain opportunities and abilities for active civic participation, promotes tolerance and respect for diversity (Klasen, 2001).

Jahnukainen (2001) conceptualises exclusion in education as a hierarchical developmental model where problems at school (such as ostracism, teasing, harassment and bullying) cumulatively lead to aggravation of consequences (such as dropout and school failure), which ultimately cause more severe problems (such as poverty, unemployment and crime). Therefore, the education system should duly address this issue by preparing teachers to recognise the importance of reducing social exclusion in the classroom. Hence, critical reflection on the significance and ways of building inclusive relationships in the learning community becomes essential in teacher education.

This study attempts to bring the issue of social exclusion into teacher education. It is conducted in the context of implementing a study course "Education for Sustainable Development" among 39 future preschool and primary school teachers in the first year of their studies. The course involves students in reflexively and experientially exploring the meanings they attach to exclusionary relationships in social and, more specifically, educational contexts, in order to question existing educational practices and judge them in terms of being sustainable or unsustainable, inclusion- or exclusion-oriented. At the same time, the intention is to strengthen the students' commitment to reorienting such relationships towards inclusion. This paper reports on a fragment within this broader study and focuses on the following research question: how do pre-service teachers make

sense of social exclusion in educational setting, notably, in what assumptions is their understanding of this issue grounded?

Methodology: action research for making sense of social exclusion

Action research is used as a framework for study course implementation in the context of which the present study has been conducted. Action research is conceptualised as an approach to creation of knowledge from reflection on experience (Bradbury Huang, 2010) which engages people in collaboratively addressing issues of immediate and practical concern (Bradbury & Reason, 2003), such as how to understand their relationships with the world better and how to live together better. The action research approach is chosen for study course implementation and, more specifically, for exploration of social exclusion because (1) it is problem-oriented, i.e. aims to solve a particular problem that is meaningful to the research participants as well as carries implications for the broader social and natural community (Reason & Bradbury, 2008), (2) it is critical, i.e. involves participants in questioning habitual ways of framing issues thereby uncovering and sustaining other ways of being and acting (Likes & Mallona, 2008), (3) it is relational, i.e. fosters connectedness (Ballard, 2005) and sense of community (Mullett, 2008) through learning from each other in partnership and participation (Bradbury Huang, 2010).

Implementation of the course "Education for Sustainable Development" focuses on fostering the learners' critical reflection on social exclusion as a feature of social unsustainability. Critical reflection entails formulating one's tentative judgement about an issue and entering into critical discourse about it with others (Mezirow, 2000) where one states reasons for choosing a specific way of thinking about the problem (Cranton, 2002) and opens oneself to alternative interpretations (Yorks & Kasl, 2006). Thus, the very ground for criticality is an initial identification of one's perspective on an issue of concern. Such identification requires an "activating event" (Cranton, 2002, 65) where learners are placed in an encounter with an idea presented from different points of view. This paper reflects on pre-service teachers' reactions to such an event – an electronic survey which entailed contemplation of social exclusion and envisaged formulation of and substantiation of students' personal perspectives on it. Hence, information and communication technologies are used to deepen and diversify students' critical reflection (Herden, 2011) during study course acquisition.

To prepare for a more extensive critical discourse on social exclusion during subsequent learning activities within the course, the students completed an electronic survey in google.doc environment. The survey was designed inductively via cascade approach (Pipere & Salite, 2006) – by drawing on insights from previous action research cycles. Six closed Likert-type questions and six open questions invited students to reflect on various facets of social exclusion in education: to contemplate pupils' and their families' characteristics as reasons for social exclusion, to look at the teacher as someone committing her pupils to exclusion, to examine an excluded pupil's relationships with peers, to characterise a socially excluded pupil and to consider what the teacher can do to reduce the learners' exclusion. The criticality of reflection was achieved by framing the exploration of an issue from multiple perspectives and by requesting justification of one's point of view.

Answers to Likert-type questions were processed in an MS Excel spreadsheet. The calculations were aimed at eliciting general tendencies in the students' perspectives. The purpose was to identify which aspects of social exclusion the students consider most acute or pronounced in order to determine how to later organise the students' critical discourse about social exclusion – which questions to ask, how to frame them, etc. Hence, survey data were processed by calculating how many students rated every item in every question as significant and very significant or pronounced and very pronounced (for tables containing the numeric data, please refer to the Appendix).

Answers to open-ended questions helped seek additional nuances in the research participants' views on exclusion. The answers were analysed via qualitative content analysis (Lee & Fielding, 2004) with a view to determining in what assumptions the participants' points of view regarding social exclusion in education are grounded. Emergent coding (Stemler, 2001) was used to perform

thematic analysis (Franzosi, 2004). The insights arrived at during the numeric analysis of Likert-type questions and the research participants' additional commentaries will be briefly outlined in the following section of the paper.

Research findings

The findings illuminate the phenomenon of social exclusion in educational context from the perspective of pre-service teachers who are also former pupils. The participants make sense of social exclusion as a complex relational process which results from multiple interrelated causes and has grave effects on individual and community levels. The pre-service teachers' assumptions about social exclusion which were elicited in the study can be summarised as follows:

Assumptions about the nature of social exclusion in the classroom
- Exclusion is a violation of basic human rights
- Social interaction in the classroom is affectively loaded
- Bonds of friendship are important for coping with exclusion
- Social exclusion is a form of twisted power relations
- Exclusion is manifested as failure to appreciate diversity, as well as inequality and discrimination, lack of respect and prevalent conflicts among pupils

Assumptions about the causes of exclusion in the classroom
- Social exclusion arises due to cultural influence
- Exclusionary behaviour stems from attention deficit
- Social exclusion occurs due to lack of empathy
- Exclusion arises due to failures in upbringing
- Social exclusion can be the result of unwillingness or inability to socialise
- Social exclusion stems from unappreciated diversity
- Family's material status and lack of parents' interest in their children can cause social exclusion

Assumptions about the consequences of exclusion in the classroom
- Being excluded tarnishes the learner's image of self
- Exclusion jeopardises children's learning
- Exclusion suffered and imposed at school has grave long-term consequences
- Experiences of social exclusion have affective influence on the child
- The learners who are constantly excluded ultimately cease trying to fit in and start to distance themselves from others

Assumptions about the consequences of exclusion in the family
- Exclusion in the family undermines the child's learning at school
- Exclusion in the family challenges the child's social relationships at school
- Exclusion in the family has affective consequences on the child

Assumptions about the teacher's role with regard to exclusion
- The teacher's responsibility is to create an inclusive learning environment
- In order to diminish exclusion, children should be taught social skills
- The teacher is an example that sets the tone for the relationships in the classroom
- The teacher must be a reflexive practitioner doing her best to deal with social exclusion in her classroom

Discussion and conclusion

In this section, the different strands of findings from this study will be reviewed by weaving them into the fabric of the broader scientific discourse pertaining to this issue.

Social exclusion as a cumulative and dynamic process. The participants of the study regard social exclusion in the classroom as a cumulative and dynamic process which is constituted by various interrelated processes that tend to aggravate as they merge into one another. A child can be excluded due to various reasons that can be mutually intensifying, such as, for instance, appearance or health, learning achievement and socialisation patterns. This peculiarity of social exclusion is recognised by various scholars (Micklewright, 2002; Todman, 2004; Lelkes, 2006) who regard it as a progression or trajectory where one problem leads to another just as past leads to present and future (for instance, if a child is excluded from education, he or she is potentially excluded from opportunities to get fully included in the labour market in the future). Low educational achievement, dropout, failure to graduate or graduation with low qualifications have been proved to have direct linkages with person's employment and level of earnings, which all have compounding effect that leads to long-term social exclusion, poverty and detachment from the labour market (Jahnukainen, 2001; Klasen, 2001). The fact that pre-service teachers possess a systemic view of social exclusion is promising because it intensifies their awareness of the gravity of this issue and might strengthen their resolve and responsibility to prevent it in their classrooms.

Immediate and long-term, individual and social consequences of exclusion. The research participants are especially concerned with immediate consequences of social exclusion suffered by schoolchildren such as tarnished self-image, painful affective experiences and decreased learning achievement. Additionally, they admit that the experiences of social exclusion can stay with the person for extensive periods of time and even impact the entire course of their lives. The latter idea is extensively discussed in theoretical literature on social exclusion. Yet the focus of this discussion is the way the excluded individuals colour the communities they live in. For instance, Klasen (2001) argues that the socially excluded are likely to adopt behaviours that undermine the social order. Klasen (2001) also points to intergenerational transmission of social exclusion – namely, the children of the socially excluded require more support and resources to gain and make use of equal opportunities for participation in the society at large and education in particular. This, in its turn, is seen as undermining cohesion and sustainability of the society and country on the whole, putting in danger the stability and legitimacy of democratic governance the functioning of which essentially depends on participation and support of its citizens (Klasen, 2001). Thus, social exclusion is seen as affecting not only those who directly suffer from it, but also undermining the well-being and social sustainability of the society in general. This perspective is essentially different from the one adopted by the research participants in that the centre of their attention is the socially excluded individual rather than the community that he or she is a part of.

Rights-based approach to social exclusion. The research participants regard social exclusion as a violation of a basic human right to be accepted as part of a (learning) community. A similar perspective on social exclusion is proposed in theoretical literature where denial of participation and respect from the mainstream society is construed as a violation of a basic right of access to critical capabilities essential for integration into society which should be provided to all members of a particular community (Klasen, 2001). Thus, exclusion emerges as an unjust, morally reprehensible, twisted form of relationships. Construal of phenomena in terms of justice is extremely powerful because it is usually accompanied by strong feelings of indignation if justice is perceived as violated, which supports a personal willingness to act in order to re-establish justice (Kals & Maes, 2002). The fact that the research participants regard social exclusion through the lens of justice appears promising because it raises hope of their being inclined to maintain this justice in their subsequent professional activity.

Self-exclusion and its possible causes. The research participants highlight the fact that some learners commit themselves to self-exclusion, notably, choose to withdraw from others, are unwilling to become included in the classroom community and participate in its social processes. Research into self-exclusion occupies a special niche in discourse on social exclusion where it is defined as a phenomenon when "members of minority groups may choose to exclude themselves from the identity associated with the majority" (Bond, 2000, p. 611). Thus, despite the fact that desire for positive social relationships is one of the most universal and fundamental human needs (Maner, deWall, Baumeister, & Schaller, 2007), some people may willingly choose the non-alignment and alienation approach. The purported reasons behind such choice may be various.

Some researchers argue that these self-imposed limitations are rooted in lack of motivation to claim membership of a particular group for fear of receiving a negative reaction, in feelings of non-belonging or in the fact that the manner in which this group identity is constructed is deemed unacceptable by those choosing the self-exclusion path (Bond, 2000). Awareness of self-exclusion is important for a teacher, and the research participants demonstrate such awareness. Even more promising is the fact that they recognise the necessity to purposefully work towards helping pupils develop their social skills in order to orient them towards building inclusive relationships in the classroom rather than committing themselves to self-exclusion.

Exclusion as incitement to create new social ties. The research participants admit that building social ties such as friendship is an important coping mechanism which helps the socially excluded person deal with this unfortunate experience. In a similar vein, a study by Maner, DeWall and Baumeister (2007) suggests that people's response to exclusion is determined by their innate need for positive social connections which is mediated by their wish to avoid the physical and emotional distress caused by being excluded. Namely, people withdraw from those who are perceived as guilty of their exclusion and strive to reconnect with other potential social partners (Maner, DeWall, & Baumeister, 2007). For a teacher it is important to be aware of this innate human tendency so as to have a better understanding of the dynamics of relational processes in the classroom and to help those children who may suffer from social exclusion establish new connections.

Thus, the description of social exclusion as perceived by pre-service teachers which was arrived at in the study reported on in this paper portrays it as a complex relational process which is the result of multiple interrelated causes and can have grave long-term effects. This emerges as a promising finding because the richer and more nuanced is the teachers' understanding of social exclusion, the more ready they are to perceive and deal with it in their own teaching practice. The findings indicate that pre-service teachers consider social exclusion in education an acute problem and begin to realise their professional responsibility to prevent it. In subsequent stages of this action research cycle, the research participants might be involved in exploring their perceptions of specific knowledge, skills, attitudes, values and other qualities that they feel they already possess or still need to acquire to be equipped for dealing with exclusion in their classrooms.

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Appendix

Table 1. Pupils' characteristics as features provoking social exclusion

o.	Features	No of students who consider the feature as significant or very significant
.1	external appearance	20 (63%)
.2	behaviour	24 (75%)
.3	learning achievement or lack thereof	14 (44%)
.4	health problems, special needs	15 (47%)
.5	gender	1 (3%)
.6	religion	5 (16%)
.7	race	11 (34 %)

Table 2. Characteristics of pupils' family as features provoking social exclusion

o.	Features	No of students who consider the feature as significant or very significant
.1	material status	26 (81%)
.2	family upbringing	23 (72%)
.3	lack of parents' interest in their children's achievement, feelings, emotions	25 (78%)

Table 3. Teachers' characteristics as features provoking social exclusion

o.	Features	No of students who consider the feature as significant or very significant
.1	teacher's indifference, lack of interest	24 (75%)
.2	conflicts with teachers	24 (75%)
.3	disrespect to pupils	26 (81%)
.4	comparing pupils	28 (88%)
.5	more attention paid to a specific group of pupils (successful/unsuccessful) and neglecting others	29 (91%)
.6	lack of faith in pupils' abilities	26 (81%)
.7	dividing pupils into winners and losers	27 (84%)

o.		No of students who consider the feature as significant or very significant
.8	language barrier	18 (56%)
.9	egoism	26 (81%)
.10	inability to accept difference	25 (78%)

Table 4. Characteristics of relationships with peers as features provoking social exclusion

o.	Features	No of students who consider the feature as significant or very significant
.1	conflicts among pupils	28 (88%)
.2	inequality, discrimination	29 (91%)
.3	lack of mutual respect	27 (84%)
.4	language barrier	17 (53%)
.5	inability to accept difference	23 (72%)
.6	egoism	20 (63%)
.7	lack of empathy	19 (59%)
.8	lack of helpfulness	19 (59%)
.9	lack of cooperation	25 (78%)
.10	rejecting, ridiculing, humiliating, not accepting those who are weaker and different	29 (91%)

Table 5. Characteristics of a socially excluded pupil

o.	Features	No of students who consider the feature as pronounced or very pronounced
.1	reserved and withdrawn, does not involve in the classroom activities	23 (72%)
.2	shy, lacking self-assurance, with a low self-esteem	22 (69%)
.3	not motivated for learning	17 (53%)
.4	feels lonely, has few or no friends	26 (81%)
.5	is often humiliated, ridiculed	29 (91%)
.6	is afraid to express own opinion for fear of being criticised, ridiculed, rejected	28 (88%)
.7	has low communication skills	21 (66%)

.8	unable to form good relationships with peers	24 (75%)
.9	is afraid, lacks assurance about the future	23 (72%)
.10	unwilling to attend school	25 (78%)

Table 6. Teacher's actions aimed at reducing social exclusion

o.	Actions	No of students who consider the action as significant or very significant
.1	avoid violent and aggressive behaviour	25 (78%)
.2	try to prevent or adequately solve conflicts among pupils	28 (88%)
.3	not to allow discrimination in one's teaching and upbringing work	30 (94%)
.4	avoid categorising pupils according to their social status or academic achievement	27 (84%)
.5	do not humiliate pupils	31 (97%)
.6	treat everyone equally, but resort to individual approach when necessary	30 (94%)
.7	do not compare pupils among each other	30 (94%)
.8	prevent pupils' fear and help them feel self-assured	30 (94%)
.9	praise pupils' success	26 (81%)
.10	listen to pupils' opinions	29 (91%)
.11	not to be indifferent to pupils' feelings, needs, interrelationships and emotional experiences	30 (94%)
.12	help pupils feel safe	30 (94%)
.13	emphasise everyone's individual contribution and appreciate diversity in the classroom	29 (91%)
.14	involve everyone, not to reject anyone	30 (94%)
.15	encourage cooperation and mutual respect	30 (94%)
.16	create and sustain more spiritual relationships among the participants of the teaching and learning process	29 (91%)

Making Sense of the Ethics of Relationships between Humans and Nonhuman Nature: An Action Research Experience

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Abstract

Teaching for sustainability requires teachers' capacity to foster learners' criticality with regards to the existing and desired quality of human relationships with the world, which means that teachers themselves must possess such a critical perspective. This paper recounts an experience form an action research fragment in university setting where pre-service teachers are engaged in critical reflection on the ethical underpinnings of human relationships with nonhuman nature in the context of a study course "Environmental Pedagogy". The study seeks to identify what frames of reference the students use for making sense of these relationships and to ascertain the potential of using ethical dilemma in the learning process for promoting the learners' critical reflection on the said issue. Qualitative content analysis is used to analyse data from group discussions. The paper concludes by contemplating the potential of using ethical dilemma to promote pre-service teachers' criticality towards human-nature relationships and the role of such learning experiences in their future professional practice of teaching about and for sustainability.

Key-words: Action Research, Sense-making, Critical reflection, Ethics, Relationships between humans and nonhuman nature.

Introduction

The present paper addresses the quality of human relationships with the rest of nature, which is a central theme in discussion about sustainability, from an ethical perspective. It has become generally acknowledged that the crisis of sustainability which we are facing is fundamentally a crisis in human ways of thinking about the world and themselves within it (Hernandez & Mayur, 2000), which means that people have adopted an anthropocentric stance – placed themselves above, become alienated or excluded from the world of nature that sustains them (Berry, 2009). Such a way of thinking about the world results in an ethically questionable human treatment of nonhuman nature. Thus, if we want to change our relationships with the rest of the natural world to make them more sustainable (balanced, harmonious, symbiotic), we need to first and foremost change the way we think and feel about the world – abandon the stance of exclusion and adopt that of inclusion in the Earth's community of life. Education can help us achieve such a change (Orr, 1992), which means that the quality of education becomes an issue of acute concern. Sustainability oriented education should be critical in a sense of striving to engage learners in dialogue and reflection about their assumptions, values, beliefs, attitudes, actions and relationships (Huckle, 1996; Moore, 2005). Teacher education institutions in particular ought to seek ways to prepare teachers for implementing such education (Iliško, 2007; Salīte, 2008). This paper reports on one such effort.

Background and context of the study

The present paper recounts an experience from a fragment within an action research study which is being conducted over a period of several years in the context of my participation in the implementation of two consecutive study courses "Environmental Pedagogy" and "Education for

Sustainable Development" at the Faculty of Education and Management of Daugavpils University, Latvia. The objective of the said study courses is, by means of theoretical lectures and practical seminars, to create an environment where first-year students of professional bachelor study programmes "Preschool Teacher" and "Basic Education Teacher" can engage in an exploration of the quality of human relationships with nonhuman nature through critical reflection on theoretical readings and their personal experiences. Such learning through critical reflection on direct experiences of interaction with the world and on related moral considerations is seen as a way of seeking wisdom (Birmingham, 2003) of inclusive and therefore sustainable relationships between humans and other members of the Earth's community of life (Berry, 1999).

The focus of my broader action research, in which the fragment reported on in this paper is embedded, is twofold:

1)   On a more general level, I look to provide pre-service teachers with opportunities to reflect on relationships between humans and nonhuman nature and on the desired orientation of these relationships towards human inclusion in or exclusion from the Earth's community of life. My action research with pre-service teachers is built on an assumption that, if during their training pre-service teachers become used to approaching their and other people's relationships with nonhuman nature critically and reflexively (seeking to identify the assumptions that underpin them), they are likely to use the insights gained this way in their personal and professional lives, helping their future pupils to learn to live sustainably (Salīte, 2008).

2)   On a more personal level, I try to engage in what has become known as first-person inquiry (Bradbury & Reason, 2003) or answer the question "how can I improve what I am doing" (Whitehead, 2009). Notably, I endeavour to gain personally significant insight about the best way to organise the above-mentioned study courses so as to create conditions which would lead pre-service teachers to orient the frames of reference they use for making sense of the relationships between humans and nonhuman nature towards human inclusion in the Earth's community of life, which I perceive as a precondition for people developing sustainable relationships with the world they inhabit.

In the action research fragment reported on in this paper, my intention was to involve pre-service teachers in making sense of the ethical underpinnings of human relationships with nonhuman nature by engaging them in critical reflection on an ethical dilemma that appears to clash human interest with that of nonhuman nature. At the same time, I sought to answer the following research questions: (1) what frames of reference do the research participants use for this sense-making? and (2) what is the potential of using an ethical dilemma in the learning process in terms of promoting the learners' critical reflection on human relationships with nonhuman nature? The way the study was organised in order to reach this aim and answer these questions will be outlined in the following section of the paper.

Organisation of the study

As stated above, this paper reports on a fragment from an action research study embedded in the implementation of the study course "Environmental Pedagogy". This form of inquiry is conceived in the present study as a systematic and purposeful reflection on one's practice with a view of better understanding or improving it with benefit to individuals, communities and the broader ecology of our planet (Reason & Bradbury, 2008). Such a values orientation makes action research particularly suited for exploring relational issues not only among humans but also between humans and nonhuman nature.

Quest for personally meaningful insight or wisdom in action research (Bradbury & Reason, 2003; Salīte, Gedžūne, & Gedžūne, 2009) is cyclical and emergent – it entails repeatedly returning to previously explored issues and reviewing them in a new light or from a slightly different angle. Therefore, following an initial inquiry into the ethical underpinnings of human relationships with nonhuman nature during the autumn semester of the academic year 2011/2012, at a later stage in our action research journey (during the final seminar in the study course "Environmental

Pedagogy") the issue concerning the ethics of human relationships with nonhuman nature was resurfaced. The research participants (39 first-year female students of professional bachelor study programmes "Preschool Teacher" and "Basic Education Teacher") were invited to reflect on an ethical dilemma where the interests of nonhuman nature and humans appeared to collide. Critical reflection on the ethical dilemmas inherent in human relationships with nonhuman nature (such as should the Earth's community of life be adjusted to human needs or should humans adjust to the needs of this community; do we, humans, belong to the Earth or does the Earth belong to us; do humans have primary meaning and value and the living Earth secondary or vice versa) is recognised as a pathway towards mutually beneficial and symbiotic, i.e. sustainable relationships between humans and nonhuman nature (Berry, 2009).

My goal was to try and create conditions which would encourage critical reflection on the assumptions which pre-service teachers hold about the quality of relationships between humans and nonhuman nature and which constitute their frames of reference – metaphorical lenses for viewing the world and acting therein (Mezirow, 2000). In this study I embrace the view on critical reflection which is held by proponents of transformative learning theory (Dirkx, 1998; Kasl & Elias, 2000) who construe it as a process whereby people uncover, question and possibly even reformulate previously uncritically assimilated assumptions about themselves and the world, which determine the meanings they attribute to different issues and phenomena. According to Mezirow (2000) critical reflection begins when individuals' beliefs are problematised. Cranton (2000) goes on to explain that such problematisation entails facing a disorienting dilemma – encountering new and different viewpoints or information about a situation or an issue. Thus, I used an ethical dilemma as a means to problematise pre-service teachers' beliefs about what human relationships with nonhuman nature should be like. This was seen as an opportunity to create conditions where the students could open themselves to alternative ways of making sense of an issue, which is perceived by Cranton (2002) as the very essence of criticality.

The present study falls within the scope of the qualitative research paradigm (Brannen, 2007) which is focused on sense-making or seeking to interpret various phenomena according to the meanings that people put into them (Denzin & Lincoln, 2005). A specific ethical dilemma was used as a particular context in which to make sense of human relationships with nonhuman nature. I conceive the process of sense-making in this study as having unfolded on three levels. Firstly, the students critically reflected on the proposed ethical dilemma, i.e. formulated arguments for and against a concrete decision (reasons why a proposed course of action should be considered the best in ethical terms), discussed their argumentation in small groups and finally tried to formulate and substantiate their personal position in the proposed situation – a process which I will call *first-order sense-making* because it was performed by the research participants. Secondly, I used the method of qualitative content analysis (Granenheim & Lundman, 2004) in order to reflect on the students' sense-making and try to identify the frames of reference in which they grounded their understanding of human-nature relationships in the proposed situation – I will call it *second-order sense-making* because it was done by the researcher in order to arrive at personally meaningful insight about the participants' sense-making. Thirdly, the readers of this paper will reflect on and try to make their own personal sense of the way the study was organised and the above-described sense-making processes unfolded as well as the insights the researcher and the participants arrived at – a process I will call *third-order sense-making* because it is performed by third parties around the researcher's and the participants' sense-making. These three interrelated sense-making processes are depicted in Figure 1.
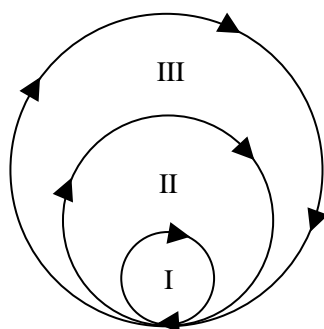
Figure 1. First-, second- and third-order sense-making in action research.

Essentially, such a perspective means that the participants, the researcher and the readers all become involved in intertwining sense-making processes which constitute inquiry in an action research study.

The context of the ethical dilemma proposed to the pre-service teachers in this study was the following:

Violet Dale is a small town whose secondary school has recently employed a new sports teacher who is eager to create a youth football team. The newly created team would unite most talented youngsters from all around the town, and the new teacher plans to prepare them for tournaments on the regional and national level. The municipality is ready to finance the project. The school sports ground is adequate for regular sports lessons but a football team would need a new, better equipped one built. The only available land site in the vicinity of the school is a forest where a colony of European rollers (Coracias garrulus) breeds. These birds are recognised by the state as an endangered species. Pro-environmentalists resist the construction of the new sports ground in the place of the forest and suggest building it in another part of the town. Opponents indicate that it wouldn't be convenient because the municipality would need to purchase the alternative land site from a private owner and the new sports ground would be located too far from the school.

The task the pre-service teachers needed to solve was formulated as follows. In groups please evaluate the situation and your perspective on it:

outline possible arguments for and against building the new sports ground near the school in the place of the forest;

formulate your final standpoint on what would be the most appropriate ethical decision in the case of the Violet Dale town – to build the new sports ground near the school or someplace else across town. Substantiate your answer.

I regard this task as fostering critical reflection because:

- the students are asked to use their imagination to envision and try on alternative ways of interpreting a situation (Mezirow, 2000);
- the students are required to evaluate their interpretations of an equivocal situation in conversation with peers (Taylor, 2000);
- the students are requested to state their reasons for embracing one or another way of thinking about a situation (Cranton, 2002).

To work on the proposed task, the 39 students organised themselves in seven groups (four groups with six participants and three groups with five). The groups worked at hexagon tables placed in a circle around the perimeter of a room. Each student was given a worksheet where the context of the dilemma was outlined, the task specified and space provided for laying out the possible arguments for and against as well as the student's personal position. The discussion in groups was followed by the students' individually filling in their worksheets (first-order sense-making). The latter were later used by me (second-order sense-making) as data sources for qualitative content analysis via emergent coding (Stemler, 2001).

During the seminar I performed a double role. Initially, I acted as a facilitator –explained the task and then retreated to the back of the room so as not to impose on the groups with my placing. Yet,

I made the point of explaining to the students that they could always turn to me to ask any questions that arose during the seminar. Such instances occurred a few times, and the questions concerned the appropriate place where to write arguments in favour and against the cutting down of the forest. While the group discussion was going on, I also performed an observer's role – monitored the group dynamics and, after the seminar, took care to analyse my observation notes in order to determine how the process of discussion and sense-making unfolded in the inquiry group (part of my second-order sense-making). Insights gained from the study will be discussed in the following section of the paper.

Insights from the study

The following pages contain an account of the insights reached in this study. I will separately review insights concerning the process and content of the performed inquiry.

Group dynamics in the process of inquiry

While reading and re-reading my notes after the seminar, underlining the occurrences and seeking an emergent pattern there, I experienced a flash of sudden insight – realised that it is possible to apply the metaphor of fire to capture and conceptualise the dynamics in the inquiry group. Metaphors are powerful vehicles for conveying a wealth of experience in a concise from – they permit to make sense of complex phenomena by mapping abstract domains onto domains of our concrete bodily experiences (Lakoff & Johnson, 1999). The conceptual metaphor of fire enabled me to paint a richer picture of the complex unfolding processes. The following pattern emerged:

Internal smouldering. To begin with, the students worked on their own – each individually read the worksheet and tried to get a general idea of the ethical dilemma proposed, to reach an initial understanding or tentative judgement of their own.

Sparking off. During the following phase in the process of inquiry, the students started interacting with their group mates by asking occasional questions or venturing some remarks. At this point, the involvement appeared somewhat timid and cautious.

From flicker to flash. After a while the sparks (ideas and questions suggested by separate students) eventually caught the group's attention, the students began interacting more actively and ultimately moved into the phase of heated discussion – ardently participated in exchanging viewpoints, substantiating their positions, questioning the propositions suggested by team mates, etc. This bright flash of active participation testified that, at that point, the fire of discussion had become well and truly established.

Steady flame. A flash, however, has a temporary nature. The brilliant blaze eventually transforms into a steady flame that gradually consumes the firewood and thereby generates heat and light. During this phase in the inquiry group an individual internal processing of information went on among the research participants – they mused over what they had heard and said, attempted to formulate their personal vision of the situation and put it on paper (write it down in their worksheets).

Wisps of smoke over dying embers. Lastly, the ending phase in the inquiry process experienced by the groups was highlighted by the participants' quietly sharing their final insights and impressions from working together to make sense of the proposed ethical dilemma. I saw these occasional comments and the reactions they evoked as light wisps of smoke that drift over the still glowing embers when the fire has all but died down.

Thus, my experience from this study has led me as an action researcher to embrace the overarching metaphor of fire as well-suited for making sense of group dynamics in action research (second-order sense-making around first-order sense-making). I cherish the hope that other researchers might use this insight in making sense of their own research so as to gain a richer understanding of how the participants negotiate the process of inquiry or, as stated elsewhere in action research literature (Hyland, 2009), of how the communicative space in an inquiry group emerges, opens up and eventually closes down. McArdle (2008) emphasises that group dynamics in action research is a complex issue which requires a lot from the researcher/facilitator in terms of an ability to

monitor the proceedings, identify possible tensions and make decisions on how to help the group rise to meet these challenges. I believe that a metaphoric view on the group dynamics characteristic of inquiry processes in action research can aid the researcher by rendering the facilitator's role less daunting and making occurrences in the process of group inquiry more easily identifiable.

Ethical underpinnings of human relationships with nonhuman nature

The insights I gained from qualitative content analysis of the data in the participants' worksheets, i.e. second-order sense-making or my sense-making of the students' sense-making, will now be presented in discussion with theoretical literature as is generally accepted in action research accounts (Herr & Anderson, 2005). Such a way of reporting on the findings from inquiry, notably, framing the researcher's claims and conclusions within the broader scientific discourse, is recognised as a means to increase the quality of a given action research study (Bradbury & Reason, 2003).

While qualitatively analysing the information obtained from student worksheets, I viewed the data in three blocks: (A) arguments in favour of cutting down the forest to build a sports ground, (B) arguments against it and (C) final decisions in the dilemma.

A. Arguments in favour: prioritising human interest

I made sense of the arguments that the research participants proposed in favour of cutting down the forest as arguments giving priority to human interest (Table 1) in a case when it appeared to collide with the interest of non-human nature.

Type of interest	Categories	Examples of content units	Tally
Practical interest	Convenient and quick access	*If the sports ground is located near the school, youngsters won't have any problems getting there, they won't have to travel far*	33
	Safety of youth	*Youngsters would be safe because they wouldn't need to go too far to reach the sports ground, for we don't know how late the training sessions would be held and how late they would have to travel to another part of town*	7
	Townspeople's health	*If we cut down the forest, we reduce the risk to catch tick-bone encephalitis*	1
Financial interest	Reduced construction costs	*The municipality wouldn't need to spend money on buying another plot*	18
	Reduced exploitation costs	*It would reduce other costs like transport costs for the school and the children*	15
	Profit from wood	*Additional income from the trees cut down in the forest – by selling them*	2
Educational interest	Physical development of youth	*The physical condition of youth would improve*	9
	Developing youth talents	*Youngsters who like football could show and develop their talent*	19
	Sensible leisure activities	*Owing to this sports ground, youngsters will have things to do and less time for bad habits – alcohol, drugs*	21
Social interest	Strengthening social ties among youth	*The aim is to consolidate the public (youth) in the town*	3
	Strengthening social ties between youth and parents	*Or parents would go with them [children] to see it all [trainings, games]*	1
	Patriotism, popularisation of the town/state in the area of sport	*The football team would represent their town and state*	13
Deviant cases	Naive suggestions to relocate the bird colony elsewhere	*I would probably relocate the colony of endangered and rare rollers deeper in the forest or to another safer forest*	1

Table 1: Arguments in favour of cutting down the forest to build a sports ground: protection of human interest.

As seen from Table 1, the research participants proposed numerous arguments in support of human interest in the ethical dilemma that seemed to clash the wellbeing of humans and nonhuman nature. The participants being pre-service teachers, the greatest number of arguments is, perhaps not surprisingly, related to educational interest that humans have in the building of a new sports ground. Practical, financial and social gains were also acknowledged, though to a somewhat lesser extent. I believe that Table 1 illustrates what is known in theoretical literature as an anthropocentric perspective on the ethical underpinnings of relationships between humans and nonhuman nature – human moral duties regarding ways to treat nature are derived from human moral duties to themselves (Taylor, 2011). I regard this perspective as grounded in an

anthropocentric frame of reference. The latter is characterised by the following core assumptions which are extensively discussed in philosophical literature on environmental issues:

humans are essentially separate from and superior to nature which means that the interest of nonhuman nature is secondary to human interest (Rolston, 1988);

the natural world exists for the sole purpose of helping humans realise their aims and increase their wellbeing (Keller, 2010);

nonhuman nature is a resource and a property, hence humans have privileges but no direct duty with regard to it (Leopold, 2003);

nonhuman nature possesses a mere instrumental value, i.e. serves to satisfy human needs and wants (Berry, 1999);

humans are merely indirectly morally accountable for the effect of their actions towards nature – only if it involves human interest (Curry, 2006).

Such a frame of reference entails human exclusion from the world of nature – a figurative severing of bonds with it, disconnect, estrangement and detachment. I believe that, by proposing arguments in favour of cutting down the forest in the context of the suggested ethical dilemma, the students implicitly described such a frame of reference.

B. Arguments against: balancing the interest of humans and nonhuman nature

The arguments that the research participants proposed against cutting down the forest highlighted human interest or that of nonhuman nature, or attempted to reconcile the two (Table 2).

Type of interest	Categories	Examples of content units	Tally
Human interest	Health	*The forest „purifies the air", which is of benefit to pupils' health*	19
	Economic benefit	*Unnecessary expenses for cutting down the forest*	2
	Recreation in nature	*Unethical towards people who live in the vicinity and go to the forest to relax and let their thoughts wander, now they would face a brick wall*	11
	Aesthetic pleasure from nature	*[The construction] will destroy the beautiful landscape*	6
	Ecologically ethical upbringing of the young generation	*By deciding in favour of construction, we would show a bad example to children. They might start thinking that nature does not matter to humans*	2
Nonhuman nature's interest	Survival of various living organisms	*All the rest of the little animals will die, and plants too*	9
	Continued existence of an endangered species	*A colony of rollers live in this forest, and it's an endangered species. But if they build a sports ground in the place of the forest, it [the species] will be threatened and can even become extinct. But that cannot be allowed.*	33
	Integrity of the local ecosystem	*The ecosystem of the area will be threatened*	33
	Animal's rights to safe life and home	*We should protect all that lives in this forest, because it is their home and you can't break into it just like that and destroy everything*	18
	Moral necessity to take care of nature derived from its intrinsic value	*You can't be cruel to nature, you have to think and care for it rather than consider it as a mechanism in your hands which you can treat in whichever way you like*	1
	Denouncement of anthropocentrism and egocentrism	*[According to] human egocentrism, it's better to cut down a forest merely to avoid traversing greater distances*	7

Reconciling human interest and that of nonhuman nature	Aim of harmonious co-existence	*Each person should show more compassion and helpfulness. One must live in harmony with people and nature, and then one will be a happy person*	1
	Principle of minimal harm	*We can't let the aim justify the means, we must act in a way which would harm other creatures as little as possible*	1

Table 2: Arguments against cutting down the forest to build a sports ground: protection of human interest and that of nonhuman nature.

The first set of arguments against the cutting down of the forest which are outlined in Table 2 defends different kinds of human interest. These arguments can be viewed in terms of the instrumental value that humans attribute to nonhuman nature. In this respect Rolston's (1988) distinction between life-support value, economic value, recreational value, aesthetic value and character building value carried by nature appears appropriate. All these kinds of value can be identified in the arguments proposed by the research participants. In this frame of reference, which is known as weak anthropocentrism (Taylor, 2011), harming nature is seen as morally reprehensible because of reduced human chances to benefit from it now and in future in terms of aesthetic pleasure, recreation, profit and the like. Protection of nature is still rooted in taking care of human interest.

Alternatively, the second group of arguments presented in Table 2 directly advocates the interest of nonhuman nature and perceives its protection as ethically right. These arguments (more than double the total number in the first group) can be regarded as evidences of a more or less holistic perspective on nonhuman nature – ranging from a focus on the wellbeing of individual organisms to species to entire ecosystems. In the theory of environmental ethics, concern for living entities and wholes is conceptualised as moral individualism or moral holism (Palmer, 2003). The second set of arguments presented in Table 2 exhibits traces of both these perspectives.

Direct attempts to reconcile the interest of humans and nonhuman nature only emerged in two of the instances (Table 2). I have come to conclude that students' reasoning in the case of being asked to provide arguments which would condemn destruction of a local ecosystem as unethical in the proposed dilemma is grounded in a mixed (anthropocentric-ecocentric) frame of reference. On the one hand (first section of Table 2), their argumentation in favour of nature protection is rooted in concern for humans being able to continuously benefit from nature in terms of sustenance, economic profit, aesthetic pleasure, recreation, etc. (anthropocentrically oriented environmental concern). On the other hand (second section of Table 2), the students also suggest arguments which indicate direct concern for nonhuman natural entities and wholes (ecocentrically oriented environmental concern). This set of arguments which directly protects the interests of nonhuman nature implies the following core assumptions about human-nature relationships:

the world is a whole – a community of life or a living web of interrelated and interdependent parts (Capra, 1982);

natural entities and systems are intrinsically morally valuable (valuable in their own right by virtue of being alive) and hence our duty is to protect their wellbeing, treat them with respect and care (Rolston, 1988);

humans are directly morally accountable for the effects of their actions on individual nonhuman natural entities and on nature as a whole irrespective of the effects of these actions on humans (Callicott, 1997).

Thus, the frame of reference through which the research participants make sense of the harming of nonhuman nature performed by a hypothetical community as morally reprehensible, appears to be mixed, notably, anthropocentrically-ecocentrically oriented or rooted in direct concern for human interest as well as that of nonhuman nature.

C. Final decision: choosing between protection of human interest or that of nonhuman nature

Lastly, I made sense of the types of the personal final decisions (for /against) that the research participants formulated in the ethical dilemma proposed for their consideration in terms of the orientation of the former towards protection of human interest or that of nonhuman nature.

Additionally, I regarded these decisions as being grounded in specific frames of reference that the research participants use for making sense of the ethics of their personal relationships with nonhuman nature (Table 3).

Type of decision	Type of interest	Frame of reference	Tally
For because of the benefit to	Human interest	Anthropocentric frame of reference	**2**
Against because of threat to	Human interest	Anthropocentric frame of reference	**0**
	Nonhuman nature's interest	Ecocentric frame of reference	**15**
	Human and non-human nature's interest	Anthropocentric-ecocentric frame of reference	**21**
Deviant cases	*Unidentifiable position*	*Unidentifiable frame of reference*	**1**
TOTAL			**39**

Table 3: Types of decisions in the ethical dilemma to cut down the forest in order to build a sports ground.

An analysis of the personal decisions made by the research participants in the proposed ethical dilemma implies the following tendencies in the inquiry group:

the majority of the research participants make sense of the ethical underpinnings of their relationships with nonhuman nature by using mixed (anthropocentric-ecocentric) frames of reference,

a considerable number of students regard this issue through ecocentric frames of reference,

only a few students view the ethical underpinnings of their relationships with nonhuman nature through anthropocentric frames of reference.

A comparison of these tendencies with those elicited from Table 2 suggests some interesting conclusions. It appears that, when required to provide arguments that would condemn the destruction of a local ecosystem and its inhabitants performed by third parties as morally reprehensible, the research participants proposed distinct arguments that were rooted in concern for human interest or that of nonhuman nature, and only a few arguments exemplified an attempt to reconcile these two kinds of interest. Nevertheless, when asked to outline their final personal decision in the proposed ethical dilemma, more than half of the research participants claim it is possible to reconcile human interest with that of nonhuman nature. In this case human interest and that of nonhuman nature is seen as interlinked. What is perceived as harming nature is by extension perceived as harming humans as well. Conversely, actions judged as benefitting nature are simultaneously regarded as benefitting humans. This tendency suggests that on a personal level the research participants appear inclined to perceive themselves as deeply interrelated and interdependent with nonhuman nature – in other words, included in the Earth's community of life.

In theoretical literature human inclusion in the world of nature is seen as characterised by such features as connectedness through identification and emotional affinity through empathy (Schultz, 2002; Schultz, Shiver, Tabanico, & Khazian, 2004) as well as appraising human-nature relationships in terms of justice (Kals & Maes, 2002; Opotow, Gerson, & Woodside, 2010). Key themes identified in the utterances made by the students when substantiating their final personal decision in the proposed ethical dilemma highlight similar ideas:

- Empathetic identification with other forms of life
  It is a home to the animals, a place where they live. Suppose our home was taken away from us, we wouldn't feel very well about it... That is why the best variant would be to build the sports ground in another area of the town.
- Extending the scope of justice to include other forms of life

> *I think it would be unethical and egoistic if due to the sports ground some species and animals started to die out. We are not superior to them and we must also consider other forms of life.*
>
> *Nature also has its rights and we can't violate them, we must be united.*

- Systemic, long-term perspective on the Earth's community of life

  If rollers disappear, other species may also become extinct because all species are interrelated (..) One can save up money and buy whatever one wants but one can't treat nature as money because it takes decades for macro- and micro- ecosystems to renew themselves.

- Spiritual fulfilment from appreciation of human instinctive belonging to the Earth's community of life

Humans will be able to feel their belonging to nature and gratification in being able not only to take from nature but also help her in some way and consequently help themselves.

Thus, the study warrants a conclusion that the frames of reference which a great part of the research participants use for making sense of their personal relationships with nonhuman nature are essentially inclusive, i.e. constituted by assumptions about the research participants inclusion in the Earth's community of life. The opportunity provided by the study course to engage in critical reflection about human relationships with nonhuman nature enabled the students to review this issue from different angles and clarify their own (inclusive) position regarding the desirable and ethically justifiable quality of these relationships.

Miles, Harrison, and Cutter-Mackenzie (2008) review a number of empirical studies which confirm that the environmental education experiences teachers gain during their training years are a major force that determines the nature of their future pedagogical practice. Pace (2010) goes on to state that for teachers to be able to help children become environmentally responsible, they themselves need to build on their personal environmental ethic and develop an individual disposition towards environmental education during pre-service training. This body of evidence supports my hope that the experiences of critical reflection on the ethical underpinnings of human relationships with the world that the research participants gained in the study course "Environmental Pedagogy" will prove valuable by helping them become teachers who are oriented towards forging inclusive and therefore sustainable relationships with the world and who will ground their future work with pupils in this orientation. For, as Schultz (2002) puts it, greater human inclusion in nature is the only path towards sustainability.

Conclusion

This paper shares an experience from a fragment of action research with pre-service teachers conducted in the context of implementing consecutive study courses "Environmental Pedagogy" and "Education for Sustainable Development" at a regional university. In this action research account I propose the conceptual metaphor of fire as a suitable means for action researchers to make sense of the group dynamics in the process of inquiry and trace how the communicative space in an inquiry group becomes established, opens up and eventually closes down. The conceptual metaphor of fire paints a richer picture of the inquiry process, which should make it easier for the researchers to identify any tensions they might need to help the participants address as their inquiry unfolds.

The processes of sense-making inherent in action research are regarded as occurring on three levels: (1) first-order sense-making by the research participants, (2) second-order sense-making by the researcher and (3) third-order sense-making by the readers of the action research account. Such a perspective means that the participants, the researcher and the readers all become involved in intertwining sense-making processes which constitute inquiry in action research.

The action research fragment reported on in this paper continued to engage pre-service teachers in critical reflection on the ethical underpinnings of human relationships with nonhuman nature. The criticality of the learning experience was achieved (1) by proposing for the students' consideration a dilemma which seemingly clashed human interest with that of nonhuman nature, (2) by asking the students to envisage alternative ways of making sense of this equivocal situation and discuss them with peers and (3) by requiring the students to choose and substantiate what they personally construe as an ethical course of action in the proposed dilemma and state reasons for their choice. This way, the pre-service teachers' habitual beliefs about human-nature relationships were problematised and alternative ways of framing this issue were examined discursively and cooperatively. The study suggests that ethical dilemma can be used as a means to promote pre-service teachers' critical reflection on human relationships with nonhuman nature.

At first glance, the insights gained from this study appear somewhat controversial. On the one hand, it suggests that, when faced with a need to judge if the harming of nature to increase human wellbeing performed by a hypothetical community is ethical, the research participants tend to use frames of reference that lead them to make sense of the interest of humans and nonhuman nature as essentially conflicting and irreconcilable. It means that the research participants see other people in general as living in a way that indicates their detachment from nature. The students do not regard the human species as fully included in the Earth's community of life in which the interest of the whole and its parts becomes merged since the wellbeing of one depends on that of the other and vice versa. At the same time, when asked to state their personal position in a dilemma that appears to clash human interest with that of nonhuman nature, more than half of the research participants claim that these can be reconciled. It implies that on a personal level the students' make sense of their own relationships with nonhuman nature through frames of reference that acknowledge their inclusion in the Earth's community of life where the interest of the whole and all its parts is interrelated and interdependent. Thus, the students appear to position themselves as included in the living world of nature while positioning people in general as excluded from it.

Utterances generated by the research participants when substantiating their personal perspective on the proposed ethical dilemma imply that their relationships with nonhuman nature are inclusive. The inclusive quality of these relationships is discernable from such key themes as empathetic identification with other forms of life, extending the scope of justice to include other forms of life, adopting a systemic, long-term perspective on the Earth's community of life and acknowledging the spiritual fulfilment derived from appreciation of human instinctive belonging to the Earth's community of life.

The study suggests that, when continuing the implementation of the study courses "Environmental Pedagogy" and "Education for Sustainable Development" in future, further attempts should be made to clarify how pre-service teachers view their personal positioning in the Earth's community of life and the general positioning of the human species. To do that, conditions should be created where students could engage in critical reflection on the assumptions that determine the way they

make sense of human relationships with nonhuman nature and the orientation of these relationships towards inclusion in or exclusion from the Earth's community of life. Such experiences gained during training years develop a stance of criticality in future teachers, which is highly important for their professional practice since teaching for sustainability essentially entails fostering the learners' critical perspective on the quality of human relationship with the world as ways are sought to improve it. In order to teach criticality, teachers must, in the first place, develop it in themselves; likewise in order to help their pupils reach ethically grounded environmental perspectives, teachers must first construct their own environmental ethic.

Acknowledgement

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Renewable Energy Education in Greece: Motivating a Sustainable Development

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Abstract

The utilization of renewable energy sources and the application of environmentally friendly energy technologies are essential to sustainable development and certainly help to ensure the quality of life and prosperity for future generations. Greece has considerable potential for renewable energy sources due to its geographical position. The use of renewable energy as a topic for study energy and its forms permits teachers to motivate students, especially in energy-related topics, in order to take environmental conscience with a novel way.

This paper presents the analysis and classification of renewable energy sources and their origin. Also, it presents the development of didactic methods in learning arrangements for teachers, applied in the new curriculum of compulsory education, intending to motivate students in energy topics related to renewable energy sources in Greece.

Key-words: Renewable Energy Education, Education for Sustainable Development, Motivation

Introduction

Energy is one of the most important factors for social development with great contribution to economic growth and quality of life. All kinds of activity in any developed and developing country, demand energy consumption. The global demand in energy presents a continuous and incremental trend, rendering the dependency on fossil fuels (carbon, gas and oil) stronger. If there is no important variation of energy policies till 2030, it is expected, that the total consumption and particularly the use of fossil fuels to be increased with higher rate than now.

Fossil fuels offer several advantages. They are widely available, the infrastructure exists and they are relatively cheap to extract and easy to use. However, there are three main disadvantages. First, their combustion emits pollutants and greenhouse gases, the main cause for climate change. Furthermore, countries without adequate reserves of fossil fuels facing incremental risk to energy security because the oil's world's stock is limited. That is due to excessive usage of non-renewable energy sources that leads to energy crisis and environmental pollution, primarily affecting human health (BP Energy Outlook 2030, 2011).

The necessary steps in solving energy problem are energy saving and usage of appropriate renewable energy sources (RES) for each region, as substitute for fossil fuels. Renewable energy sources (RES) are viable forms of energy derived from various natural elements such as wind, geothermal fields, water movement, solar radiation, biomass and others. In principle, the exploitation does not require any active intervention such as mining, extracting, burning, in contrast with fossil fuels. It is "clean" energy, environmental friendly, not releasing hydrocarbons and carbon dioxide or toxic/radioactive wastes as other sources do. Therefore, renewable energy can help tackling climate change and meet the targets set for reducing global greenhouse gas emissions. Also enables the security of supply by boosting diversification of energy production and contributes to "sustainable development" (Educational programmes Kallisto, 2008). Renewable energy sources appear to be the one of the most efficient and effective solutions for sustainable energy development and a serious alternative for environmental pollution prevention.

According to texts of UNESCO, UNECE and UNEP (ESD UNESCO, 2005;UNEP, 2008; UNECE, 2005), energy education, particularly renewable energy education, will be a new discipline that both developed and developing countries should take into account when considering their energy, environmental and educational policies. Many countries have lack of a structured framework for providing energy education and particularly renewable energy education. Energy in itself has not been regarded as a separate discipline of education but as a part of their curricula. Usually energy related issues occupy a very small part of formal education, primarily through topics from Science curriculum (Physics, Chemistry and Biology). Because the courses are determined by social, cultural, economic and technological developments and the impact of these to the environment, national educational policies need to plan required changes in their curricula at different educational levels. These will integrate energy and environment related concepts, units and activities, providing answers on everyday problems and making citizens aware of the need to protect their environment. Starting at the Rio Summit in 1992 (UNCED, 1992) and Johannesburg in 2002 (UNESCO, 2002), the Education for Sustainable Development as a concept founded and oriented towards the adoption of a new educational project develops arrangements in favor of environment and human beings through reflection and development of critical thinking. The decade 2005-2014 is characterized by the United Nations as the «Decade of Education for Sustainable Development» (Combes, 2005). According to the UNESCO, UNECE and UNEP, the general principles of Education for Sustainable Development aim to impart knowledge, skills and abilities, positive attitudes and behaviors toward a more prudent use of energy individually, nationally and internationally.

Renewable energy education in Greece

Greece is an energy importing country. The energy dependence of Greece is on the level of 71.9% in 2006, according to the European Statistical Office (Eurostat), that is more than half of the energy requirement has been supplied by imports, mainly oil (EU, 2006). There is a steady trend of substitution of oil with natural gas primarily. In addition, the fact that Greece has limited fossil fuel resources seems to propose a gradual shift from fossil fuels to alternative energy sources, such as renewable energy.

Greece's lignite reserves are limited and Greek lignite is characterized by low calorific value and relatively high ash content. The power plants are the main source of emissions, and the responsible ones for the release of 43% of greenhouse gases. Greece has the two most polluting power plants across Europe (St. Demetrios and Kardia in Northern Greece). Due to increasing energy consumption, air pollution is becoming a great environmental concern, important for the country's future and has to be addressed without delay. Thus, renewable energy sources (RES) appear to be a satisfactory and feasible solution for sustainable energy development in Greece and able to tackle environmental pollution. They are replenished through natural cycles that are practically inexhaustible and their utilization for energy production does not burden the environment. Greece has considerable potential for renewable energy production, even for exportation to other European countries. There can be a wide usage of most forms of renewable energy sources that can offer the sole alternative for Greece to cover a significant part of energy needs of the country, contributing to the reduction of fossil fuel dependence (School Curricula for Obligatory Education - Greece, 2003).

As mentioned above, energy sector and development of this sector are vital for Greece. For this purpose, renewable energy education and more broadly energy education has to have the young population as its target audience. The specific objectives of desirable program of energy education is to develop an awareness among students about the various types of non-renewable and renewable sources of energy, to develop functional values and attitudes towards utilization of energy sources, to make the students understand the consequences of various energy related policies, to enable the students to suggest alternative strategies towards solving energy and environmental problems such as overconsumption, depletion of natural resources, environmental degradation, etc. In the Greek curriculum, the subject of energy is not pictured with all its own

aspects but as part of other modules, such as physics, chemistry, and biology. The students are just exposed to some relevant aspects (of energy conservation, production, conversion, transmission and distribution, extraction, utilization, etc.) but not holistically. Furthermore, these independent modules of the curriculum related to energy issues are not offered to the students at any levels of formal compulsory education. Energy is considered a very special topic and all its relevant dimensions are considered to be studied in considerable details in Higher Education.

Additionally, in the field of innovative activities, the Environmental Education program related to renewable energy issues is voluntarily implemented by teachers and student groups and is not offered to all students. The Environmental Education program is part of compulsory education with purpose of raising the awareness about the problems associated with natural and social environment. A number of special programs are in motion to contribute on the overall effort. Through these activities, environmental education takes its own time to school curriculum, for teachers and students who take into consideration environmental and educational factors and want to be aware of the need to protect their environment. Because energy is closely linked to concern for environment, energy education and environmental education should be linked and both include modules of renewable energy sources (RES) (Environmental Education - Greece,1990; Digital School- Greece, 2003).

The Pedagogical Institute which is responsible for educational reform proposals in Greece, has introduced a new curriculum, which is an interdisciplinary structured framework, for providing compulsory education. In detail, at the fourth, fifth and sixth classes of primary school, this curriculum emphasizes specifically on teaching concepts of energy such as energy conservation, energy principles and interactions. The didactic approach of the subject is determined by factors such as the age and the mental abilities of the students and focuses mainly on understanding the usefulness of energy, especially electricity, in everyday life and also, the ways of saving energy.

In secondary school students have to understand the concept of energy in itself through some of its relevant aspects (such as relation between energy- work, forms of energy and conversions between them, the principle of energy conservation, particularly understanding electricity and Joule's Law through the study of electrical circuits and their components, dynamic and kinetic energy of oscillations, nuclear reactions and nuclear energy with particular focus on the fundamental principal that matter and energy are interrelated).

Desirable didactic aims of the new curriculum at the level of secondary school are as follows: it should make students seek and acquire knowledge, it should develop independent and critical thinking, it should provide constant contact with scientific thinking and scientific methods (as observation, concentration - using information from various sources, hypothetical solutions, experimental control, data analysis and interpretation, conclusions, generalization capability and manufacturing standards) in accordance with the level of mental development and interests of students.

Also, the new curriculum introduces the interdisciplinary learning approach, including the development of projects, sometimes with environmental subjects which link school with society.

This reform of the Greek curriculum, despite of its positive elements, contains a fundamental contradiction. It attempts to combine the contents of a rigid curriculum, with interdisciplinary approaches which demand a flexible and dynamic curriculum. Greek teachers have to teach the required by the curriculum scientific subjects but the main task of the modern school is to help students to become critical thinkers.

Motivating Education for sustainable development

A new pilot curriculum
In 2011 a new pilot curriculum has been introduced at 68 secondary schools, 99 day primary schools and 21 kindergartens in Greece, including the field "Education for Environment and Sustainable Development".
The new features of the new pilot curriculum are:
- Is goal oriented (emphasis to the expected learning outcomes in each module).

- Has main principles such as: a) initiation in research techniques, b) understanding of basic concepts, processes and events, c) communication and collaboration and d) connection with real life.
- Introduces the use of multiple teaching tools and materials (of textbooks, from digital school, from internet's authoritative sources, etc.).
- Provides indicative teaching activities per module but considers desirable throughout the educative process that teachers themselves to develop their own didactic activities and educational materials.
- Is characterized by continuity in each scientific field throughout compulsory education (from kindergarten to secondary school) avoiding partial presentations and continual revisions of scientific subjects of the past.
- Introduces the discovery learning by:
- implementing horizontally in all scientific subjects the project based learning as well as including a special zone in the educative program based on active learning and creative activities for a number of scientific subjects (e.g. Environmental Education, Health Education, School and Social Life, Technology, etc.)
- Is emphasizing not only in the content but also in the specific methodological tools and learning procedures of each scientific field (e.g., experimental work in the Physical Sciences, search sources and evidence in the Social Sciences).
- Provides a balance between theory and practical aspects and involves all aspects of teaching.

The new pilot curriculum has been developed for different levels, from kindergarten to secondary school, and for different audiences. It is developed in such a way that the degree of difficulty and complexity of approaching scientific issues is consistent with the age, intelligence and emotional development of students. Furthermore, the content of the scientific issues should be consistent with the existing, till now, scientific disciplines and with the study requirements of students. Each of the scientific topics is approached in more than one class, with an increasing degree of difficulty, to reveal different aspects of the scientific issue or problem. Students throughout compulsory education should be able to clarify and to interface the new with the prior knowledge and should be developing higher-order thinking skills and tasks: analysis, synthesis and evaluation. The new pilot curriculum should be capable of providing energy education to all students in a minimum amount of knowledge and skills so that the maximum number of students may be educated within the existing didactic procedures. So, it includes the field "Education for Environment and Sustainable Development" which is broader than environmental education and it is taught at all levels of compulsory education. It should be an independent educational activity based on active learning that includes all principles and values of sustainable development with particular emphasis on some specific ones depending upon the needs and characteristics of fields with similar scientific issues and activities of the pilot curriculum. Its aim should be to identify and investigate environmental issues and problems and seek to decide how teaching about energy education should be done and what should be taught about. Its goals and objectives based on constructive and discovery learning.

The pilot curriculum focuses on local, national and global environmental issues. Subjects that are presented on teaching per educational cycle are:
- 1st step/cycle (Kindergarten, first and second class of primary school): Study mainly local environmental issues to the immediate environment of children,
- 2nd step/cycle (third, fourth, fifth and sixth class of primary school): Study mainly local and national environmental issues,
- 3rd step/cycle (first, second and third class of secondary school): Study of local, national and global environmental issues.

The Education for Sustainable Development includes topics as follows:
- Basic human needs.
- Human rights and values such as freedom, justice, solidarity, responsibility, self-respect, etc.
- Interdependence / interaction between human and natural environment.

- Sustainable production and consumption and link local and global chain.
- Ecological footprint.
- Precautionary principles.

Its key issues are:
- Environment and Health
- Management of Water Resources
- Geopolitics/ Quality of soil and subsoil
- Sustainable Forest Management
- Biodiversity
- Energy Ecological Footprint
- Climate Change
- Environmental and Biotechnological Applications
- Sustainable Residence and Sustainable School
- Sustainable Production and Consumption
- Heritage-Cultural Diversity
- Environment and Social Issues and Human Relations
- Urban, rural, coastal and island regions Development
- Natural and Technological Disasters- Environmental Crisis Management

The principal aim of Education for Sustainable Development is to create environmental awareness and interest among the students and also to provide first-hand exposure to the basic concepts and their applications for an 'environmental literate society', able to make decisions on environmental subjects.

The educational approach

Cooperative/collaborative process is the principal educational approach that is proposed in the pilot curriculum. It is a team process with not pre-defined number of students for every team but the number of members is determined by teacher's criteria such as the total number of students, students' age, intelligence and the aspects of agreed topic, that is they are teacher's assigned groups. An important role should be playing the availability of teaching materials, of classrooms, of sufficiently trained teachers.

A good learning team should meet specifications such as:
- Four to six students. Larger teams have difficulty in keeping everyone involved
- Mixed groups (in terms of gender and school performance)
- Set specific time to work
- Definition of subject studied and researched
- Providing resources (materials, equipment, etc.)
- Valuation standards

The teacher encourages team members, facilitates discussion with a creative way and suggests alternatives but does not impose solutions on the team, especially those having difficulty working together. Team members support and rely on each other to achieve the agreed goal.

All learning arrangements are based on discovery learning and on 'learning by doing' that develop competencies for constructing meanings by students based on prior knowledge. To share a common goal, to be accountable to others, and they be accountable to you, to depend on others, and they depend on you, characterize this educational approach and its teaching objectives.

Also, the above interactive-based learning method and its instruments used seem to be highly attractive for students. Students play an active role in the systematic improvement processes of the schools and achieve synergy effects, as it is intended, by doing projects together, by empowering each other to speak and contribute and by developing team-building skills that they will need later in their life.

The main educational procedures adopted are problem-solving and project methods, functioning optimally in cooperative process.

Within the above mentioned methods more specific strategies are included such as:
- Discussion

- Concept mapping
- Survey
- Library research
- Experimental demonstration workshop
- Field trip
- Case study
- Debate
- Role playing

The new pilot curriculum is goal oriented and gives emphasis to the objectives, not only to the integration of the required school material and proposes alternative subjects or contents to be taught. It provides the opportunity to teachers, in collaboration with students, to offer to students the choice of studying subjects according to their interests and to fulfill their goal implementation.

The use of ICTs as a mean of teaching and learning

While all educators realize that the use of Information and Communications Technology (ICT) can be a valuable resource for improving teaching and learning, the process of integrating technology into a technological curriculum in the context of Renewable Energy Education is a challenging one. It challenges educators reconsidering the teaching practice, the curriculum, the role of teachers and the ways in which ICT can be incorporated in order to maximize educational outcomes. ICTs, multimedia and Web 2.0 tools should be adopted for educational and communicational applications in Renewable Energy Education as means to:

- Assist, generate learning and create critical thinking.
- Provide students with a variety of experiences and contexts to integrate into their skills and knowledge both in and out of school.
- Provide skills in analysis and problem-solving, the ability to communicate ideas and information and to collaborate with others
- Provide student with opportunities and examples with good practices to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.

The user-friendly and interactivity features of ICT's tools involve user's participation while the visual and audio elements are able to engage and retain users' concentration.

The above highlights the need for provision of effective professional development to teachers to be able identifying the educational issues involved in the integration of ICT adequately. Teachers need to go beyond training in technical competence and the use of the technology merely as a tool. The major role and importance of Information Technology in Renewable Energy education is its usage to:

- Improve the participants' knowledge.
- Increase the participants' awareness.
- Influence the participants' investment decision.
- Influence the participants' adoption behavior.

Renewable energy education

Renewable energy education has a crucial role in the development of awareness among students about environmental issues. This environmental and renewable energy awareness should be improved for a sustainable development, and also, at the development of innovative approaches for the analyses and solution of problems. Therefore, many developed and developing countries have been planning to make required changes in their educational programs to integrate some energy and environment related concepts, units, activities, etc. into their curricula at different levels.

According to the new pilot curriculum in Greece, a compulsory-education focus on renewable energy education is particularly important, for this may be the only formal education students receive. The attitudes about energy inculcated at this time might have a profound effect, not only on the students, but also on their parents if they follow their children's schoolwork. For this reason, the new pilot curriculum introduces the field "Education for Environment and Sustainable Development", as a novel way to motivate students in energy topics related to renewable sources, particularly those who energy topics taking conscience with the environment.

The features of the field "Education for Environment and Sustainable Development"are as follows:

- Knowledge of renewable energy education is progressively presented in accordance with the age of students.
- It includes all energy resources with particular emphasis on some specific ones depending upon the local needs and characteristics and covers all aspects of energy technologies such as resource assessment, technology, economics, energy, social and cultural issues, and ecological and environmental impacts.
- Its teaching is based on active learning and it involves all aspects of teaching including lectures, laboratories, demonstrations, hands-on skills training, design, etc.
- Key concepts are "Energy - Sustainability".
- The creation of new knowledge is based on prior knowledge and experiences of students throughout the discovery learning, 'learning by doing' and collaborative learning strategies.
- It uses information and communications technologies in learning arrangements such as office-files, VLEs, multimedia design, Web 2.0 tools and uses the technology as a tool of collaboration among students.
- It promotes the social learning and the exchange of experiences for building knowledge throughout the problem-solving process.
- It brings the school closer to the real world.
- It adopts descriptive assessment which gives much more information and better feedback about students, overcoming the simple score as a unique way to evaluate students.
- It gives the opportunity of self-assessment to the student.

Teaching procedure of environmental education follows the steps:

1. *What is the environmental subject or problem?*
2. *What are the sub-subjects?*
3. *What are the main goal and the objectives?*
4. *What are the required activities?*
5. *How and what we assess?*

It is now widely accepted that renewable energy education should be included in the curricula at different levels of education in schools, universities, colleges and various other academic institutes. Because renewable energy education is a relatively new field, it is essential to develop and implement a well-designed energy education program including environmental issues oriented to compulsory education level.

Conclusion

Schools will be the keystone in preparing, empowering and encouraging students to assume responsibility for creating and enjoying a sustainable future. Such a vision for school education is transformative. It is more than a curriculum issue and requires a holistic school approach and

innovative teaching and learning (Australian Government Department of the Environment and Heritage, 2005).

The aims of renewable energy education should improve the environmental and renewable energy awareness of students for a sustainable development, and also, develop the innovative approaches for the analyses and find solution of problems.

After internal evaluation procedures, registration of aspects, needs and suggestions of all who have been involved in the pilot educational process of the new pilot curriculum, the mandatory implementation of it is expected, probably in 2012, to help effectively to demands of 'energy literacy' of the student population.

At the end of compulsory education and through the opportunities offered to students, it is expected the development of the following competencies:

- Students should have build and broaden their personal experiences by using active practices and should increase understanding and awareness on the importance of environment and sustainable development.
- Through the study of the local and broader environment, students should gain important learning competencies about changes in the world by using information technologies. Furthermore, by involving real people and places, students acquire skills to develop actions in the real world outside and beyond the school.
- Through their participation students should gain a more informed and responsible behavior that will help them make decisions and act independently of both personally and as citizens of society.
- Students should use a variety of sources, including maps, experimental materials, etc., and should explore important national and global environmental issues using a range of skills, including the use of ICT and should link parts of the curriculum and of other subjects related to Sustainability and Environmental Education between them.

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Sustainable School Indicators: Approaching The Vision Through The Sustainable School Award

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Abstract

The Sustainable School Award is a project for schools that aims to integrate a sustainability perspective into all aspects of school life through "sustainable school indicators". It complies with the implementation strategy of the International Plan of Action of the Decade for Education for Sustainable Development (2005-2014) and the Strategy of UNECE. In this paper we present the vision of a "sustainable school" and an attempt to connect theory and practice of ESD in order to approach this vision. A brief report on the first year of the implementation of the project in Greece is also presented.

Key-words: Sustainable School Indicators, Sustainable School, Sustainable Development

Introduction

For more than thirty years Environmental Education (EE) has been the main vehicle for raising the environmental awareness of students and seeking to change their attitudes and behaviors in relation to the environment. The school was one setting for environmental education, with teachers the main facilitators of attitudes and behavior change.

A number of authors have reported on the intrinsic and acquired problems of EE in Greece (Flogaitis, 1993; Flogaitis 2005; Kalaitzidis & Ouzounis, 2000), problems that have prevented it from realizing its potential. Greek schools have features that are not consistent with the principles of sustainability (Papadimitriou, 2010) and in order for the school to be a significant agent in moving society towards sustainability it has to be the very object of this change (Orr, 1992; Sterling, 2002). The introduction of Education for Sustainable Development (ESD) (Skoullos, 1995; Papadimitriou, 1998; Flogaitis, 2006), which is considered the successor of Environmental Education, accentuated this failure due to the higher requirements of this new kind of education (Papadimitriou, 2010).

The theory and practice of ESD suggests that the participation of the whole school community to promote sustainability is necessary, and consequently it should adopt a "whole school approach (Henderson, 2004; Gough, 2005). Many countries have adopted the "sustainable school" as a policy goal, such as the United Kingdom (Huckle, 2009), Sweden (Green School Award), Australia (Henderson, 2004) etc.

The experiments of the 19th and 20th centuries produced progressive schools that had advantages in relation to sustainability (for example the freedom and self-management experienced by pupils at Summerhill School in England) and such schools had some impact on mainstream schools. Progressive schools resulted from and inspired people of educational vision and included such innovations as the active participation of students in learning process, the cooperative approach to learning, the democratic functioning of the school leadership etc. The limits of reform were and are however shaped by the dominant educational paradigm, which reflects prevailing structures of economic and political power.

The Sustainable School

The sustainable school can be viewed as one element of a future utopian sustainable society. The basic idea of the "Sustainable School" is the integration of sustainability in every aspect of school life, namely the administration, the learning process, management of buildings, transportation to and from school, the school's relationship with the school community (Huckle, 2010). The management of the school reflects and reinforces what students learn in the classrooms through the ways in which it runs the campus (use of energy and water, transport and travel, food, etc) and at the same time such learning is further strengthened by the ways in which the school and its students learn alongside local and more distant communities. The active involvement of students and staff in reflecting and acting on sustainability themes creates a sense of responsibility which in turn is transferred to the interactions between the school and the wider community (Living Sustainably, 2009). To facilitate discussion, we can classify the characteristics of sustainable school into three general domains of organization (Papadimitriou, 2010): the pedagogic (curriculum, school culture, teaching and learning process), social and organizational (organization, administration, relations with the wider community and other bodies) and the environmental-technical-economic (school environment, buildings and yard).

The "sustainable school" label covers a range of variants on the light green to dark green spectrum that ranges from conservative (light green) to radical (dark green). At the light green end the school will be adopting environmentally friendly measures such as recycling and energy saving (ecological modernization, faith to solutions deriving from technology, doing more with less) that offer no real challenge to and even support the status quo. At the dark green end, the school will be adopting a holistic approach to sustainability, including challenging the dominant production and consumption patterns, the dominant values of the consumer society, the dominant distribution of power and financial resources, while at the same time, challenging the dominant schooling values. The dark green approach implies a more thorough reform or radical change of both environmental and social interactions in the school, allowing students and teaches a more democratic process of decision making. The current UK government has taken down the webpage that set out the guidance on the previous government's sustainable schools policy. Eco-schools (managed and promoted by the NGO Keep Britain Tidy) is now the main vehicle encouraging more sustainable schooling in the UK.

The pedagogical domain

The sustainable school adopts participatory and student-centered approaches that develop students' skills, abilities and qualities for critical thinking, intercultural understanding and willingness to participate. These are key attributes of active citizenship. Team teaching around issue-based topics is the pedagogy best suited to sustainable schools. Active student participation in the planning of the lesson, the teacher's function as coordinator of the discovery of new knowledge by the students themselves, the introduction of new technological innovations in the learning process, are all aspects of sustainable school, which relate to improving the conditions of the learning process, while improving the overall functioning of the school. Principles of EE and ESD should be integrated into all aspects of the curriculum (UNECE 2005). The hidden curriculum teaches students much about sustainability through the day-to-day relations between people and between people, energy, materials, and plants/animals on the school campus.

The social and organizational domain

The social and organizational domain includes the school relations with the local community, local government, relations with parents etc. The administration must put sustainability at the heart of school design and everyday practice. The sustainable school adopts the democratic and

participatory process of decision-making. A proper atmosphere of cooperation should be established so that the school generates improvement plans and undertakes the relevant actions to implement the plans and achieve the goals. The democratic operation, from the administration to the function of student councils, best fits the sustainable school. The decisions taken with democratic procedures are respected by all members of the School Community. Local government has an important role in school life as it distributes the annual grant, is responsible for repairs and improvements of school buildings, taking advantage of school programs to educate and enlighten local citizens, etc. But even more important is the democratic functioning of the teachers' assembly (staff meeting) in each school, as its decisions largely determine the nature of school life.

The environmental domain

The main objective of SSA in the environmental domain is to reduce the ecological footprint (Wackernagel, M. & Rees, W., 1996) of the school, and through the students, of the ecological footprint of the families. At the same time, in an era of financial crisis, reducing the ecological footprint will result in reduced spending for running the school building. According to surveys (Santamouris, 2008) in Greece 30% of the energy consumption goes to buildings. The Greek school buildings in particular, are very costly in terms of heating, because none of them was built according to the principles of green building. Besides heating, paper consumption is also booming. Only an insignificant percentage of the paper consumed at school ends up in paper recycling. The contribution of schools to increase greenhouse gas emissions could also include the consumption of fuel to transport children to school in their parents' car.

For all these reasons, schools are organizations which produce waste and consume significant quantities of resources, contributing to global warming. The impact of the school is not confined within the narrow limits of its campus, but extends to the broader social environment and affects a substantial part of society.

The Sustainable School Award

In Greece, thousands of schools implement optional school projects, short and medium term, every year. The topics of these projects are about environment, sustainable development, human health, jobs, culture and civilization, intercultural issues, human or animal rights, theater, consumerism etc. The quality of the projects sometimes is high and deserves to be recognized. However, most of them are implemented in isolation, detached from the school community and restricted within the limits of a class. Teachers and students need to be supported and motivated in different ways in order to improve the quality of the projects, prolong their duration for the profit of both the students and the local society, and infuse the school community with the principles of sustainability. Introducing incentives for more active student participation in the common effort can often improve the significant achievements of these optional projects.

World Conference on "Education for Sustainable Development» (UNESCO, 2009), among others, urges all states to reorient education towards sustainability, to benefit the organizations of civil society in order to encourage debate on Education for Sustainable Development and to undertake initiatives. These positions agree also with the Article 36 of the Strategy (UNECE, 2005), *«NGOs are important sources of informal and non formal learning, able to implement processes of social empowerment (Strengthening of the role of civil society) and to integrate and transform the scientific knowledge and facts into understandable information. Their role as intermediaries between governments and the public should be recognized, promoted and strengthened".*

In response to the above, the "Sustainable School Award" was established by the Council for Environmental Education of the Hellenic Society for the Environment and Culture, in order to recognize, promote and enhance the efforts made by schools in different thematic areas, but within

the broader context of the ESD. Also the Sustainable School Award (SSA) was instituted to disseminate good practice sustainability in schools.

The Sustainable School Award (SSA) is a project for schools in the form of a contest. The object is for schools to integrate sustainability in all their functions and in particular in the three domains mentioned above, namely: the educational, social-organizational, and environmental. The school that decides to participate in the SSA has to visit the website www.aeiforosxoleio.gr to subscribe. Following the subscription the school undertakes the activities implied by the sustainable school indicators. At the end of the school year the school inserts the value of each indicator at the website, in order to receive its score.

Sustainable School Indicators

For each one of the above mentioned domains the Council for Env. Education d has introduced indicators (quality criteria), which facilitate comparisons among the schools participating in the project. Indicators are becoming one of the most commonly applied and promoted evaluation strategies in sustainable development and ESD (Reid, Nikel, and Scott, 2006). The SSA indicators are based to an extent on the set of "sustainable development indicators" of the UN (UNESCO, 1997, Breiting et al, 2005), and have taken into account the "Indicators for Education for Sustainable Development" developed by the UNECE (2007, 2009). Similar approaches are suggested by UNESCO (UNESCO Lens, 2010) and by the Department of Environment and Heritage (Australian Government, 2005). It encourages schools to undertake an audit to identify areas for improvement in key areas of ESD (cultural, environmental, and economic aspects of ESD). This can help schools to set targets for change and improvement. As Mogensen and Schnack state (2010) "Indicators cannot be seen as a mechanism that aims to prescribe and test the "correct" content (knowledge, skills and values) in ESD, but rather must be formed in ways that stimulate and qualify students to become future citizens, who can make sound judgments, think critically and independently, and who can and will play an active role". The same authors state that quality criteria (or indicators) are considered starting points for reflection. The literature may indicate a variety of indicators (Morgensen & Mayer, 2005, DfES, 2007, Living Sustainably, 2009, Australian Government, 2005) that all can come under the three domains mentioned above. The difference is that the "Sustainable School Award" has introduced in Greece a set of Sustainable School Indicators that are measurable, so they constitute a new approach to the idea of sustainable school. The full list of the Sustainable School Indicators can be seen in Annex 1. Each indicator receives a value, including a maximum score that summed up with the rest of the indicators to give the overall score of the school. The scoring of the indicators is designed to give greater or lesser weight to some of them. For example, it gives less weight to the existence of solar panels on the roof of the school and greater weight the reduction of electricity consumption. The SSA accepts as candidates all types of schools: nursery schools, primary and secondary schools, vocational schools, special schools. Each school competes with the schools of the same category (nursery, primary, secondary, vocational). Each indicator implies an action taken by the school in the direction of sustainability. For example, the indicator "Total number of teaching hours per subject, employing teamwork teaching approaches, per cent (%),implies an effort by all the school community to increase the incorporation of teamwork teaching in the teaching strategies of the school. The indicator "Number of social and pro-environmental actions of school (e.g. planting trees, participating in social fundraising, taking care of animals, etc.), implies that the school will undertake initiatives to contribute to the improvement of the local environment and local society, through different actions and activities. The indicator "Does the school have composting systems?" implies that the school will start a composting program, etc.

Results of a questionnaire survey

The "Sustainable School Award" was introduced in Greece for the first time during the school year 2010-11. One hundred and forty (140) schools across the country declared participation in the project-contest. Of these 22 senior high schools, 51 high schools, 54 primary schools, 10 kindergartens and special schools. After the conclusion of the first year of the project, the participating schools were asked to fill in a special questionnaire (Annex 2) different of the indicators' one (Annex 1). The questionnaire was answered by teachers and principals of participating schools. Only 35 schools out of the 140 that declared participation in the S.S.A. returned a completed questionnaire (25%). This negative attitude towards evaluation is a persistent feature of most Environmental Education projects and programs (Morgensen & Mayer, 2005, p.87). Some possible reasons for the low response of schools could be: A. A fear for evaluation, as this is not a common practice in Greek schools (abandoned already from the early 80's). B. A negative attitude towards behaviorist approaches to education. C. Lack of interesting and meaningful activities at school, in the framework of the Sust. Sch. Award. A review of similar programs around the world reveals a lack of research and evaluations reflecting upon the achievements, lessons learnt and critical success factors of whole school sustainability programs, like Eco-Schools, Green School Award, Enviroschools (Henderson, 2004). This process would enable programs to capture both quantitative and qualitative data in order to reflect upon progress, learn from experience and ways to improve (Bolstad, 2004).

The questionnaire sought information about (mainly) improvements in the hidden curriculum, after the implementation of the sustainable school program and participation in the corresponding contest (see Annex 2). Because it was the first year of the implementation of the SSA, there were no comparative data from previous years to depict improvements in school life, the questionnaire asked for estimations from the participating school principals and teachers. Under these circumstances the results of the survey should be treated with care. Mostly they indicate some attitudes, they do not depict with accuracy and validity all the potential opinions and attitudes. The main findings of this survey are the following:

- The initiative for the school to participate in the SSA derived mainly from the Principal.
- The school activities related to the SSA begin mainly in October and end in middle May.
- In most of the participating schools environmental education projects were implemented as a result of participation in the SSA.
- All schools that responded to the questionnaire have formed student environmental teams. The student teams are formed mainly on a class base.
- Most of teachers said they would participate in the project in the next year and nobody said a negative intent.
- All the teachers said that they will continue the good practices developed within the SSA project, whether it continues or not.
- All schools developed collaboration with non-governmental voluntary organizations.
- All schools said to participate in activities in the local society (e.g., fundraisers, care of stray animals, etc.).
- Most of schools responded that they have developed relationships with schools in other countries within European Union programs (Comenius, e-Twinning, etc).
- Most of the teachers said there were positive changes to the hidden curriculum, as a result of the participation in the contest.
- The rate of teacher participation in the different activities implied by the indicators was very high. Similar or even higher rates are claimed for student participation.
- The most active student teams are recycling, reduction in electricity and water consumption teams.
- The less active student teams are those that dealt with issues related to the educational sector (introduction of ICT, teamwork approaches to teaching).
- A major change considered by teachers as a result of the participation in the SSA, is a significant change in the school climate. Student and teacher participation in the design

and implementation of different activities in and out of school has led to the development of better relationships of trust and cooperation both between students and between students and teachers. This effect is depicted in the reduced number of punishments and penalties imposed to students.

- Teachers reported as difficulties the limited spare time for high school students, the relative difficulty of coordination when teams are mixed, the need for more and closer contact between coordinators of the SSA and schools, the lack of adequate teacher training, the complexity of some indicators, etc.

Innovation

Significant change occurs in schools participating in the "Sustainable School Award" project as they redirect their work towards sustainability and overall greening. To summarize the innovative elements of the SSA:

- Most of the "Sustainable School Indicators" are original
- Measurable "indicators for sustainable school" are used for the first time to assess effort and achievements of schools in the area of "sustainability". No references were found in the relevant literature, about appointing a certain value for the fulfillment of a target in the form of an indicator.
- It is the first time that "whole school approach" is implemented in both large scale and with such positive results in Greece (Kalaitzidis, 2001).
- High percentage of participation of both teachers and students are observed. According to estimates, the average rates of participation of teachers and students in medium and long term school projects in Greece does not exceed 12%.
- The SSA integrates various innovative actions taken in one school, under the umbrella of sustainability. Thus, the final effect achieved is greater than the sum of the individual achievements of the teams participating in each individual action or project.
- In the framework of the SSA the existing experience and knowledge inherent in schools by former environmental and other projects is reclaimed, giving them new content, as determined by the active and wide participation of the school community.
- Teachers claim that SSA has reinforced at a high level the hidden curriculum and improved the school climate.
- The SSA had a catalytic effect on student-school relationships, as evidenced by the rapidly evolving reduced punishments imposed on students.
- The specific and crucial role of school director who encouraged the school to participate in the SSA was confirmed.
- The SSA allowed a big part the members and stakeholders of the school community to take ownership of the initiatives and incentives to participate in the innovation, while promoting the development of their environmental consciousness.

Conclusions

The Sustainable School Award is a project in the form of a school contest. It is running under the auspices of the Ministry of Education. It puts forward indicators in order to help schools guide themselves towards sustainability. The indicators are original and have been formed taking in account recognized indicators about sustainable development and indicators about Education for Sustainable Development. They cover the three domains of school function (Pedagogy-Social-Environmental) and are 40 on total. During the first year of the project 140 schools took part, while in the second year 180 schools. The project is facilitated by a special website (www.aeiforosxoleio.gr) where the participating schools insert the values of each indicator to

receive their score. An evaluation with the use of a questionnaire for the first year showed optimistic results about the effort towards sustainability through the Sustainable School Award.

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Annex 1

Sustainable School Indicators

A. Pedagogical Indicators

1. Incorporation of sustainability issues in school subjects (e.g. health education, different cultures, gender card, human rights, cultural heritage, etc) per cent (%).
2. Total number of teaching hours per subject, employing teamwork teaching approaches per cent (%).
3. Incorporation of ICT for teaching of all subjects, used to develop cooperation skills, critical and creative thinking to solve problematic situations.
4. Number of educational visits, in order to improve the environmental, social and cultural awareness of pupils.
5. Number of events (cultural, environmental, etc.) organized by the school in collaboration with pupils and teachers, for pupils, parents or local community members.
6. Number of optional school activities and projects (e.g. Environmental, Health Education, Cultural Education, Comenius, e-Twining, pupil competitions, etc.) implemented in school.
7. Number of punishments imposed to pupils.
8. Percentage of dropouts.

B. Social and Organizational Indicators

1. Does the school implement a Sustainable Management Plan (S.M.P.) and an Activity Program (S.A.P.)?
2. Part of the total number of school teachers (%) who are actively involved in Sustainable Management Plan (S.M.P.).
3. Percentage of pupils who are actively involved in the Sustainable Management Plan (S.M.P.).
4. Total hours of professional development seminars attended by school teachers
5. Total hours of professional development seminars attended by the school Principal.
6. Number of teacher meetings (other than mandatory) on teaching and learning approaches, to plan joint projects related to education for sustainability, to develop strategies to link the school with the local and international community, to reflect on the school accomplishments, etc.
7. Number of pupil-council meetings on issues relating to environmental management of the school, teaching methods, safety issues, etc.
8. Number of pupils' general assemblies with the same topics as above.
9. Has the school undergone an aesthetic improvement by students in collaboration with teachers, parents, municipality, etc?
10. Number of School Councils convened in order to inform the school community, to reflect on school issues (teaching methods, environmental management, etc).
11. Number of social and pro-environmental actions of school (e.g. planting trees, participating in social fundraising, taking care of animals, etc.).
12. Number of lectures on sustainability issues given by out of school specialists who visited the school.
13. Number of collaboration meetings with the local school activities adviser-consultant.
14. Members of the Parents' Association who voted in the last election (%).
15. Number of visits to the website of the school during the school year.
16. Does the school canteen offer organic food to pupils?

C. Environmental-Economic-Technical Indicators

1.   Percentage of pupils going to school on public transportation, bike / private car / feet.
2.   Weight of recyclable materials (paper, glass, metal and plastic) that were recovered per pupil and teacher.
3.   Weight of waste going to landfill per pupil and teacher.
4.   Number of copier paper sheets per student and teacher.
5.   Water consumption per pupil and teacher.
6.   Does the school employ a system for storage and use of rainwater?
7.   Electricity consumption per pupil and teacher.
8.   Does the school use environment-friendly detergents for cleaning?
9.   Weigh electric-electronic devices and batteries given for recycling per pupil and teacher.
10.   Is the central heating system checked annually for compliance with Eco Audit?
11.   Consumption of oil or natural gas for heating per pupil and teacher
12.   Is the school building insulated?
13.   Power of photovoltaic systems installed in school.
14.   Does the school run a vegetable garden, flower garden or a roof garden?
15.   Number of plants and trees across the surface of the school (courtyard included)
16.   Does the school have composting systems?

Annex 2

Questionnaire

1.   Who has taken the initiative to suggest the Sustainable School Award to the school?
2.   When did the school start the SSA activities?
3.   How many student teams for implementation of Env. Educ, Health Educ., etc, at school have you organized?
4.   Were these teams mixed or pure classes?
5.   What percentage of the pupils did not participate to any activity?
6.   What percentage of the teachers did not participate to any activity?
7.   What were the most active pupil teams?
8.   What were the less active pupil teams?
9.   What factors influenced the success of the active pupil teams?
10.   What factors influence the relative failure of the less active teams?
11.   What major changes have taken place at your school, in the framework of SSA?
12.   What minor changes have taken place at your school, in the framework of SSA?
13.   What were the most serious problems you have faced during the implementation of the project?
14.   What was your school accomplishments attributed to the SSA?
15.   Are you going to participate next year?
16.   If there will be no more SSA, are you going to continue the good practices that you have developed during the SSA?
17.   What changes do you suggest for the SSA?
18.   Do you have any cooperation with NGO's or other bodies?
19.   Do you participate in the social activities on local scale?
20.   Do you have relations with foreign schools? If yes in what framework?
21.   Have you observed changes in the hidden curriculum of your school as a result of your participation in the SSA
22.   If yes, how can you describe this change?

Students' Generation of Meanings on a Global Energy Issue through Digital Game Play

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Abstract

The potential of digital games as learning tools in school-based contexts, and especially within the field of Environmental Education, is not yet fully explored. To address this problem the present study focuses on a qualitative analysis of the dialogues exchanges between students making use of a multiple platform of transmedia storytelling. This multiple digital platform, Collapsus, combines interactivity, fiction and documentary on a scenario using global energy politics as the main issue of a challenge-based game task. The present study examines the ways students through the interactive game of the platform collectively resolve global energy challenges influencing the world's energy production, with the aim to avoid undesirable energy black-outs. The study's findings indicate that the students managed to relate their choices in regard to global energy politics to issues of quality of life involving social, ecological and economical parameters. They also succeeded to collaborate without particular difficulties.

Introduction

Exploring the learning potential of digital games and their use for educational purposes remains a greatly under-explored although fast growing research area (Prensky, 2001; Gee, 2003; Kirriemuir & McFarlane, 2004). Although it is well-documented that playing with digital games contributes to the development of important skills, such as planning, strategic thinking, decision-making, problem solving and communication (Whitebread, 1997), the potential of digital gaming as a learning tool in school-based contexts is not yet fully explored (Kynigos & Daskolia, 2011). Research affirms that there are several examples of current digital games that can facilitate social exchange, conversation and teamwork among players by offering multimodal channels of communication, collaboration and experience among them (Gee, 2003; Williamson & Facer, 2003). Apart from that, digital games can act as systems of socially constructed meanings by which new forms of literacy can be developed (Gee, 2003). As objects which represent particular 'realities' (Gee, 2003), digital games can be employed to assist the generation of new meanings with regard to these realities. Convergence of the various possibilities offered by different expressive media is suggested by Jenkins (2006) as an important feature of current digital culture to be further employed for educational purposes. Such enhanced participation in trans-media game-based activities is thought as allowing the learners' learning interest to boost and as a motivating factor to a more active engagement in collaborative exchange.

There are nevertheless many questions raised by educational researchers pertinent to digital game-based learning's scope and impact not only in informal contexts but school settings as well. One of them has to do with whether digital game-play opportunities can be of any additional value in teaching and learning about concepts and issues of particular subject domains, such is the case of Environmental Education (EE). EE is an educational field where considerations of this kind have been left greatly unaddressed although there is plenty of room for posing and exploring such challenges (Kynigos & Daskolia, 2011). This is not surprising as EE has attributed a minimal interest towards investigating the contribution of digital tools in teaching and learning about environmental concepts and issues (ibid). Even though a growing number of children and young

people have become really passionate about some new technological tools and their associated practices (as in the case of digital game play), and there is enough evidence that they are more actively involved in learning activities incorporating elements related to their everyday digital practice (Hewitt & Forte, 2006), not a strong interest has been expressed till now from the part of EE research in addressing this recently-born reality and in investigating its implications in the context of children's informal playing or as a potential pedagogical tool for supporting EE practice in school settings.

Reservations from the part of EE concerning the pedagogical value of using digital games have also to do with how adequately it can address the idiosyncratic nature of its subject-matter. Environmental and sustainability concepts and issues are by nature complex, controversial, value-laden and dense with conflicting social interests. Teaching and learning about them requires the exploration of the various perspectives inherent in them and the exercise of critical thinking in identifying their roots and solutions in the established individual and social practices (Bardwell, Monroe & Tudor, 1994; Scott & Gough, 2004). However, these are modes of knowledge that build not only on 'objective' scientific data, but also on the values, speculations and emotions which arise through personal and collective reflection and action processes (Unesco, 1978; Huckle, & Sterling, 1996). Moreover, environmental and sustainability issues are complex issues that need to be addressed through collaborative processes of thinking and action (Zeiderman, 1992). In terms of pedagogical design, group learning approaches towards approaching issues of this genre have to take into consideration the students' prior knowledge, the roles they adopt and the information exchange among them (Dillenbourg & Hong, 2008).

We argue that digital game-play learning offers many opportunities worthy to be explored by EE within the context of assisting young people to get engaged with environmental and sustainability concepts and issues in more meaningful and enjoyable ways.

The study context

The study reported in this paper aims to identify ways in which students address a global environmental issue, energy resources allocation policy, while engaged into digital game-based learning through a transmedia storytelling and interactive games platform. Among the main characteristics of these games is the increased engagement of players which turns the whole gaming experience more meaningful and fun for them and creates a learning environment through which players are incited to critically reflect on the issues involved and exchange information in attempting to solve them. By combining several digital media opportunities and functionalities a transmedia platform enables players to immerse into an entire imaginative world instead of focusing solely on particular characters or a given story plot. This storytelling experience becomes therefore more exciting and motivating for players to learn more and explore the game in greater depth, since they become part of the story and they need to understand several parameters of the issue in order to win. Moreover, by engaging different types collaboration among learners is an essential prerequisite for them to understand the story and respond to the game's demands (Jenkins, 2007).

We designed and implemented a study with a small group of 11-grade students based on a learning scenario which foresaw that students would interact and collaborate through 'Collapsus', a multiple platform of transmedia storytelling and interactive games dealing with issues of global energy politics (Fig. 1). This platform involves users in a series of challenges related to issues of this kind and brings them in a position to have to decide on their future while also witnessing the consequences of their choices. The different media used – the interactive game and the film/animation and documentary components – are not isolated but combined to each other, so that the players enter into a expanded imaginative world, they become part of the story and lean on each other to meet the challenges posed to them.

Figure 1: The Collapsus storytelling and interactive games platform.

By looking into the near future, Collapsus shows how the imminent energy transition from fossil fuels to alternative energy sources affects a group of ten young people who appear to be caught up in an energy conspiracy and failing energy supplies. The story entangles the interventions of international power systems that try to cope with issues of political dissension, uprisings and a population terrified from increasingly frequent black-outs. Collapsus places users in the centre of the events and provides the opportunity to decide upon their own future and observe the consequences of their choices. Consequently, the users are asked to make decisions and seek for solutions both on a national and a global scale that will help the actors of the story get out of the energy crisis with minimal costs. They have to select types of energy by taking into consideration their advantages and disadvantages as well as their trade-offs. This process strongly contributes to the development of dialogical interactions between the users as they have to collaborate in order to address and solve these challenges.
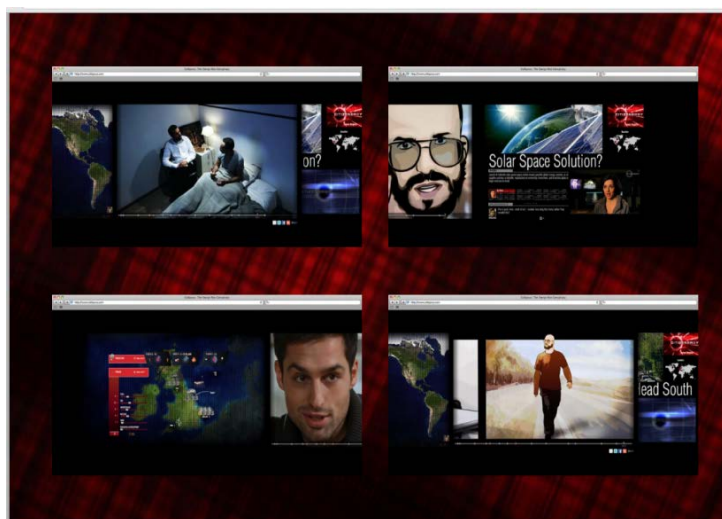

Figure 2: Multiple representations in the Collapsus platform.

This is because the challenges that the users of the platform are confronted with cannot be solved by each of them individually. Instead, they necessitate face-to-face communication in small groups so that the right decisions are taken in common. The users have the mission to face these global energy challenges on a collective level. While they are pondering on the types of energy to select they receive visual feedback and so they every time they proceed with the solution they have decided to follow. Collapsus attempts to merge real documentary footage with mini-games and movie fragments while incorporating the users' perspectives while the story unfolds. Apart from interacting and deliberating on the decisions the users have to make to avoid undesirable energy blackouts, they have the opportunity to broaden their perspective by listening to the experts' point of views and of course by observing the consequences of their decisions projected into alternative courses of action and how they influence the deployment of the whole story.

Methodological frame and implementation of the study

The reported study departs from the assumption that by engaging students with a digital game which puts them in a position to have a series of energy policy challenges to confront, the students' generation of meanings concerning global energy politics is facilitated. The research questions that guided the study are:

- In what ways does a multiple platform of transmedia storytelling and interactive game, when intertwined in appropriately designed learning activities, lead to the generation of meanings concerning global energy politics among students?
- In what ways do the students ascribe meanings to related environmental concepts while attempting to identify solutions to the challenges set by the game?
- To what extent do the various media provided by the platform support students in better understanding global energy politics issues?

In terms of the research methodology used in the study we followed a design-based approach (Cobb, Confrey, diSessa, Lehrer, Schauble, 2003; Design-Based Research Collective, 2003). This is a qualitative methodological frame which is mainly contextualized in educational settings and its focus is on generalizing from findings to guide the design process. It is grounded on theory and relevant research results while reflection is an integral part of the whole process.

The study took place among students of the 11th grade class (2nd class of Lyceum) of a school located in Athens. We purposefully decided to employ a small number of participants in order to pursue an in-depth analysis. Participants to the study were four students divided in two pairs. Their selection was based on their previous experience with playing digital games, although not with Collapsus in particular.

The students enacted a scenario which was designed by the researchers to engage them in a series of activities before, during and after having played the game. To allow the students to get familiarized with the platform, the researchers left enough time for them to try all its functionalities. Once familiarized the two pairs of students were asked to address the challenges set by the game and to attempt to solve them through face-to-face discussion, sharing their ideas and explaining their moves in the game. The students were also provided with several opportunities to reflect upon their decisions and the degree they affected the global energy production in different countries.

Figure 3: Film/Animation in the Collapsus platform.

Hypercam was used the software for collecting data in this study through recording the moves of students while playing the game. Data collection was also based on participatory observation, short interviews and the narrative reports prepared by the students regarding the new understandings they gained and the collaboration problems they faced.

Findings of the study

A preliminary analysis of the study's findings revealed that the students managed to associate choices with regard to global energy politics with issues of quality of life involving social, ecological and economical parameters in a relevant and concise way. Almost all four of them developed their ability to use various environmental concepts proposed by the different media and apply them in a relevant way when making decisions about how to proceed in the game. For instance, even though they gave the impression at the beginning that they could not realize how to use power plants in the game, they consequently employed strategies that progressively led them to integrate them with the minimal environmental cost for the countries involved. The initial disagreement between the two groups concerning appropriate decisions to take was replaced by arriving at successfully supporting their views with arguments.

Figure 4: The documentary part of Collapsus platform.

More particularly, students communicated sufficiently with each other in order to identify the issue at stake and meet the challenges involved. An indication to this is the fact that the information presented in the game regarding environmental concepts, such as different types of energy, led the students to interact more intensely with each other. What is more important to highlight concerning this point is that students communicated with the aim to share their ideas and personal views regarding the environmental perspectives to be taken into account when thinking about the alternative solutions to the challenges as well as how to relate the environmental concepts projected by the film/animation to social and economical factors. Students also exchanged information and views during the film-animation and the documentary parts on the issue of the global energy policy, as they were divided between those who were strongly supporting to focus on the environmental dimension and those being in favor of the economic perspective of seeing the whole issue.

The findings of the study also revealed different levels of the student abilities when using environmental concepts in a contextualized problem-solving situation. What is indicated is that an appropriate pedagogical use of a digital game platform such as Collapsus facilitated the creation of learning opportunities leading to reflection on environmental issues and concepts. The students were provided with some novel learning opportunities to understand current socio-environmental issues. We argue that by using a digital learning platform with these characteristics a learning situation was orchestrated where students had several opportunities to generate meanings on some current socio-environmental issues, to face the complicacies of bringing forth sustainability and to realize the need to apply collective thinking and action to accomplish it.

As related to collaborative learning, our findings indicate that most dialogical interactions among students included information exchange, justification of their choice, investigation of alternatives, reply to question posed, evaluation, after-statement, and agreement. As evidenced by the short interview, the students considered their interaction and communication as necessary for constructing the knowledge they needed to meet the challenges. Verbal conflicts were accompanied by arguments as a result of the information gathered by playing the game, that is the feedback messages, the consequences of previous choices and prior knowledge. As the interactive game and the film progressed, students started to realize that they had to focus on the overall situation instead of separate dimensions. In other words, the key for them to understand and meet these challenges was to achieve a balance between the three fundamental aspects of sustainability, meaning "economy", "society" and "environment".

As far as the digital platform is concerned the students did not face any particular difficulty regarding the human-computer interface. Instead they characterized the whole experience as interesting, entertaining and motivating, and as providing much useful information about politics concerning global energy resource allocation. They also argued that it offered them a unique opportunity to learn about global energy politics, a complex issue about which they would never think to search information. Concerning the path they followed, the students had first a short navigation, they then defined the energy challenge, they analyzed the available data, and considered the alternative options they had in relation to different types of energy. After that, the students decided about the changes they would have to make in order to meet the challenge, they analyzed the feedback messages they got and finally reviewed the decisions taken. As far as the multiple representations of the platform, the students used the film and the animation parts of the platform to render the whole procedure more creative and thus interesting to them and the other students to get information regarding international relations and conflicts around the central issue of energy politics. On the other hand, in several occasions the students skipped the mini-games included in the film, since they did not offer specific information about environmental concepts.
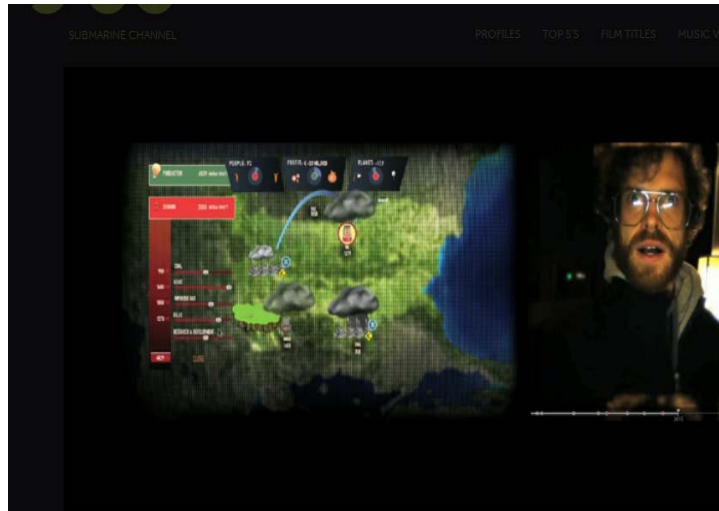
Figure 5: The interactive game in Collapsus.

Further analysis suggests that the interactive part of the digital game was that tool in the platform that challenged learners most to communicate and collaborate and hence to develop new understandings about global energy politics. Students focused mostly on the interactive game, since it was the tool through which they could ascribe meanings to the related environmental concepts and actually apply them in their attempt to meet the challenges. Another important implication is that even though the interactive game was the tool that initiated most of the interactions, the feedback messages created an appropriate context for acquiring more information about the energy concepts presented in the game and their impact on environment, economy and society. Furthermore, the results show that the documentary possibility was least exploited by the students, even though they got some information from that too.

Some concluding remarks

We argue that the use of Collapsus, a transmedia storytelling and interactive games platform, contributed to a great extent to the effective interactions and exchanges of information and views between the members of the two groups of students. This was a crucial factor for the students to address and attempt to resolve the energy challenges posed by the game and subsequently for developing and improving their knowledge of environmental concepts and global energy politics issues. The students managed thus to ascribe meanings to related environmental concepts while they attempted to identify solutions to the challenges set by the game. We actually ascertain that the meanings the students ascribed to the environmental concepts employed were determined by the interaction between the students and that between the students and the platform.

This small-scale study contributes to the knowledge regarding how to design and use pedagogically innovative ways of incorporating new technologies (and digital game play in particular) in learning about environmental concepts and issues. Our findings provide some first insights that transmedia storytelling can actually help creating meaningful learning situations in classrooms concerning environmental issues by facilitating students' strategic thinking, decision-making, problem solving, communication as well as the application of environmental concepts in specific real-world issues. With the aid of this technology-based learning environment the students showed an enhanced competence in discussing about global energy politics and in drawing conclusions about it. One implication for future studies in this field could be to use a technology-based learning environment of game-construction instead of just game-playing in order to examine how students ascribe specific meanings to environmental concepts and how they apply them in real conditions.

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Environmental Education in Greece: An Evaluation Based on Quantitative Data

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Abstract

Environmental education was formally introduced in the Greek educational system during the years 1991-1993, after the ministry of education provided legislative, administrative and infrastructural support to teachers willing to undertake environmental education projects. These initiatives remain on a voluntary basis and involve a steadily increasing number of teachers and students. However, the current political and economic crisis has not spared the structures of environmental education. The staff related to environmental education was cut in half during the years 2010-2012 and funding has become sporadic and dwindling. The uncertain fate of environmental education in Greece poses an urgent reality: The need to disseminate the experience of its implementation, with any good practices or weaknesses to be documented and studied. This research aims to contribute into this direction, by monitoring the effects of environmental education in Greece, as practiced in the last two decades.

Key-words: Environmental education, Environmental Education Centers, Sustainability, Greece

Introduction

Environmental education in Greece was launched in the mid 1980's (Flogaitis & Alexopoulou 1991). To the present, it is implemented on an optional basis, where teachers involved carry out one school year long environmental school projects with a group of students. The subject and way of realization are decided together with the teacher and the group of students, which normally numbers from 15 to 30 persons. The projects can be realized in various ways, including fieldwork, interviews from community members and visiting of specialized institutions such as Environmental Education Centers. The goals and results of the projects are reported in a written essay at the end of the school year.

In the early 1990's, the Greek ministry of education provided administrative and infrastructural means in order to support environmental education in the school system (Katsakiori et al. 2008). From 1991, each of 52 primary administrative prefectures acquired appointed education advisers with the duty of supporting and monitoring environmental school projects. Additionally, the first Environmental Education Centre was launched in 1993, in the remote mountain village of Klitoria, Achaia[1]. In the following years, as environmental school projects propagated, a lot of Environmental Education Centers were initiated to meet the demand (figure 1).

According to the initial planning, Environmental Education Centers should provide environmental education for students and also support the sustainable development of the periphery. Recently (2010) their scope has been expanded to cover the need for lifelong training of local communities [2]. These centers are state owned and staffed by public school teachers with special knowledge in environmental education. Each centre is staffed by 5 to 6 public school teachers of various levels and subject specialties [3].

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[1] according to the 1892/1990(ΦΕΚ 101 τ. Α), act of the Greek Ministry of Education, article 111 par. 13
[2] according to the 11941/23-08-2010 and 11942 / 23-08-2010 updates of the Greek Ministry of Education
[3] according to the 83691 /Γ7/ 22-07-2011 decree of the Greek Ministry of Education

Figure 1: Environmental Education Centers in operation, March 2012.

The distinguishing fact of environmental education from other educational activities is its outdoor implementation. Using the ecosystem as an open laboratory, Environmental Education Centers provide structured activities for students and adults. Local knowledge about the evolution of the ecosystems and the human communities has been incorporated. This is essential in a country with great cultural and ecological diversity but centralized educational planning which does not take the local element into respect.

Environmental education, as implemented in Greece, has also received criticism (Katsakiori et al. 2008), such as:

- environmental education did not stand up to the expectations
- there was overspending
- it is an elitist activity, as most students are not benefited
- the educational material used is of dubious quality

Even though some of the criticism is justified, it could be partially attributed social parts that do not agree to the urgency of environmental protection, and would prefer to divert its funding to other needs.

The current political and economic crisis in Greece has not spared the structures of environmental education. The number of Environmental Education Centers is dwindling and the staff has been reduced (figure 2). The positions of environmental education advisers were abolished through their merging with other advisors of scholar activities. Presently, only half of the environmental education positions have been retained, compared to 2009. Even more ominous is that the future funding for Environmental Education Centers has not been secured, whereas their operation has been de facto suspended four times between 2010 and 2012 (Notharos, 2010).

The uncertain fate of environmental education in Greece poses an urgent reality: The need to disseminate the experience of its implementation, with any good practices or weaknesses to be studied and documented. There are strong indications of significant innovation and original

pedagogical techniques, which have rarely crossed the country's geographical, cultural and linguistic barriers. This survey aims to help closing this gap, by monitoring the effects of environmental education in Greece, as practiced in the last two decades.

Methodology

In order to approach the subject of the research, a questionnaire (see the appendix) was used to collect the opinions of a representative number of school teachers from various parts of Greece. The sampling was stratified in respect to i) geography- the sample size was representative of the student population for each administrative prefecture of the country ii) grade of education-primary and secondary education teachers were equally represented in the sample, and iii) ownership- the public school/ private school ratio was equivalent to the percentage of the student population attendance. A representative sample of 8 public kindergartens, 40 public primary schools, 2 private primary schools, 24 public High Schools, 1 private High School, 16 public Lyceums, 1 private Lyceum and 8 public vocational high schools was selected. The selection of the specified schools from each category was made using the computer-generated mathematical function RAND in updated schools catalogues sorted by their address. This sorting was selected to enhance the randomness of the stratified samples.

The survey was performed in a random selection of schools, in December 2010, in the context of the author's master's degree, under the supervision of Professor Skordoulis Konstantinos, University of Athens (Yanniris K. 2011). A representative sample of 110 primary and secondary school teachers was finalized (Neyman, J., 1934) and their opinions were collected by the use of a questionnaire. The sample stands for the 0.07% of the total number of school teachers in Greece.
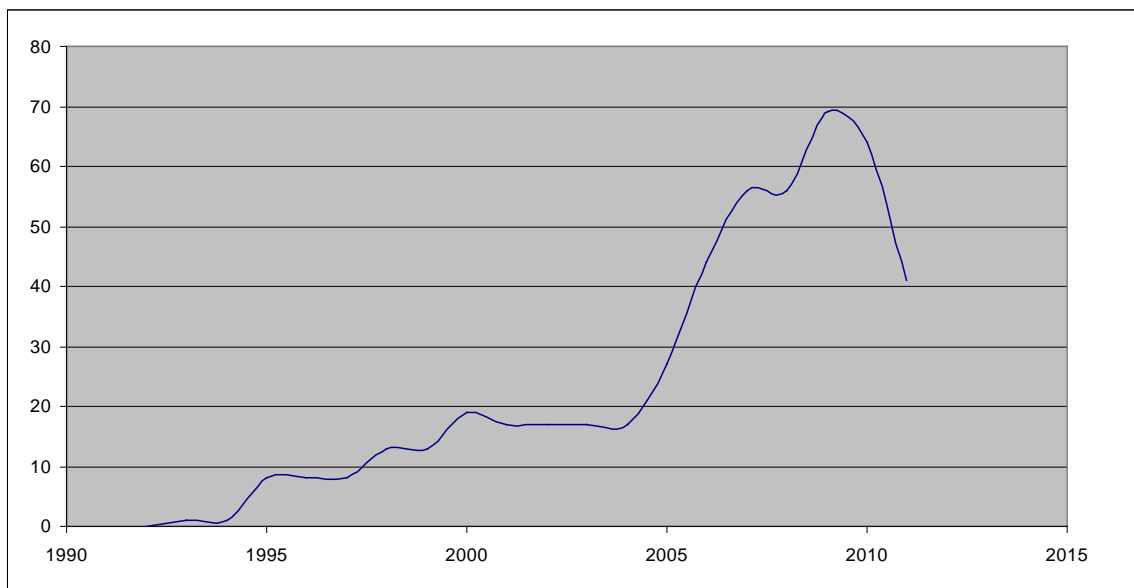
Figure 2: Number of Environmental Education Centers in operation.

Results

In the introductory question, teachers were asked to assess their posture towards environmental education by the question "How important do you feel environmental education is, nowadays?" using one of the numbers from 1 to 10 (1 for least important- 10 for extremely important). The average of the answers stands impressively high, at 9.23 out of 10 for the general sample, whereas 10 is the most popular answer, with a relative frequency of 59%. It is clear that teachers regard environmental education as an urgent necessity. This indicator is even higher between female teachers and teachers with post graduate studies (figure 3). Age, years of service and geography

does not affect the indicator. A strong correlation is suggested between the importance of environmental education indicator and the internationally monitored indicator of environmental consciousness. Self- attributed environmental consciousness is steadily found to be increased among women and persons with higher education (Van Liere, K. and Dunlap, R. E. 1980). Consequently, the sample's answers fall into the general population patterns as regards to reported environmental consciousness.

Moreover, 98% of teachers answered that they would find it useful to receive more information on environmental education or education for sustainability.

Figure 3: Answers on the necessity of environmental education, depending on sex and educational level.
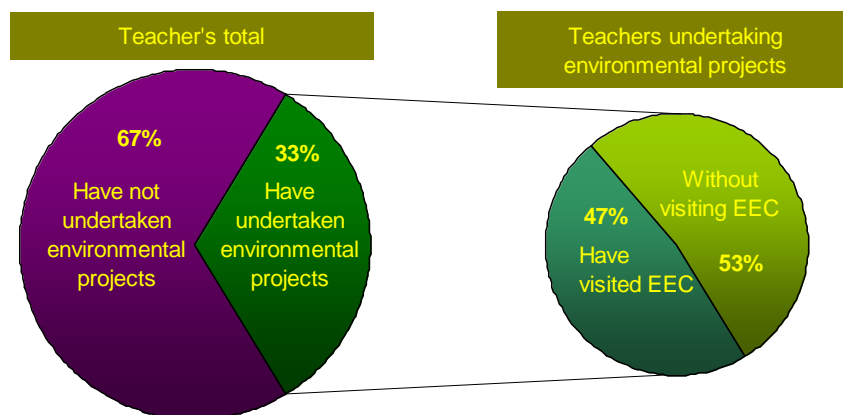
Figure 4: Frequency of environmental education projects and visits to Environmental Education Centers, per teacher.

On the other hand, environmental education remains a minority activity. Only 33% percent of the educational personnel, regardless of specialty, have implemented an environmental education project at some point of their career. Out of those, 47% have visited an Environmental Education Centre (EEC) in the context of an environmental project, while 53% have not (figure 4).

Even though teachers claim that environmental education is extremely important, most of them refrain from undertaking environmental education projects, which, as mentioned, remain a voluntary educational activity for the time being. An explanation for this fact could be provided by the next question, which aims to search for difficulties encountered by the teachers who implemented environmental education projects. Problems turn out to be abundant, with 97% of teachers reporting to have experienced some kind of difficulties in   the process. The most common of the difficulties reported is strict and inflexible school schedule (53%), funding difficulties (50%), lack of specialized knowledge in environmental issues (48%) etc, as there was the possibility of multiple answers [figure 5]. The Greek educational system has been criticized of being inflexible and centralized (Flouris and Pasias 2003), and the strict curriculum apparently hinders the undertaking of novel, community based activities, such as environmental education projects.

Teachers who refrained from undertaking environmental education projects- two thirds of the sample- were asked which the major deterring factor was. Only 3% answer that they did not find it necessary- 52% cited increased work load, 28% answered that they lacked specialised training and 7% give the spontaneous answer that they are newly appointed. These responses reveal that environmental education would propagate if the teachers received more specialized training.

Difficulties encountered during the implementation of environmental school projects
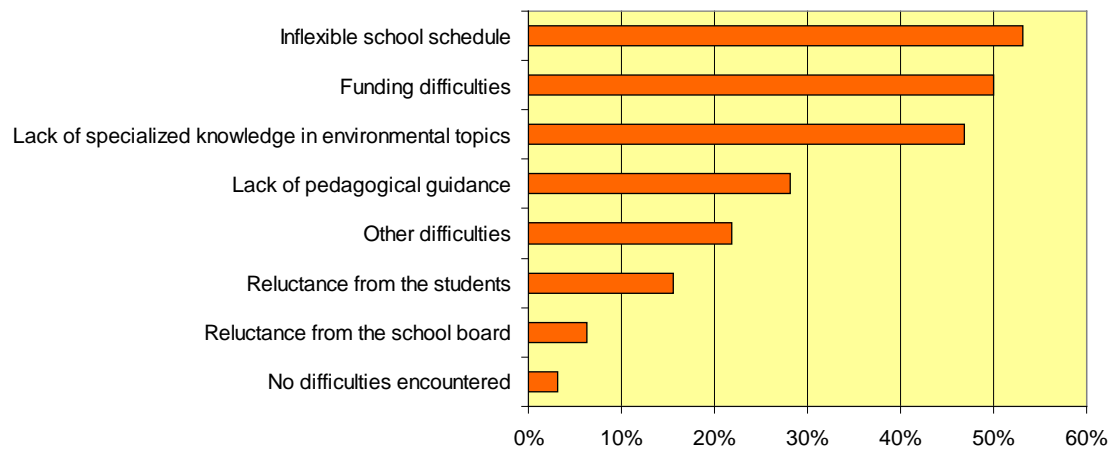
Figure 5: Difficulties encountered during the implementation of environmental school projects.

In spite of the practical difficulties, environmental education was found to offer the students multiple benefits. Teachers who have carried out environmental education projects observed various changes at their students' behavior: Enhanced interest in environmental issues (82%), improved cooperation between the students (79%), increased knowledge of environmental subjects (61%), decline of behavior problems (27%), increased participation in the school courses (24%) were among the benefits observed. A mere 3% did not witness any change in the student's behavior after their participation in environmental education projects [figure 6].
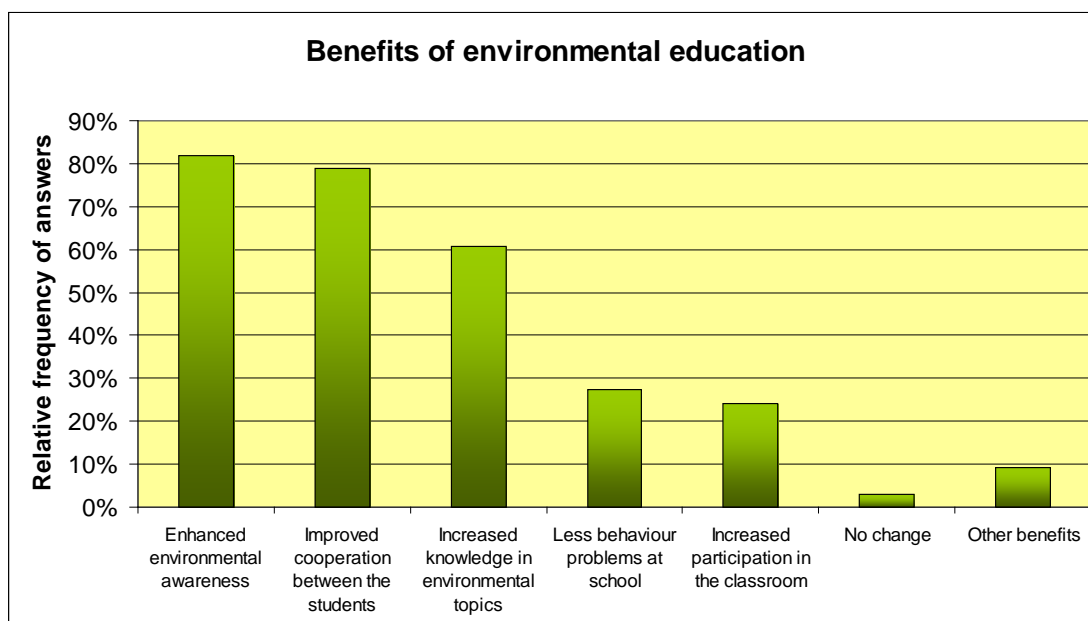
Figure 6: Benefits of environmental education.

Therefore, 97% of the teachers who undertake environmental education projects observe significant benefits as a result of this activity. The nature of these benefits extends beyond the scope of the environmental education and covers all aspects of the educational activity. Obviously, improved cooperation among students (reported by 79% of teachers), the reduction of delinquent behaviour in school (mentioned by 27% of teachers) and increased participation in the classroom (mentioned by 24% of teachers) can be included in the additional benefits of environmental education. These benefits, although outside of the original scope of environmental education (UNESCO 1978), act cumulatively and diffuse throughout the educational process.

The rewards from the implementation of environmental education could explain the finding that of the teachers who have undertaken environmental education projects, 71% did so multiple times. Possibly, after witnessing the benefits of environmental education in their classrooms, teachers decided to repeat it, overseeing the practicalities. Moreover, the general sample of teachers believe that environmental education "can help their students in the comprehension of their school courses", rating the validity of this sentence by 6.9 out of 10. The rate is higher between science teachers.

Respectively, teachers who have had implemented environmental education projects, were asked "Up to what extent was the implementation of environmental education projects helpful to the general learning process?" with the answerers requested on a gradient of 1 to 10. The average of the answers was 6.7 out of 10. On the breakdown of the answers according to the student's age, an interesting pattern occurs [figure 7]. As the age of the students increases, teachers become more restrained from stating that environmental education was helpful to the general learning process. This finding suggests that environmental education should begin in the first years of school.
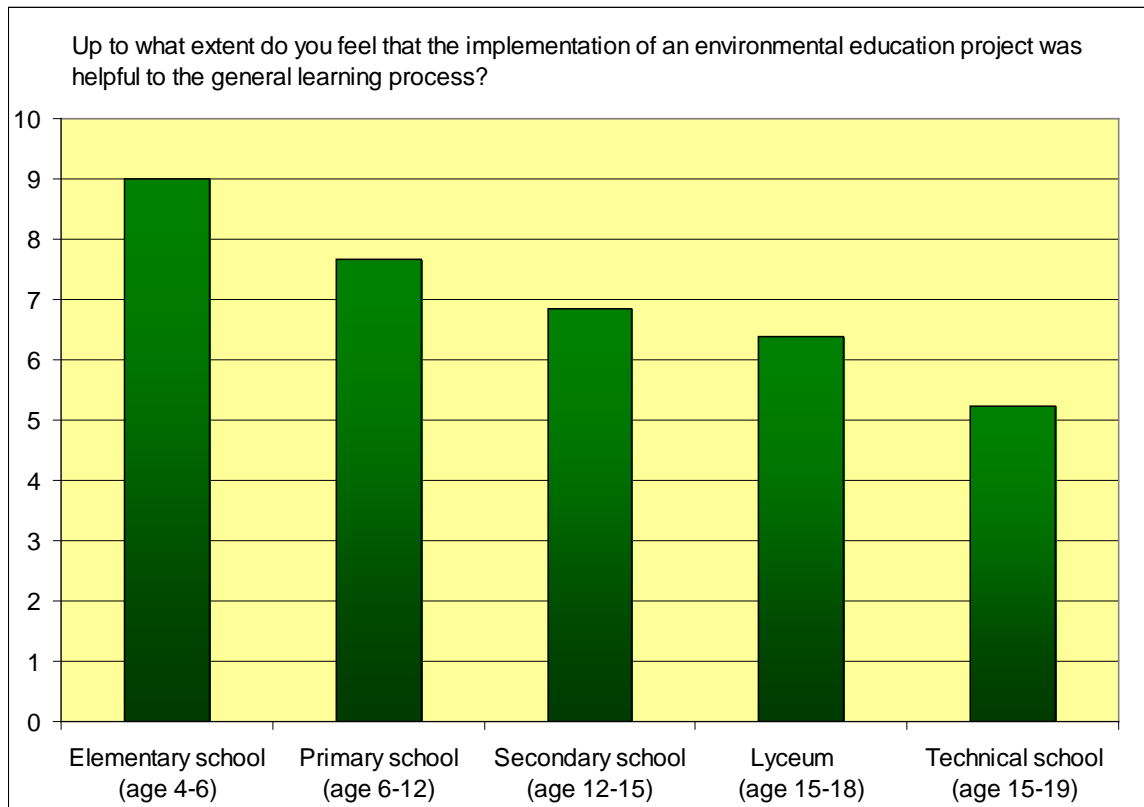
Figure 7: The extent to which teachers found the implementation of environmental education projects helpful to the general learning process. Graded answers from 1 to 10.

As we mentioned earlier, 41 **Environmental Education Centers** operate currently throughout the country. Their assignment consists of
-hosting and training students and teachers who belong to environmental school groups
-teacher's training with seminars and specialized actions
-informing and motivating the local communities in the direction of sustainability
Teachers were asked to assess the contribution of Environmental Education Centres, on a gradient of 1 to 10. The average was 6.4 out of 10, not a great score indeed. However, the attitude of those who have visited an EEC for environmental training is significantly improved (7.2 out of 10). We should also mention that a percentage of 15.4 % of the teachers is not informed about the contribution of the EECs and refrains from rating them [figure 8].
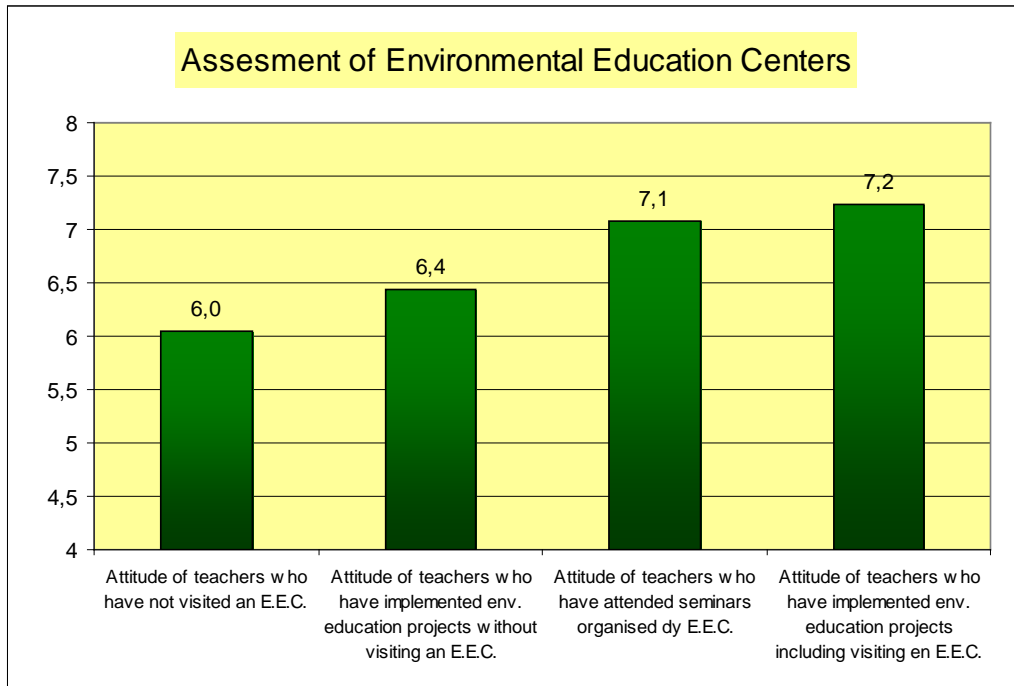
Figure 8: Attitude towards Environmental Education Centers improves among teachers who have visited them.

Another interesting finding is that the attitude of teachers depends on their school's distance to the closest Environmental Education Centre. Teachers who work close to an EEC have improved attitude towards them [figure 9].
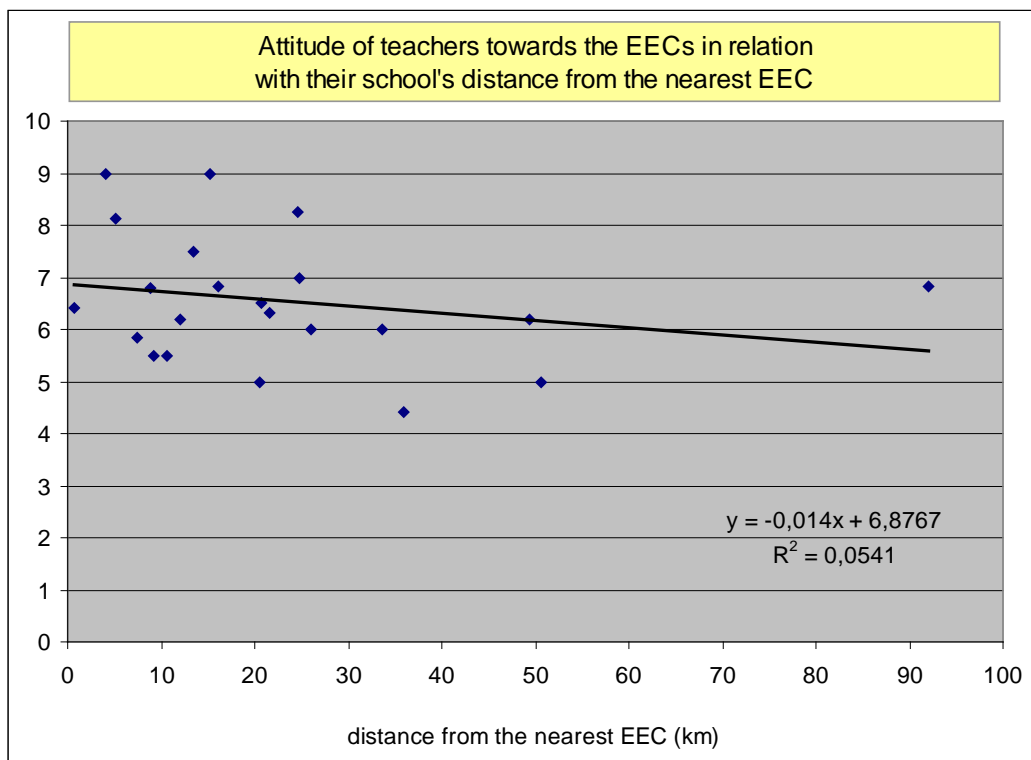
Figure 9: Attitude towards EECs in relation with the distance from the nearest EEC. (Linear least squares method).

Moreover, the frequency of environmental education projects in the selected schools was juxtaposed with their distance from the nearest EEC. It was found that teachers from schools which are nearest to an EEC

a) Are more probable to implement environmental education projects
b) Undertake a greater number of environmental education projects
c) Realise more educational visits at EECs
d) Are more likely to have attended seminars on environmental education
e) Have improved opinion for the contribution of EECs than the average teacher

On the last question, teachers who participated in the survey were asked to assess the questionnaire in terms of appearance, structure and intentions. The answers were asked in a gradient scale of 10 and the average outcome was 8.0 out of 10, which is considered satisfactory. A good assessment of the questionnaire attests its validity and adds credibility to the results (Karageorgos, 2002).

Discussion: Documented effects of Environmental Education

These findings suggest that EECs actually act as nuclei for the dissemination of environmental education.

In conclusion, in respect to environmental education, as it was applied in Greek schools, the fact that, according to our survey among teachers:

i) 98% ask for more information concerning environmental education/ education for sustainability
ii) There is unanimous consent about the importance of environmental education (9.23/10)
iii) 97% observe important benefits for their students during the implementation of environmental education projects
iv) 28% of those who have not undertaken environmental projects cite their lack of training as the major deterring reason
v) 48% concedes lack of specialized knowledge during the implementation of environmental education projects,

advocates to the need of supporting, consolidating and disseminating this model of environmental education.

Moreover, we can attest that Environmental Education Centers in Greece:

- Assist in the implementation of environmental education, which is a necessity of our times
- Ensure that environmental education will be practiced outdoors and not air-conditioned rooms
- Consist a good practice already exported abroad (Zachariou and Kadis 2008)
- Contribute to the optimum incorporation of European Union funds directed to the promotion of sustainable development
- Guide their share of funding into small and medium enterprises (SME), mainly in the Greek countryside
- Support the local communities, directly by creating a flow of visitors and indirectly by training the population towards sustainability.

Finally, we can assert that environmental education, as was implemented in Greece from 1992 to 2012, displays many features which are innovative on an international level, whereas Environmental Education Centers consist a good practice, already exported abroad. The main problems encountered derive from the inflexible school schedule, particularly in the second grade of education, and could be overcome with structural reforms. However, in the climax of the economic crisis outdoor environmental education is considered a luxury by a large portion of decision makers and its continuation is uncertain. In this respect the duty of the scientific community should be to commute the Greek experience to the international level, in order to salvage the lesser or greater gains made in the field of education for environmental awareness.

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APPENDIX:

QUESTIONNAIRE FOR PRIMARY EDUCATION TEACHERS

Name of school: _____

1. Specialty: _____ 2. Years of service _____

3. Sex
   - Male ☐
   - Female ☐

4. Age
   - 22-30 ☐
   - 31-40 ☐
   - 41-50 ☐
   - 51-60 ☐

5. Position:

   ☐   ☐   ☐
   Principle   Subprinciple   School board member

6. Education:

   ☐   ☐   ☐
   University degree   Master's Degree   Doctorate

7. Subject and title of post graduate thesis, if applicable:

   _____

8. How important do you feel environmental education is, nowadays?
   Mark a number from 10 (least important) to 1 (very important).

10	9	8	7	6	5	4	3	2	1

   VERY IMPORTANT   LEAST IMPORTANT

9. Doyoubelievethatitwouldbeusefultoyouifyouhadmoreinformationonenvironmentaleducation/ education for sustainability?

   ☐   ☐
   YES   NO

10. Do you believe that environmental education should become compulsory or remain on a voluntary basis?

    ☐   ☐
    COMPULSORY   VOLUNTARY

11. Do you feel that environmental education can help your students in comprehending their school courses?

10	9	8	7	6	5	4	3	2	1

    YES   MAYBE   NO

13. Have you ever attended a seminar organised by an Environmental Education Center?

☐
YES

☐
NO

14. If you have attended such a seminar, what was the subject _____ and in which Environmental Education Center? _____

15. Since you have attended such a seminar, how useful did you find it as regards to

A) your pedagogical skills:

| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

VERY USEFUL   NOT USEFUL

B) your scientific training:

| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

VERY USEFUL   NOT USEFUL

Γ) your undertaking novel activities in the classroom:

| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

VERY USEFUL   NOT USEFUL

16. Has your school implemented an environmental education project during the last tree years?

☐
YES

☐
NO

☐
I DON'T KNOW

17. Have you implemented any environmental education projects during your school service?

☐
YES

☐
NO

18. If not, why? (Answer this question only if your answer in the previous question was "NO").

☐
I did not find
it necessary

☐
Work overload/
Lack of spare time

☐
I did not have the
appropriate
training

☐
Other reasons
_____
_____
_____
_____

Answer the questions 19 – 25 <u>only</u> if your answer in question 17 was "Yes" i.e. if you have had implemented an environmental education project during your school service.

19. How many times (school years) have you undertaken an environmental education project, and on what subject?

    _____
    _____

20. What kind of difficulties did you encounter during the implementation of your environmental education projects?
    You can choose more than one answers.

    ☐ No difficulties

    ☐ Funding difficulties

    ☐ Lack of specialized skills

    ☐ Lack of pedagogical guidance

    ☐ Inflexibility of the school curriculum

    ☐ Reluctance from the principle

    ☐ Reluctance from the school board

    ☐ Reluctance from the students

    ☐ Reluctance from the students' parents

    ☐ Other difficulty _____

21. After the participation of your students in environmental education projects, have you noticed any change in their behavior concerning the following fields?
    You can choose more than one answers.

    ☐ Increased knowledge of environmental subjects

    ☐ Enhanced interest in environmental issues

    ☐ Improved cooperation between the students

    ☐ Increased participation in the school courses

    ☐ Decline of behavior problems

    ☐ Did not witness any change

    ☐ Other _____

22. Up to what extent was the implementation of environmental education projects helpful to the general learning process?

| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

VERY HELPFUL   NOT HELPFUL

23. Have you visited an Environmental Education Center as part of an environmental school project?

☐ YES   ☐ NO

24. If yes, how many times and at which environmental education center(s)?

_____
_____
_____
_____
_____

25. If no, it was because

☐ It was not in our pedagogical goals

☐ There were funding difficulties concerning transportation/ lodging/ nutrition costs

☐ The school was too far from the nearest environmental education centre

☐ There were problems associated with the inflexibility of the school curriculum

☐ Other _____

26. How do you assess this questionnaire in terms of appearance, structure and intentions?

| 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

EXCELLENT   GOOD   MEDIOCRE   UNACCEPTABLE

Notes, comments, suggestions:

_____
_____
_____
_____
_____

Green ICT in the Environmental Consciousness of Greek People

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Abstract

Every European country should provide: a) appropriate infrastructure for green ICT and b) education upon this infrastructure (basically to shape –through education– the environmental consciousness of ICT users) because it is not enough to have smart systems without knowing how to use them.

This article studies, presents and outlines the Greek green reality regarding infrastructure-benefits and educating the Greek state in green ICT. Specifically, via compiling an electronic questionnaire it investigates the opinion, attitude of "web" Greek people towards this reality and contributes this knowledge along with the results to the committees which will deal with the goals of the seventh pillar (green ICT) of the digital content matter. This knowledge defines the Greek green reality so that various committees will be able to define for 2020 Greece more accurate, justifiable and achievable goals, duties and suggestions.

Key-words: Green ICT, Digital Agenda, European Union, Environmental Awareness, Environmental Education

Introduction

Initially, in December 2008, the European Union expressed their commitment (Council of the European Union, 2007) to have achieved by 2020, the goals they had set regarding conserving energy and carbon dioxide emissions and emphasized the urgent need to accelerate improvement of energy efficiency (Council of the European Union, 2008). Energy efficiency is the central part of the European Union's efforts to overcome problems of energy safety and climatic change (COM, 2006 & COM, 2008).

Europe can only escape economic recession on a sustainable basis, which means direct use of technological innovations to overcome the problems in the development of energy efficiency with low carbon dioxide emissions. ICT can achieve: a) conserving energy and b) rapid and profound changes in every aspect of society, government and sector. As a result it is deemed necessary to create a policy framework which incorporates ICT in the attempt to face current problems.

Today, owing to the economic recession, Europe has to face demographic aging and global competition, thus for that reason they need to increase Europeans' subsistence level. To achieve this, the need for digital content matter arises, which defines the duties, goals, suggestions and actions which must be adhered to in order for Europe to develop viably, barring social discriminations. Consequently, all European countries (member states) are called upon compiling their National Digital Content Matter (i.e. a digital agenda for every European country).

The digital content matter that was presented by the European Committee for Europe has seven priority action fields (seven pillars) (European Union Law, 2011):
1) Create a common digital market.
2) Improve inter-functionality.
3) Increase trust and safety on the internet (combating electronic crime).
4) Faster access to internet (support investment in network).

5) Improve investment in research, innovation and development.
6) Improve digital literacy, abilities and facilitate social integration.
7) Apply information technology and communication to solve problems faced by society such as aging of population and climatic change.

This present article is closely connected with the seventh pillar of the digital content matter. This seventh pillar concerns ICT, where are now called "green ICT" because they acquire a green attitude and development with the primary goal to protect the environment. Through compiling an electronic questionnaire, this article investigates and represents Greek green reality regarding: a) the infrastructure and benefits of the Greek state to its citizens for the use of green ICT, b) education (information) of Greek citizens to use green ICT, c) green information (education) and environmental education of Greek citizens and d) the attitudes, stances and preferences of Greek citizens towards Environmental Education.

Goals and investigative questions of the research

With the presentation of the digital agenda, we have defined the actions that must be employed and applied by every European state with regard to conserving energy and carbon dioxide emissions. It highlights the important role of green ICT to these actions (handling environmental problems).

In order to apply the above mentioned actions in Greece, the environmental reality should be investigated. These actions will be applied on condition that they are known, understandable and the ground is appropriate. As a result it is a prerequisite, in order to use green ICT, on the one hand to provide the infrastructure to use green ICT and on the other hand to know and be positive towards the use of this technology, therefore it investigates: a) Greek infrastructure, b) education and use of green ICT, c) green education and environmental awareness and d) use, stance and citizens' opinion towards green ICT.

Therefore, initially the infrastructure and education in Greece ought to be investigated regarding green ICT and later on decisions must be made- by committees- decisions and changes which must take place so as to be included in the digital agenda and finally to set achievable goals by 2020. More specifically, the study parameters (research goals) as well as the research suppositions are as follows:

• Whether the Greek government has promoted environmental knowledge through formal and lifelong education. Whether Greek people in their everyday life apply their environmental knowledge which will lead to sustainable development. In particular, if they have the knowledge to: a) conserve energy of their appliances, b) smart ecological labels, c) recycling, d) methods for disposing waste, e) renewable sources of energy. Moreover, if they act green: a) not change mobile phones frequently, b) not leave the computer on for many hours, c) unplug appliances that are not in use, d) recycle and reuse old appliances, e) use automatic devices at home to reduce functional needs and f) use low consumption lamps.

  • Whether the Greek state offers citizens the appropriate infrastructure to sensitize, educate and use green ICT. In particular, whether it provides: a) free internet access, b) subsidies for solar panels, c) cheap tickets and frequent availability of public means of transport in all the areas, d) withdrawal of old cars and financial support for the use of hybrid cars, e) better prices for organic products, f) familiarization with Environmental Education Centers (E.E.C.) and g) giving incentives to people to join environmental organizations.

  • Whether the Greek state has made ICT known through formal and lifelong education. Whether Greek people are digitally trained, i.e. if they know and apply ICT in their everyday life. Specifically, if they can: a) use for their communication email or VoiceOverIP instead of the telephone, b) learn through e-learning, c) conduct tele-conference meetings, d) use e-banking for their bank transactions, e) make electronic purchases, f) make use of the electronic governing choices like opengov and e) opt for and apply exclusively cloud computing.

  • Whether Greek people have acquired and maintained green attitudes and opinions in their everyday life. Whether their attitude is green, for example, use tele-working, enjoy

digital reading, use mp3 players over cd/dvd. If they are interested not only in what is easy for them but also to contemplate on environmental damage like the one caused by the use of cordless communication. Moreover, whether they are aware of Environmental Education (E.E.) and knowledgeable about: a) the greenhouse effect, b) the society' sensitization for the environment, c) the conditions at schools regarding environmental awareness and lifelong development, d) information about ways to conserve energy, e) the contribution of the local council about issues of correct environmental and energy management, f) environmental pollution as an acute problem and g) establishing a green University.

The problem that the present article deals with is the study of the four above mentioned suppositions in relation to socio-economic criteria (age, gender, education, place of living, income) of Greek people certifying their presence as far as the level of infrastructure and education is concerned regarding green ICT and green awareness (green opinions and stances).

The general purpose of this research, based on the already mentioned guidelines, is to study Greek people's opinions about protecting the environment (environmental awareness) and the use of green ICT. The study is the result of the examination of the following three research questions:

- To what extent are Greek people sensitive towards the use of green ICT to protect the environment?
- Whether and to which degree the use of green ICT is facilitated by the state.
- To what extent "web" citizens use green ICT.

Research methodology and sample technique

In a recent Eurostat research (December 2011) in the European countries about the use of the internet, Bulgaria, Romania and Greece are in the lowest ranking as their citizens do not use the internet by 46%, 54% and 50% respectively while among the ones with the lowest percentage are Sweden (5%), Denmark and Holland (both 7%). In the same research regarding broad band connection, Greece is much lower than the average European as only 45% of Greek households use DSL connection. (Eurostat, 2011).

Based on the Eurostat research, it is revealed that in comparison with the mean European country, Greece has lost five years of penetration in internet access.

In the present research, the studied population refers to 50% of Greek people who use the internet as well as to 45% of Greek households which have DSL connection. As a result Greek "web" citizens are studied, meaning those who have access to internet through a computer. Those citizens (the participants in the research) are computer users, either beginners (basic knowledge of surfing on the internet and sending/receiving emails) or experts (professionals in the field of computers, students of the sciences, IT teachers etc.)

The characteristics of the population that will be studied reflect the knowledge, stances and opinions of Greek people about infrastructure and education of the Greek state with regard to green ICT. The research was materialised through an electronic questionnaire. More specifically, a Greek website through Google sites was created which was nationally accessible and included the electronic questionnaire as well as the relevant information.

The reason for choosing the electronic questionnaire was: a) to study "web" people (50% of the Greeks who have and use internet), b) low cost and easy access to interviewees and c) the not so detrimental to the environment method (no printing of questionnaires).

The first stage of the research was to determine the goals and to design the questionnaire. Setting goals is directly linked to the seventh pillar of the digital agenda (green ICT). The design of the questionnaire was also connected with the goals of the research. The aim of the present research is to collect data which highlight the knowledge, stances and opinions of Greek people about infrastructure and education of green ICT. For this reason prior to compiling the questionnaire, a discussion and recording of the opinions took place with people falling into three categories: a) those who are aware of green ICT (e.g. Environmental Engineers) and b) those for which the term green ICT was completely new.

There were two main reasons why the people who participated in the questionnaire (random mixture) were not specified. The first was that the research aspired to being of national range. The second reason was that Environmental Education concerns all Greek people.

The questionnaire was designed after: a) studying Greek infrastructure and benefits in green ICT and green education in these green technologies and b) seeking information which would be useful to the Heads of the Committees of the digital agenda to fulfil the goals of the seventh pillar.

It has to be noted that before the electronic presentation (publicizing) of the final questionnaire on the internet the coherence of the questionnaire was tested as a pilot run in ten people of various skills and education aged 20-35 years old, whose comments contributed to the final version of the questionnaire. The second step was to determine the sample. The size of the sample was as large as possible to achieve higher accuracy. The questionnaire lasted from 25/1/2011 to 30/11/2011 and was completed by 1069 people anonymously. It has to be noted that the large number of the sample was possible as the questionnaire was easy to comprehend and did not tire the participant. The answers to the questionnaire were filed in a Microsoft Excel file.

The research data which were collected through the electronic questionnaires were analysed quantitatively. The software used to analyse quantitatively the data was SPSS edition 18. (Norusis, 2004).

Compiling the questionnaire

The research was conducted along with preparing and submitting a relevant electronic questionnaire in Greek citizens regardless of age, gender, education, place of living and income.

The main restriction to compile the questionnaire was that the questions had to be understood by people of all ages (from 9 to 50+ years). In order to achieve that, for some questions that included ICT terms there was an explanation of the term, because somebody might have used ICT but not know the formal naming. In addition, in many questions the variant "I don't know" was included. This specific answer (I don't know) is of great significance as the interviewee shows: a) that he is aware of the degree of his knowledge and b) that he is completely unaware of his question. Finally in this way we avoid false evaluation of answers due to a haphazard answer.

The questions had to be short and concise so that they can be answered easily. Great effort was put into avoiding pointless questions in order to draw adequate and useful conclusions. The purpose of the questionnaire was on the one hand to gain the first impression of the interviewees and on the other hand not to be time consuming and inconvenient.

The questionnaire was checked on its form, language, coherence, difficulty and credibility on a pilot research prior to the main sample.

The test run research is an important stage as it aims to detect: a) whether the questions were understandable, b) whether each question provides the information it was designed for and c) whether it ensures the interviewees' interest and co-operation.

Moreover, during the test run period it was concluded that in order to have the right information from every question the interviewee could not leave a question unanswered. Therefore, in that last stage before the main sample, it became obligatory to answer all questions.

With the test run research, the questionnaire was corrected and tried again before the main sample, to determine its operation and to achieve further improvement.

Questionnaire's architecture

The electronic questionnaire that was used in this study has a total of 52 obligatory questions. The first five questions deal with socio-economic criteria of the participants and the rest 47 were divided into four sections based on the research goals (four study parameters) that have been set.
- Socio-economic criteria of the participants
  - age (9-12, 13-18, 19-24, 25-35, 36-49, 50+)
  - gender (male, female)

    o   education (Primary, Secondary, Senior High School or Vocational Training, Technological Training, University, Master's, PhD)

    o   place of living (at the centre of the city, near the city centre, relatively far from the city centre, far from the city centre, in a village, in a remote area)

    o   income (1-500, 501-800, 801-1100, 1101-1500, 1501-2000, 2000+ euro, I don't know)

- Questions concerning the benefits and infrastructure of Greek people by the state for the use of green ICT.
- Questions concerning the information (training) of Greek citizens for the use of green ICT.
- Questions concerning green information (education) and environmental awareness of Greek people.
- Questions concerning the Greek people's opinions, stances and preferences about E.E.

The characteristics of the sample's subjects

All in all, 1069 interviewees participated in the completion of the electronic questionnaire.

Specifically, 47.7% were men and the rest (52.3%) were women. In regard with the age, 9.4% were between 9-12 years old, 12.5% between 19-24 years old, 42.8% between 25-35 years old, 18.5% between 35-49 years old and the rest (4.3%) were over 50 years old.

Regarding the interviewees' level of education, 9.5% were primary school students, 9.4% junior High school students, 14.5% senior High school students or vocational training students, 38% University or Technological Institute undergraduates, 23.9% post-graduate students and only 4.8% PhD students.

The majority of the interviewees (57.8%) stated that they live either in the city centre (25.4%), or close to the city centre (32.4%). Among the ones questioned 15.4% stated that the live either relatively far from the city centre (11.3%) or far from the city centre (4.1%). Finally, 26.8% stated that they live either in a village (16.6%) or in a remote area (10.2%).

Finally, regarding the interviewees financial status, as can be seen by their monthly income: 16.7% earned up to 500€, 15.6% were within the range of 500€ and 800€, 22.4% declared an income of 800-1100€, 14.9% over 1100 up to 1500€ and only 16.5% earned more than 1500€. Finally, 13.9% of the interviewees did not reveal their income.

Results

The research goals of the present study investigate: a) the interviewees' opinions on the Greek state's infrastructure on green ICT, b) their opinions in relation to education and use of green ICT, c) their opinions regarding green education and environmental awareness and finally d) people's use, attitude and opinions on green ICT. In the next part the answers to the research questions are presented according to the order of questions.

First question: To what extent are Greek people sensitized towards the use of green ICT to protect the environment.

Based on the analysis of the data from the interviewees' opinions, it seems that the Greek state does not support environmental education but also does not shape students' attitude to a satisfactory degree through formal education in Primary and Secondary schools. More specifically, Greek students aged between 9 and 18 years do not apply their environmental education in their everyday life. In detail they have little or no knowledge about:

    a)   the energy consumption of their appliances

    b)   smart ecological labels

    c)   recycling

    d)   methods of waste disposal

    e)   renewable energy sources

Also they seem not to act green as:

    a)   they frequently change mobile phones

b) leave the PC on for several hours
c) do not unplug the appliances that they do not use
d) do not reuse and recycle old appliances
e) do not use or know of automatic devices at home to reduce their functional needs
f) do not use or know of low consumption lamps.

However, it is noted that the interviewees aged 19-49 years old answer more correctly in the questions on environmental knowledge. We could therefore assume that the Greek state infrastructure (as well as any support that is offered to citizens through life long living) is developed to such an extent that allows the increase in knowledge in these ages.

Second question: To what extent is the use of green ICT facilitated by the state.

The findings suggest that the Greek state does not provide to a large number its citizens with, on the one hand adequacy of technological infrastructure to sensitise them towards knowing and using green ICT and on the other hand, does not seem to support environmentally friendly actions. Specifically, it provides:
a) expensive internet access and expensive organic products
b) lack of information about E.E.C. and environmental organizations at the ages of 9 to 18 years
c) lack of support for the use of solar panels, public means of transport and hybrid cars.

Nonetheless, the interviewees state that they have at least one computer and at the same time feel content with the speed of connection. Thus, it is safe to assume that the state offers the necessities for the citizens' internet access although it is acknowledged as an expensive service.

Third question: To what extent do "web" people use green ICT.

It seems, based on data analysis and interpretation of the findings, that the Greek state has not publicized to a large extent green ICT through formal education (Primary and Secondary). In detail, Greeks aged 9-18 years old are not digitally trained, i.e. do not know or apply green ICT in their everyday life as they cannot:
a) use email and VoiceOverIP to communicate instead of the telephone
b) use e-learning
c) have meetings through teleconference

Also, they do not know:
d) e-banking
e) electronic commerce
f) electronic government choices
g) cloud computing

As it has already been mentioned, the ages with little or no knowledge and use of green ICT are between 9-18 years old. It also seems that in these ages it is believed that schools offer information with the aim of developing green (environmental) awareness. As a result what appears to be the case is not. The ministry of education, without further ado, should promote and operate correctly the green (sustainable) school.

However, it seems that the Greek state has to a large extent familiarized people with green ICT through life long education as the ages 19-49 years old answer better to the questions that deal with the use of green ICT. Thus, the mean numbers of Greek people who make better use of green ICT are women and generally citizens aged 19-49 years old with higher education and a relatively high income who are city dwellers.

It is also worth noting certain preferences and opinions of Greek people such as:
- Seven out of ten Greeks prefer reading on printed paper rather than digital reading.
- Six out of ten Greeks prefer listening to music on an mp3 player instead of cd/dvd.
- Six out of ten Greeks prefer cordless machines.
- Five out of ten Greeks are positive towards establishing tele-working as ideal work.
- Six out of ten Greeks are not fully aware of the greenhouse effect.
- Seven out of ten Greeks believe that in schools today little or no information is provided in order to cultivate environmental awareness.
- Seven out of ten Greeks believe that the school is the most important factor to sensitize the society about the environment.

- Four out of ten Greeks believe that the school can contribute to sustainable development.
- Nine out of ten Greeks believe that the local council has not been involved or informed the citizens on matters of correct environmental and energy management.
- Eight out of ten Greeks believe that environmental pollution is a serious problem for Greece.
- Seven out of ten Greeks are positive towards the establishment of a green University.

Nonetheless, six out of ten Greeks believe that their source of information on ways to save energy is either through the internet or public means of information etc.

Conclusions

Every country, but Greece even more, due to lack of industrial production, faces environmental, social and economic crises owing to over consumption. The solution to over consumption is the replacement with Sustainable Development and Sustainability, whereby the citizens' true needs will be covered by the use of Green Technologies. It is a general rule that in order to apply and develop one technology it should be known beforehand. Consequently, environmental education about green ICT, sustainable development and sustainability ought to be incorporated in Greek education.

It is important to apply a green educational reform into Greek education, which will attempt to combine education with (Agronews, 2011): a) sustainable education and sustainability on a local and national level, b) green ICT, c) green professions, d) renewable energy sources and energy saving, e) climatic change. Through the use of this educational reform there will be a direct improvement of environmental knowledge, opinions and the systematic use of green ICT in the age group of 9-18 year olds.

In contemporary times, it is undeniable that the environment is one of the most important and pressing matters, worthy of everybody' attention. Therefore it is necessary for all people to develop a more positive and active attitude towards the environment. The intensity and extent of the environmental problems that threaten the planet's viability ever since the 1960s have generated great interest about the environment and its problems. Under this light, the Greek state should participate in the actions to protect the environment by: a) providing the appropriate infrastructure about the use of green ICT for all the citizens, regardless of place of living and income and b) making known the use of green ICT through Greek education so as to escape the ecological crisis.

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PART II

Παιδεία Βασισμένη στην Ισόρροπη και Υγιή Νόηση ως Απαραίτητη Προϋπόθεση για την Αειφορική Ανάπτυξη.

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Περίληψη

Στην παρούσα εργασία αναλύεται η απόλυτα ισόρροπη και υγιής νόηση χρησιμοποιώντας το μοντέλο της υγιούς νόησης του Πλάτωνα καθώς και η παραδεκτά ισόρροπη και υγιή νόηση χρησιμοποιώντας το μοντέλο της μεσότητας της αρετής από τον Αριστοτέλη. Τα μοντέλα αυτά εμπλουτίζονται με σύγχρονες μαθηματικές και τεχνολογικές βάσεις, όπως είναι τα νευρωνικά δίκτυα, ώστε να γίνεται πλήρης ανάλυση των επιπτώσεων στην παιδεία που στοχεύει στην αειφορική ανάπτυξη καθώς και στην ποιότητα ζωής. Επισημαίνονται επίσης οι επιπτώσεις που μπορεί να υπάρξουν από την μη ισόρροπη ανάπτυξη της νόησης οι οποίες μπορεί να εκτείνονται από την οικονομική κρίση που βιώνουμε σαν αποτέλεσμα μιας κακής παγκοσμιοποίησης μέχρι την πλήρη καταστροφή του πλανήτη. Επίσης αναλύονται οι μέθοδοι αυτών που κερδοσκοπούν σε βάρος της αειφορικής ανάπτυξης, που βασίζονται γενικά στη μη υγιή και ισόρροπη νόηση την οποία συντηρούν, ώστε να συσσωρεύουν οικονομική και πολιτική δύναμη σε βάρος του περιβάλλοντος και του κοινωνικού συνόλου.

Abstract

This work deals with the analysis of the absolute balanced healthy mind using the healthy mind model of Plato, as well as, the acceptable balanced healthy mind using the model of midway of virtue of Aristotle. These models are enhanced by current mathematical and technological bases like neuron networks, so that to obtain a complete analysis on education which targets on sustainable development and quality in life. Furthermore, the impacts of the imbalanced non healthy mind are pinpointed, which could be expanded from the current crisis of the wrong globalization process we are facing up to the total destruction of our planet. In addition, the methods used by those who make profit against sustainable development, which are based on the maintenance for the public of a non balanced neither healthy mind and which help them to accumulate financial and political power against the environment and the public interests, are also presented.

Εισαγωγή

Η φιλοσοφία που αναπτύχθηκε εδώ και χιλιάδες χρόνια ήταν αρχικά συνδεδεμένη με όλες τις επιστήμες και αποτελούσαν ένα αρμονικό σύνολο, χαρακτηριστική ήταν η επιγραφή στη κυρία είσοδο των φιλοσοφικών σχολών «*Μηδείς Αγεωμέτρητος Εισίτω*». Η μεν φιλοσοφία παρείχε το υπόβαθρο για τη σωστή χρήση της επιστήμης στην πρόοδο του ανθρώπου, οι δε επιστήμες παρείχαν στη φιλοσοφία τα απαραίτητα επιστημονικά εφόδια για να μπορεί η ίδια με αναλυτική λογική να ασκεί κριτική και να θέτει ερωτήματα σε οποιοδήποτε θέμα συζήτησης (University of Oxford 2012). Τα τελευταία περίπου 1500 χρόνια η φιλοσοφία έχει διαχωρισθεί από τις επιστήμες με αποτέλεσμα σήμερα να μην διαθέτει πολλά από τα επιστημονικά τεκμήρια που χρειάζεται να στηρίξει τη λειτουργία της και έτσι ουσιαστικά είναι νεκρή. Ο θάνατος της φιλοσοφίας είχε και έχει ολέθρια αποτελέσματα το χειρότερο των οποίων είναι η κακή παγκοσμιοποίηση την οποία βιώνουμε η οποία συντελείται από «άμουσους» και συνεπώς εχθρούς της αειφορίας ανθρώπους.

Η αειφορία βασίζεται σε μεγάλο βαθμό στην παιδεία που έχουν τα άτομα ή οι ομάδες ατόμων. Η παιδεία πέρα του γνωσιακού της στόχου πρέπει κατά κύριο λόγο να έχει σαν υπόβαθρο τον ίδιο

τον άνθρωπο και ιδιαίτερα την υγιή ανθρώπινη νόηση η οποία κατευθύνει όλες τις σκέψεις και πράξεις του ατόμου. Η παιδεία συνεπώς πρέπει να προσεγγίζεται με τρόπο που να συμβάλλει στην ανάπτυξη υγιούς και ισόρροπης νόησης. Χαρακτηριστικά στην Πολιτεία του Πλάτωνα αναφέρεται: «Όπως όταν στο σώμα διαταράσσεται η ισορροπία (π. χ., λειτουργία του στομάχου – περισσότερα οξέα) χρειάζεται ιατρική περίθαλψη και θεραπεία, το ίδιο και όταν στην ανθρώπινη νόηση διαταράσσεται η ισορροπία, χρειάζεται παιδεία». Το ζήτημα της Ελληνικής παιδείας πραγματεύεται διεξοδικά ο Jaeger Werner 1945, στο ομώνυμο βιβλίο του.

Στην παρούσα εργασία θα επιχειρηθεί η χρήση σύγχρονων επιστημονικών και τεχνολογικών βάσεων για να στηριχθούν οι φιλοσοφικές δομές που θα θεμελιώσουν την παιδεία ώστε αυτή να συμβάλλει στην ανάπτυξη υγιούς νόησης, που είναι απαραίτητη για κάθε σωστή ανθρώπινη ενέργεια συμπεριλαμβανομένης και της αειφορικής ανάπτυξης.

Μοντέλο απόλυτα υγιούς και παραδεκτά υγιούς νόησης

Το μοντέλο της απόλυτα υγιούς νόησης προέρχεται από την ανάλυση του υλικού στα έργα του Πλάτωνα *Πολιτεία* (435α – 445ε) και *Φαίδρος* (246α – 254ε). Το μοντέλο βασίζεται στην ανάλυση της ανθρώπινης νόησης σε τρεις αντιπροσωπευτικές συνιστώσες οι οποίες είναι η *λογική*, η *επιθυμία* και ο *θυμός*. Απόλυτα υγιής νόηση υπάρχει όταν η λογική ελέγχει και ισορροπεί την επιθυμία και το θυμό, … *ουκούν τω μεν λογιστικώ άρχειν προσήκει…* (Πολιτεία 441ε). Ο Πλάτωνας φέρνει πολλά παραδείγματα για να τεκμηριώσει την αντιπροσώπευση της νόησης με τις τρεις αυτές συνιστώσες, επίσης για να ερμηνεύσει τη λειτουργία της απόλυτα υγιούς νόησης παρομοιάζει το σύστημα αυτό με μια άμαξα που την έλκουν δύο άλογα ένα *τυφλό* που μπορεί να θεωρηθεί ότι είναι η επιθυμία, ένα *τρελό* που μπορεί να θεωρηθεί ότι είναι ο θυμός και ο *ηνίοχος* που θεωρείται να είναι το λογικό και πρέπει να οδηγήσει την άμαξα στο σωστό δρόμο (*αρετή*).

Το μοντέλο της παραδεκτά υγιούς νόησης προέρχεται από το μαθητή του Πλάτωνα Αριστοτέλη ο οποίος θεμελιώνει την αρετή σαν μεσότητα των δύο άκρων. … *περί μεν ουν φόβους και θάρρη ανδρεία μεσότης* …(Ηθικά Νικομάχεια Β-7). Ο Αριστοτέλης θεωρεί ότι η αρετή, στη συγκεκριμένη περίπτωση η ανδρεία, βρίσκεται στο μεσοδιάστημα (μεσότητα) ανάμεσα σε δύο ακραίες θέσεις ή κακίες που είναι η δειλία και η θρασύτητα. Μάλιστα επεξηγεί ότι η μία ακραία θέση έχει έλλειψη σε σχέση με την αρετή (η δειλία έχει έλλειψη θάρρους) ενώ η άλλη ακραία θέση είναι υπερβολή σε σχέση με την αρετή (η θρασύτητα υπερβαίνει την αρετή σε θάρρος) …*μεσότης δε δύο κακιών, της μεν καθ' υπερβολήν της δε κατ' έλλειψην …, …έσται γαρ ούτω γε υπερβολής και ελλείψεως μεσότης* …(Ηθικά Νικομάχεια Β-6). Παρόμοια μπορεί κανείς να διακρίνει την οικονομία σαν αρετή στο μεσοδιάστημα ανάμεσα στην τσιγκουνιά και τη σπατάλη.

Ο Αριστοτέλης προβληματίζεται με το γεγονός ότι η μεσότητα δεν είναι ένα σταθερό μεσοδιάστημα και ενδεχομένως κάθε ένας μπορεί να την εκτιμά ότι βρίσκεται σε διαφορετικό σημείο … *τούτο δε ουχ εν, ουδέν ταυτόν πάσιν* …(Ηθικά Νικομάχεια Β-6) και προσπαθεί να χρησιμοποιήσει μεθόδους στατιστικής για να κάνει τη διατύπωση αυτή: … *του μέσου αν είη στοχαστική* …(Ηθικά Νικομάχεια Β-6). Θα μπορούσαμε εδώ να πούμε ότι ο Αριστοτέλης είναι ο ιδρυτής της στατιστικής δεδομένου ότι η επιστήμη αυτή είναι μια στοχαστική διαδικασία και καλείται διεθνώς *stochastic process* μέχρι σήμερα. Είναι προφανές συνεπώς ότι η διαδικασία εντοπισμού της μεσότητας της αρετής οφείλει να γίνει με ευρύτερη συναίνεση κάτι που εξασφαλίζουν οι δημοκρατικές διαδικασίες, αλλά προσοχή, αυτές έχουν νόημα μόνον όταν οι άνθρωποι που ψηφίζουν έχουν παιδεία και ελάχιστη προκατάληψη, όπως θα αναλυθεί πιο κάτω.

Θα πρέπει να σημειωθεί εδώ ότι η ερμηνεία της μεσότητας από ερευνητές στο διεθνή χώρο σαν *μέσο όρο* (*mean*) είναι επιστημονικά ανεπαρκής και λανθασμένη διότι ο μέσος όρος δεν έχει καμία αξία αν δεν συνοδεύεται από τη *διασπορά* και ο Αριστοτέλης με τον όρο μεσότητα ορίζει ένα μεσοδιάστημα που περιλαμβάνει το μέσο όρο μαζί με τη διασπορά. Η μεσότητα ή διασπορά επιτρέπει σχεδόν απεριόριστες επιλογές του παραδεκτά σωστού και σε αυτό ο Αριστοτέλης είναι ξεκάθαρος … *μεσότης μεν ελευθεριότης, υπερβολή δε και έλλειψις ασωτία και ανελευθερία* (Ηθικά Νικομάχεια Β-7) που σημαίνει ότι ο άνθρωπος για να είναι ελεύθερος θα πρέπει πρώτα να καθορίσει τα όρια των ενεργειών και των πράξεων του.

Ο Αριστοτέλης ουσιαστικά με τη διαδικασία της μεσότητας μοντελοποιεί το ανθρώπινο λάθος το οποίο εμπεριέχεται σε κάθε ανθρώπινη ενέργεια. Το λάθος ξεκινά από μια μηδενική τιμή και εφόσον βρίσκεται εντός των ορίων της μεσότητας της αρετής θεωρείται η ενέργεια καλή και σωστή, ακολούθως εφόσον το λάθος ξεπεράσει τα όρια της μεσότητας μπορεί να φθάσει το άπειρο και η αντίστοιχη ενέργεια θεωρείται κακή και λανθασμένη … *εις άπειρον ζητούσι την υπερβολήν*... (Αριστοτέλους των πολιτικών: 1267β). Συνεπώς, η παραδεκτά υγιής νόηση είναι αυτή της οποίας το λάθος βρίσκεται εντός των ορίων της Αριστοτελικής μεσότητας.

Ενίσχυση και ανάλυση των μοντέλων νόησης με σύγχρονη επιστήμη και τεχνολογία.

Η αναλυτική αναπαράσταση του μοντέλου της απόλυτα υγιούς νόησης του Πλάτωνα μπορεί να φανεί στο Σχήμα 1α, β. Στο παράδειγμα αυτό η απόλυτα σωστή νόηση εξαρτάται από την απόλυτα σωστή λογική η οποία ισορροπεί ακριβώς την επιθυμία και το θυμό.
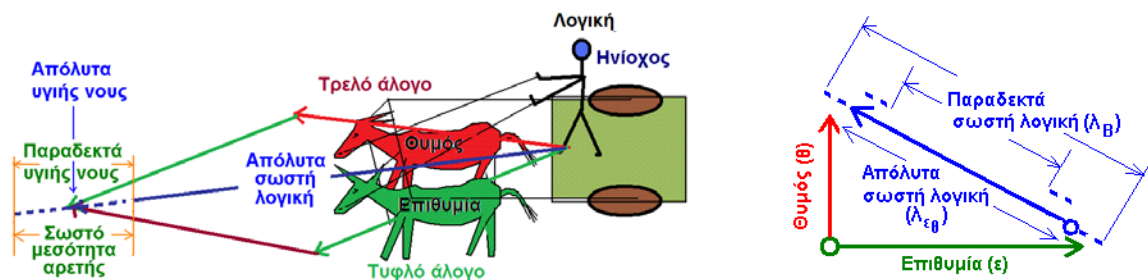
Σχήμα 1: (α) Το παράδειγμα του Πλάτωνα, (β) Η γεωμετρική ερμηνεία του παραδείγματος.

Δεδομένου ότι τα δύο άλογα έλκουν την άμαξα, η ισορροπία είναι ισορροπία δυνάμεων όπως συμβαίνει στη φυσική και η ισορροπούσα λογική είναι η υποτείνουσα ορθογωνίου τριγώνου του οποίου οι κάθετες πλευρές είναι η επιθυμία και ο θυμός αντίστοιχα (Βλέπε Σχήμα 1β). Αναλυτικά η απόλυτα ισορροπούσα λογική $\lambda_{\varepsilon\theta}$ μπορεί να εκφρασθεί με το Πυθαγόρειο θεώρημα:
$$\lambda_{\varepsilon\theta}{}^2 = \varepsilon^2 + \theta^2 \qquad (1)$$
Όπου (ε) είναι η επιθυμία και (θ) είναι ο θυμός.
Η απόλυτα σωστή λογική μπορεί σαν μοντέλο και σαν ιδανικό να χρησιμοποιηθεί για την παιδεία δεν μπορεί όμως να επιτευχθεί από τον άνθρωπο του οποίου η λογική λόγω της νευρωνικής σύστασης του εγκεφάλου εμπεριέχει *πάντοτε* το λεγόμενο *ανθρώπινο λάθος*. Έστω ότι η λογική μιας ανθρώπινης ενέργειας είναι (λ), τότε το ανθρώπινο λάθος (Χ) μπορεί να ορισθεί από τη σχέση:
$$X = \lambda - \lambda_{\varepsilon\theta} \qquad (2)$$
Εδώ μπορούμε να υιοθετήσουμε το μοντέλο *της παραδεκτά σωστής νόησης* που βασίζεται στη μεσότητα της αρετής του Αριστοτέλη (δεδομένου μάλιστα ότι η αρετή είναι ανθρώπινη ενέργεια και πράξη) και να δεχθούμε ότι αν το ανθρώπινο λάθος είναι μικρότερο κατ' απόλυτο τιμή από ένα κατώφλι ξ > 0, τότε η ενέργεια που προκύπτει από το λάθος αυτό θεωρείται παραδεκτά σωστή.
$$|X| < \xi \qquad (3)$$
Αν το κατώφλι αυτό είναι γνωστό, τότε μπορεί επακριβώς να ορισθεί η παραδεκτά υγιής νόηση και η παραδεκτά σωστή λογική όπως αυτή φαίνεται στο Σχήμα 1α, β. Για να ορίσουμε το κατώφλι αυτό κάνουμε τον εξής συλλογισμό: *Έστω Χ το ανθρώπινο λάθος και έστω Υ το ανθρωπίνως σωστό σε μια συγκεκριμένη ανθρώπινη ενέργεια. Αφού στην ενέργεια αυτή σωστό και λάθος συνυπάρχουν, τότε αυτά είναι το ένα αντίστροφο του άλλου, δηλαδή όταν το λάθος της ενέργειας αυξάνεται, τότε η ορθότητα της μειώνεται και αντίστροφα όταν το λάθος της ενέργειας μειώνεται η ορθότητα της αυξάνεται.* Αυτό εκφράζεται μαθηματικά με την εξής σχέση:
$$X = 1/Y \qquad (4)$$
Το όριο συνεπώς, που διαχωρίζει το σωστό από το λάθος βρίσκεται στη θέση |Χ| = ξ. Εφόσον όμως αυτό είναι όριο κοινό και στο Χ και στο Υ θα πρέπει πάνω στο όριο αυτό τόσο το Χ όσο και

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το Υ να έχουν την ίδια τιμή, δηλαδή Χ = Υ (Χατζόπουλος Ι., 2012 σελ 359, Hatzopoulos J., 2008, pp. 247). Αντικαθιστώντας λοιπόν την τιμή του Υ στην (4) με την τιμή του Χ έχουμε:

$$X = 1/X \rightarrow X^2 = 1 \rightarrow X = \pm 1 \rightarrow |X| = 1 \text{ ή } \xi = 1 \qquad (5)$$

Με τον συλλογισμό αυτό το μεσοδιάστημα της αρετής ορίζεται με μαθηματική ακρίβεια και μπορεί να φανεί παραστατικά στο Σχήμα 2. Στο Σχήμα αυτό η έλλειψη σε σχέση με το σωστό παρίσταται με το αρνητικό λάθος, ενώ η υπερβολή σε σχέση με το σωστό παρίσταται με θετικό λάθος.

Σχήμα 2: Ο άξονας (Χ) του ανθρώπινου λάθους με το μεσοδιάστημα του σωστού.

Αν θεωρήσουμε, όπως ισχυρίζεται ο Πλάτωνας, ότι οι τρεις καταστάσεις της νόησης (λογική, επιθυμία, θυμός) αντιπροσωπεύουν όλες τις καταστάσεις του ανθρώπινου νου, τότε μπορούμε να δημιουργήσουμε ένα τρισδιάστατο γεωμετρικό χώρο ο οποίος θα αναπαριστά όλες τις
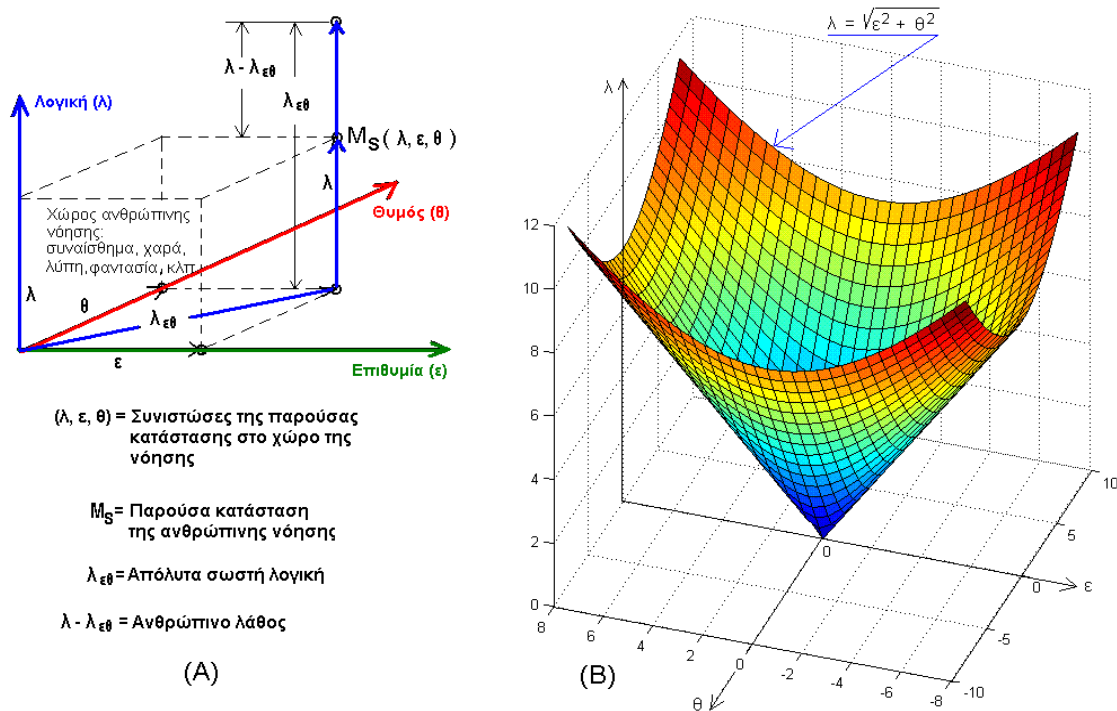
Σχήμα 3: (Α) Ο τρισδιάστατος χώρος της νόησης, (Β) Ο απόλυτα σωστός χώρος της νόησης.

εκδηλώσεις της ανθρώπινης νόησης M_S με τρεις συντεταγμένες (λ, ε, θ) όπως φαίνεται στο Σχήμα 3 (Α). Στην περίπτωση αυτή θα υπάρχει *αμφιμονοσήμαντη αντιστοιχία* ανάμεσα στις τρεις αυτές συντεταγμένες και σε μια συγκεκριμένη κατάσταση της ανθρώπινης νόησης, δηλαδή, σε κάθε κατάσταση της νόησης θα αντιστοιχούν τρεις μοναδικοί σε συνδυασμό αριθμοί, ενώ σε κάθε τριάδα αριθμών θα αντιστοιχεί μία και μοναδική κατάσταση νόησης. Μέσα στο χώρο αυτό επίσης μπορούμε να σχεδιάσουμε όλα τα σημεία τα οποία αντιστοιχούν στην απόλυτα σωστή νόηση και που δίνονται από τη συνάρτηση $\lambda_{\varepsilon\theta} = \sqrt{\varepsilon^2 + \theta^2}$ και σχηματίζουν την έγχρωμη επιφάνεια, όπως

φαίνεται στο Σχήμα 3 (Β). Δημιουργώντας δύο παράλληλες επιφάνειες εκατέρωθεν της επιφανείας αυτής και σε απόσταση ±1ορίζουμε τον χώρο της παραδεκτά υγιούς νόησης.

Συνοψίζοντας αυτά που αναλύθηκαν πιο πάνω καταλήγουμε στο συμπέρασμα ότι το μεσοδιάστημα της αρετής οριοθετείται σε απόσταση ±1 εκατέρωθεν ενός ανθρώπινου λάθους με μέσο όρο μηδέν. Υπόψη ότι ο μέσος όρος του ανθρώπινου λάθους μπορεί να έχει όριο το μηδέν με την προϋπόθεση ότι οι άνθρωποι έχουν παιδεία και είναι ενάρετοι και δεν έχουν σημαντική προκατάληψη. Υπ' αυτήν την έννοια η προκατάληψη ορίζεται με μαθηματικό τρόπο σαν τη μη μηδενική ποσότητα του μέσου ανθρώπινου λάθους. Επίσης όταν η προκατάληψη βρίσκεται μέσα στα όρια της μεσότητας της αρετής θεωρείται μη σημαντική. Από τη στατιστική όμως είναι γνωστό ότι μια τυχαία μεταβλητή με κανονική κατανομή που έχει μέση τιμή μηδέν και διασπορά 1, ακολουθεί την πρότυπη κανονική κατανομή του Gauss. Αυτό φαίνεται στο διάγραμμα του Σχήματος 4, όπου στον άξονα Χ είναι το ανθρώπινο λάθος και στον άξονα Ζ είναι το σύνολο των ανθρώπων που ο μέσος όρος του λάθους τους είναι Χ.
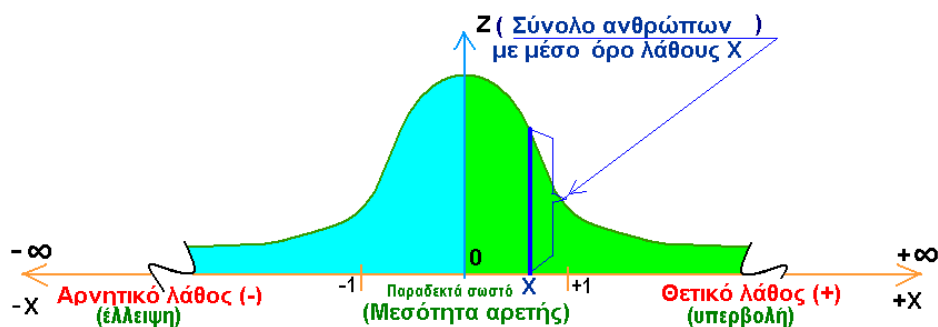
Σχήμα 4: Η κατανομή του ανθρώπινου λάθους με την προϋπόθεση ότι έχουν παιδεία και μη σημαντική προκατάληψη (Hatzopoulos 2004, 2009, Χατζόπουλος, 2005, 2005α).

Αν λάβουμε υπόψη ότι η φύση έχει σχεδιάσει την ανθρώπινη νόηση να αποδίδει σύμφωνα με την πρότυπη κανονική κατανομή του Gauss όπως φαίνεται στο Σχήμα 4, τότε οι ενάρετοι άνθρωποι με τυπική απόκλιση σ = ±1 θα πρέπει να αποτελούν το 68.26% το συνολικού πληθυσμού της γης. Αντίστοιχα αν διπλασιασθούν τα όρια του μεσαίου χώρου και γίνουν 2σ, τότε έχουμε το 95.45% του συνολικού γήινου πληθυσμού να βρίσκεται μέσα στα όρια αυτά. Αν τριπλασιασθούν τα όρια αυτά σε 3σ, τότε έχουμε 99.73% του συνολικού γήινου πληθυσμού να βρίσκεται μέσα στα όρια αυτά. Θα πρέπει να σημειωθεί ότι οι άνθρωποι στην περιοχή από 1σ μέχρι 3σ που αντιστοιχεί στο 31.47% του συνολικού πληθυσμού της γης, δεν κάνουν κάποιο σημαντικό λάθος ίσως μια παράνομη στάθμευση περισσότερη εργασία ή υπερκόπωση, κλπ., δεν είναι δηλαδή λάθος το οποίο δημιουργεί σοβαρά προβλήματα. Αντίθετα το λάθος πέραν του 3σ που αντιστοιχεί στο 0.27% του γήινου πληθυσμού, εκφράζει την καταστρεπτική δύναμη της νόησης η οποία γίνεται κολοσσιαία όταν τείνει στο άπειρο και που ενδεχομένως έχει επιτραπεί από το σχεδιασμό της φύσης για λόγους αυτοάμυνας.

Θα πρέπει επίσης να σημειωθεί ότι η Αριστοτελική μεσότητα της αρετής έχει παγκόσμια εμβέλεια. Αν πάρουμε τις τροχιές της γης γύρω από τον ήλιο θα διαπιστώσουμε ότι κάθε μια από αυτές είναι διαφορετική από τις άλλες. Όλες οι τροχιές μπορούν να χαρακτηρισθούν από ένα μέσο όρο και μια διασπορά, άρα η γη για να κινείται σωστά θα πρέπει να περιορίζει την κίνηση της μέσα στα όρια της διασποράς (μεσότητα αρετής). Αν ξεφύγει από τα όρια αυτά θα είναι λάθος με ολέθριες συνέπειες. Όταν το λάθος είναι θετικό (υπερβολή) η γη θα τείνει να χαθεί στο διάστημα, όταν το λάθος είναι αρνητικό (έλλειψη) η γη θα τείνει να συγκρουσθεί με τον ήλιο. Υπ' αυτήν την έννοια η διασπορά αποτελεί παράγοντα σχεδιασμού της φύσης και έχει να κάνει με την εξέλιξη των όντων. Αν δεν υπήρχε διασπορά στο σχεδιασμό αυτό δεν θα υπήρχε και εξέλιξη και όλα θα λειτουργούσαν σε μια αενάως επαναλαμβανόμενη ρουτίνα.

Καθήκον μας και πιθανόν προορισμός μας σαν άνθρωποι είναι πέραν της ποιότητας ζωής, που έχουμε υποχρέωση να εξασφαλίσουμε για το κοινωνικό σύνολο όπου η αειφορία αποτελεί βασική παράμετρο, έχουμε επίσης καθήκον και υποχρέωση να κάνουμε εξερεύνηση τόσο των φυσικών

νόμων όσο και τον χώρο της νόησης. Αυτό επιβάλλεται διότι η φύση είναι τέλεια σε όλες της τις εκδηλώσεις και τυχόν αντίθεση μας με τη φύση θα έχει καταστρεπτικές συνέπειες και αποτελέσματα. Ο Αριστοτέλης μας δίνει ένα χαρακτηριστικό παράδειγμα για κάτι που είναι αντίθετο προς τη φύση και είναι μάλιστα επίκαιρο … *Τα δε καλά και τα δίκαια περί ων η πολιτική σκοπείται, πολλήν έχει διαφοράν και πλάνην, ώστε δοκείν νόμω μόνον είναι, φύσει δε μη* …(Ηθικά Νικομάχεια Α-3).

Το σημερινό παγκόσμιο πρόβλημα, συνεπώς, είναι η προκατάληψη η οποία διαχωρίζει τον ανθρώπινο πληθυσμό σε υποομάδες με κάθε υποομάδα να έχει τη δική της προκατάληψη. Η προκατάληψη έχει να κάνει καθαρά με τον τρόπο που ενεργεί ο άνθρωπος με την πρόθεση να εκμεταλλευτεί τους συνανθρώπους του ή τους φυσικούς πόρους προς ίδιον όφελος. Δεν πρέπει, συνεπώς, να γίνεται σύγχυση με την ποικιλότητα των εθνοτήτων και των πολιτισμών που έχει δημιουργήσει ο άνθρωπος και τα οποία συμβάλλουν σε ένα υγιές πολιτισμικό περιβάλλον.
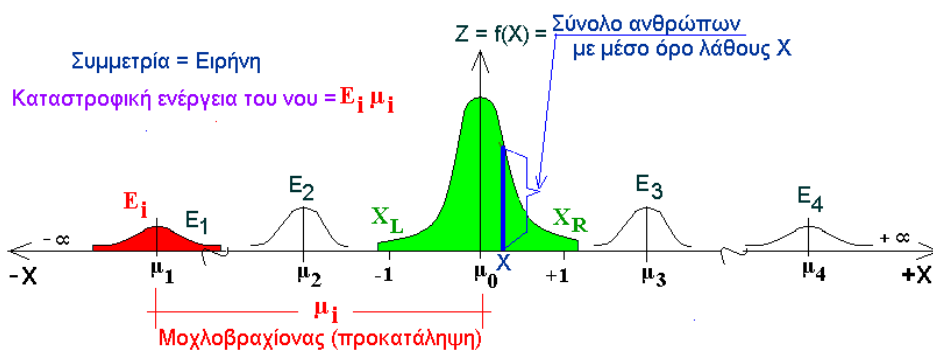
Σχήμα 5: Το σημερινό παγκόσμιο πρόβλημα με προκαταλήψεις ομάδων που τείνουν να κρατούν ισορροπίες και ειρήνη ή τείνουν να συγκρούονται.

Στο Σχήμα 5 δίνεται μια εικόνα της σημερινής παγκόσμιας κοινωνίας με ισχυρότατες προκαταλήψεις οι οποίες ανάλογα με τον όγκο της ομάδας E_i και το μοχλοβραχίονα της προκατάληψης της $μ_i$ είναι και η καταστροφική ενέργεια που διαθέτει ($E_iμ_i$). Για να υπάρχει ειρήνη θα πρέπει να υπάρχει και ισορροπία προκαταλήψεων, όμως η ειρήνη γίνεται ασταθής όταν αυτές είναι μεγάλες, ενώ γίνεται σταθερή όταν οι προκαταλήψεις είναι σχετικά μικρές.

Για να ολοκληρωθεί η χρήση της σύγχρονης επιστήμης και τεχνολογίας στην ανάλυση των εν λόγω φιλοσοφικών δομών και μοντέλων θα γίνει προσπάθεια σχεδιασμού της συνάρτησης (4) η οποία συνδέει το σωστό (Y) με το λάθος (X): $Y = 1/X$.
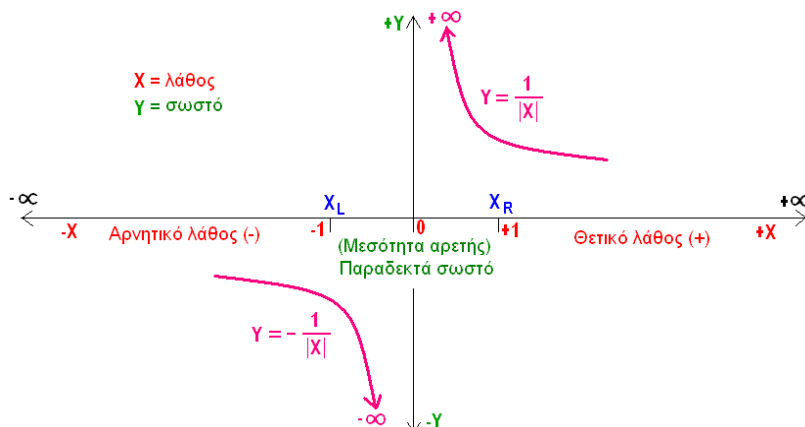
Σχήμα 6: Η οντότητα της οποίας το λάθος είναι μηδέν έχει ορθότητα από το μείον άπειρο μέχρι το συν άπειρο και ίσως αυτή να είναι η πιο βασική ιδιότητα της φύσης.

Ο σχεδιασμός αυτός δίνεται στο Σχήμα 6, όπου βλέπει κανείς ότι όταν το Χ παίρνει τιμές από το μείον άπειρο προς την περιοχή του μηδέν, η συνάρτηση τείνει ασυμπτωτικά προς το μείον άπειρο. Αντίθετα όταν το Χ παίρνει τιμές από το συν άπειρο προς την περιοχή του μηδέν, η συνάρτηση τείνει ασυμπτωτικά προς το συν άπειρο. Αν λοιπόν υποθέσουμε ότι υπάρχει οντότητα που σε όλες τις εκδηλώσεις έχει λάθος μηδέν, τότε η ορθότητα της οντότητας αυτής εκτείνεται και καλύπτει ολόκληρη την περιοχή από το μείον άπειρο μέχρι το συν άπειρο. Τέτοια ιδιότητα, με απεριόριστη ορθότητα, θα μπορούσε να έχει η ίδια η φύση.

Η νευρωνική δομή και η λειτουργία της νόησης

Εδώ θα ασχοληθούμε με τον ίδιο τον άνθρωπο και θα μελετήσουμε τα βασικά δομικά του στοιχεία. Ο άνθρωπος στην προσπάθεια του να κατασκευάσει κάτι όμοιο του, κατασκεύασε τον ηλεκτρονικό υπολογιστή (Η/Υ). Η ομοιότητα έγκειται στο ότι και ο Η/Υ αποτελείται από το *υλικό μέρος* (*Hardware - H/W*) το οποίο εξαρτάται από το χρόνο και είναι φθαρτό και από το *λογισμικό* (*Software - S/W*), δηλαδή το άυλο μέρος το οποίο είναι ανεξάρτητο του χρόνου και είναι άφθαρτο. Ο άνθρωπος συνεπώς διαθέτει ένα βιολογικό σώμα με ποικιλία οργάνων τεχνολογίας DNA το οποίο έχει εξάρτηση από το χρόνο και για το λόγο αυτό είναι φθαρτό. Το σώμα διαθέτει δομές νευρώνων (Saxe, 2010) οι οποίες έχουν την ικανότητα να συγκρατούν ή και να δημιουργούν λογισμικό, μέρος του οποίου έχει πλήρη ανάπτυξη κατά τη γέννηση ώστε να ελέγχει τη λειτουργία των περισσοτέρων οργάνων και επίσης ένα άλλο μέρος του λογισμικού αναπτύσσεται κατά τη διάρκεια του βίου του όπως είναι αυτό που ελέγχει την κίνηση και τη νόηση. Το λογισμικό όπως ειπώθηκε είναι άυλο και ανεξάρτητο του χρόνου, το ίδιο επίσης είναι και η νόηση η οποία μπορεί να καλύψει οποιαδήποτε στιγμή το παρόν, το παρελθόν και το μέλλον και για το λόγο αυτό είναι αθάνατη. Τα βιβλία, π.χ., μεταφέρουν την άυλη και αθάνατη ουσία της νόησης.

Η λειτουργία των νευρώνων είναι γνωστή και το σημαντικότερο, προσομοιώνεται από τους Η/Υ για την αντιμετώπιση πολύπλοκων ή/και χαοτικών ζητημάτων. Ένα τέτοιο ζήτημα που είχα την τύχη να συμμετάσχω στην αντιμετώπιση του με νευρωνικά δίκτυα ήταν η εκτίμηση τις επικινδυνότητας για την έναρξη πυρκαγιάς (Vasilakos et al, 2009), όπου ο νευρώνας εκπαιδεύτηκε με δεδομένα από πυρκαγιές παρελθόντων ετών.

Οι νευρώνες είτε εκπαιδεύονται για την αντιμετώπιση ζητημάτων, είτε έχουν από μόνοι τους την απαραίτητη δομή και δεν χρειάζονται εκπαίδευση (π. χ., οι νευρώνες που λειτουργούν ζωτικά όργανα όπως είναι η καρδιά, το στομάχι, κλπ.). Οι νευρώνες όμως από τη φύση τους δεν είναι απόλυτα σωστοί αλλά το λάθος τους ελέγχεται συνήθως με μηχανισμούς ανάδρασης ώστε να διατηρείται σε μέγεθος κάτω από ένα επιθυμητό κατώφλι.

Η ανάλυση που έγινε μας επιτρέπει να διαπιστώσουμε ότι το μοντέλο της Αριστοτελικής μεσότητας συμφωνεί απόλυτα με τη λειτουργία του νευρώνα και αυτό φαίνεται καθαρά στο Σχήμα 7, όπου το άτομο προσπαθεί να περάσει ένα εμπόδιο στο διάβα του και το ζήτημα είναι πόσο πρέπει να σηκωθεί το πόδι για να περάσει το εμπόδιο αυτό.
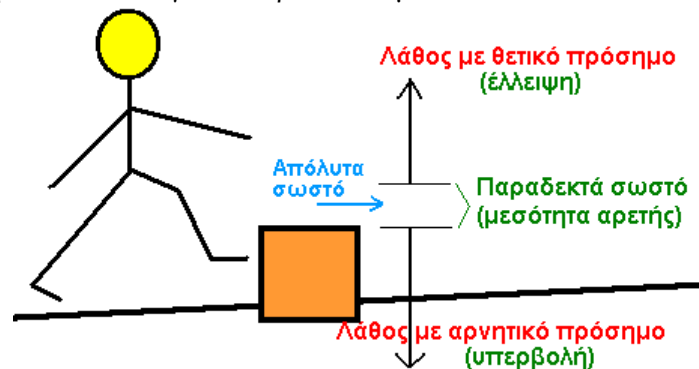
Σχήμα 7: Η λειτουργία του νευρώνα και το ανθρώπινο λάθος.

Αν το πόδι σηκωθεί λιγότερο ή περισσότερο από το παραδεκτά σωστό, το άτομο θα σκοντάψει άρα θα πραγματοποιήσει αντίστοιχα ένα λάθος έλλειψης ή υπερβολής κατά το Αριστοτελικό

μοντέλο. Μπορούμε να δεχθούμε ότι υπάρχει ένα απόλυτα σωστό σήκωμα του ποδιού το οποίο ενδέχεται να συμπίπτει με το μέσο όρο όλων των πιθανών περιπτώσεων προσπέλασης του ίδιου εμποδίου από το ίδιο άτομο και αυτό μπορεί να θεωρηθεί ότι ικανοποιεί το απόλυτα σωστό μοντέλο του Πλάτωνα. Βλέπουμε και εδώ δηλαδή ότι ο μέσος με τη διασπορά του μπορεί να θεωρηθεί το παραδεκτά σωστό και συμπίπτει με το μεσοδιάστημα της Αριστοτελικής μεσότητας.
Στο παράδειγμα αυτό μπορούμε να παρατηρήσουμε επίσης ότι το άτομο έχει άπειρες επιλογές ή βαθμούς ελευθερίας, για το πώς θα σηκώσει το πόδι με παραδεκτά σωστό τρόπο, χωρίς να σκοντάψει, που σημαίνει επίσης ότι το άτομο για να είναι ελεύθερο πρέπει πρώτα να καθορίσει τα όρια του σωστού, ώστε να μην κάνει σοβαρά λάθη. Μια άλλη σημαντική παρατήρηση είναι ότι όταν το άτομο κάνει λάθος και σκοντάψει, οι συνέπειες και άρα το μέγεθος του λάθους, μπορεί να κυμαίνονται από ένα χάσιμο της ισορροπίας και επανάκτηση της (λάθος μικρότερο από 3σ) μέχρι ένα πέσιμο με σοβαρό τραυματισμό (λάθος μεγαλύτερο από 3σ). Μια άλλη περίπτωση είναι όταν ένα άτομο δεν γνωρίζει πώς να περνά εμπόδια, ενδέχεται την πρώτη φορά να σκοντάψει τη δεύτερη να τα πάει καλύτερα μέχρι που ο νευρώνας να εκπαιδευτεί και το λάθος θα περιορίζεται στα όρια του παραδεκτά σωστού. Ένα τελικό συμπέρασμα είναι επίσης ότι για να κάνει ένα σωματικά υγιές άτομο το λάθος και να σκοντάψει θα πρέπει είτε να είναι απαίδευτο, είτε να το κάνει σκόπιμα (προκατάληψη, δόλος). Το τελευταίο έχει ιδιαίτερη σημασία για τον τρόπο που ορισμένοι κερδοσκοπούν σε βάρος της αειφορίας και θα αναλυθεί πιο κάτω.
Η φύση όπως την αντιλαμβανόμαστε θέτει και συντηρεί τους φυσικούς νόμους (νόμος της βαρύτητας) και τους κανόνες (μεγάκοσμος, μεσόκοσμος, μικρόκοσμος) που διέπουν το σύμπαν και τις οντότητες που το αποτελούν. Από μόνη της η φύση δεν έχει μάτια αλλά χρησιμοποιεί τα δικά μας μάτια που είναι μέρος της φύσης, για να βλέπει τον εαυτό της, για το λόγο αυτό τα έργα μας θα πρέπει να είναι καλαίσθητα, να σταματήσει το χάλι της γραφητορύπανσης των πανεπιστημιακών χώρων. Από μόνη της δεν έχει νόηση αλλά χρησιμοποιεί την νόηση μας για να εξερευνεί τον εαυτό της και είναι ένας λόγος παραπάνω να προσπαθούμε να διατηρούμε τη νόηση μας πάντα υγιή ώστε οι πράξεις μας που απορρέουν από αυτή να είναι ενάρετες.

Παιδεία και αειφορική ανάπτυξη

Το σημαντικότερο πρόβλημα που αντιμετωπίζει η σύγχρονη εποχή είναι η λανθασμένη αντίληψη για τη χρήση της ανθρώπινης ενέργειας και αυτό που έχει επικρατήσει είναι η χωρίς όριο μεγιστοποίηση του κέρδους και η απόκτηση όσο δυνατόν περισσότερου χρήματος. Αυτό έχει σαν συνέπεια τη συσσώρευση κολοσσιαίων χρηματικών ποσών σε μικρές σχετικά ομάδες ανθρώπων οι οποίες χρησιμοποιούν την καταστρεπτική δύναμη του νου για να αυξήσουν ακόμη περισσότερο τα κέρδη τους. Οι άνθρωποι αυτοί είναι απαίδευτοι και η απαιδευσιά τους φαίνεται από την αλόγιστη καταστροφή του περιβάλλοντος προκειμένου να κάνουν περισσότερα κέρδη. Με βάση την οικονομική δύναμη που διαθέτουν δρομολογούν την χειρίστου είδους παγκοσμιοποίηση την οποία βιώνουμε, επηρεάζουν τις πολιτικές εξελίξεις και επίσης επηρεάζουν τη νομοθεσία και το σύστημα της δικαιοσύνης σε εθνικό και διεθνές επίπεδο ώστε να εξυπηρετεί τα συμφέροντά τους. Η πιο επιζήμια όμως ενέργειά τους για την ανθρωπότητα είναι η αθόρυβη σχετικά επέμβαση τους στην παιδεία τόσο μέσα από το σύστημα του επίσημου εκπαιδευτικού συστήματος όσο και μέσα από άλλα συστήματα όπως είναι τα ΜΜΕ, οι ΜΚΟ και οι διεθνείς οργανισμοί. Θα πρέπει συνεπώς να αναλυθούν οι τρόποι που επεμβαίνουν σε θέματα παιδείας ώστε αφ᾽ ενός να αναπτυχθούν αντιστάσεις στην κατεύθυνση αυτή και αφ᾽ ετέρου να τοποθετηθεί το σύστημα της παιδείας σε νέες βάσεις ώστε να διαμορφώνει ενάρετους ανθρώπους οι οποίοι δεν θα χρησιμοποιούν χωρίς σοβαρό λόγο την καταστρεπτική δύναμη της νόησης και δεν θα επιτρέπουν σε άλλους να το κάνουν.
Η ανάλυση που έγινε στα προηγούμενα κεφάλαια μας δίνει αρκετά στοιχεία για να εντοπίσουμε τον τρόπο που θα μπορούσε κάποιος να ελέγξει το σύστημα της παιδείας ώστε αυτό να διαμορφώνει δούλους που θα εξυπηρετούν τα συμφέροντα του. Η όλη διαδικασία έχει να κάνει με μηχανισμούς που θα διαταράσσουν την ισορροπία της υγιούς νόησης είτε γιγαντώνοντας την επιθυμία και το θυμό είτε αδρανοποιώντας τη λογική.

Ερευνώντας κάποια γεγονότα φαίνεται να υπάρχουν μηχανισμοί εξαγρίωσης που γιγαντώνουν τον θυμό, και εδώ να σημειώσουμε την ενεργοποίηση των μηχανισμών αυτών στην περίπτωση του άτυχου Ανδρέα-Αλέξανδρου Γρηγορόπουλου στα Εξάρχεια, στις 6 Δεκεμβρίου του 2008, ενώ σε ανάλογο περιστατικό στις 23 Οκτωβρίου 1998, όπου πάλι αστυνομικός, πυροβόλησε και τραυμάτισε θανάσιμα τον 17χρονο μαθητή από τη Σερβία Μάρκο Μπουλάτοβιτς, οι μηχανισμοί εξαγρίωσης δεν ενεργοποιήθηκαν. Οι μηχανισμοί γιγάντωσης της επιθυμίας είναι γνωστοί και έχουν να κάνουν με το μάρκετινγκ. Αλλά μεγαλύτερο ενδιαφέρον παρουσιάζουν οι μηχανισμοί αδρανοποίησης της λογικής οι οποίοι βασίζονται στην υπερβολική πίστη και υπερβολική αλληλεγγύη. Πέραν των μηχανισμών αυτών υπάρχουν και άλλοι μηχανισμοί που προάγουν το φανατισμό με ταυτόχρονη γιγάντωση του θυμού και της επιθυμίας και αδρανοποίηση της λογικής. Στους μηχανισμούς που αναφέρθηκαν θα πρέπει να προστεθούν και τακτικές που χρησιμοποιούνται βασισμένες κυρίως είτε στην υπέρμετρη λογική, είτε στην ελλειπή λογική. Η ελλειπής λογική εφαρμόζεται όταν λαμβάνονται αποφάσεις χωρίς επαρκή τεκμηρίωση. Αυτό συμβαίνει είτε επειδή έχουν διαμορφωθεί συνθήκες τέτοιες που δεν αφήνουν χρονικά περιθώρια για συζήτηση (τα δύο μνημόνια που υπέγραψε πρόσφατα η Ελλάδα), είτε επειδή δεν υπάρχει ενημέρωση του κοινού και παίρνονται αποφάσεις εν αγνοία του (υπάρχουν πάρα πολλές λέσχες που αποφασίζουν πίσω από κλειστές πόρτες για την τύχη του πλανήτη εν αγνοία του λαού). Η υπέρμετρη λογική έχει στόχο την κωλυσιεργία και έχει εξίσου καταστροφικά αποτελέσματα, π. χ., όταν κάποιος πεινά και δεν έχει τροφή βρίσκει όμως στο δρόμο του ένα κρεμμύδι και διαλογίζεται κατά πόσο θα πρέπει να σκοτώσει το κρεμμύδι τρώγοντας το, υπάρχει κίνδυνος από τον πολύ διαλογισμό να χάσει τη ζωή του από την πείνα. Η υπερβολική λογική εκδηλώνεται, είτε σε ατέρμονες συζητήσεις που καταλήγουν στο «πουθενά», είτε κάνοντας κύκλους γύρω από το ίδιο ζήτημα (φαύλους κύκλους), π. χ., η μία παράταξη να ρίχνει εσαεί τις ευθύνες για τα κακώς κείμενα στην άλλη.

Από το άλλο μέρος για να επιτευχθεί η αειφορική ανάπτυξη θα πρέπει οι ίδιοι οι άνθρωποι να έχουν τις βάσεις να διακρίνουν τα όρια της έλλειψης και της υπερβολής και να βοηθήσουν να διαμορφωθούν οι κατάλληλες πολιτικές και το θεσμικό πλαίσιο που θα τις εκφράζει ώστε να στηρίζουν την αειφορία και όχι τη μεγιστοποίηση των κερδών μιας ασήμαντης μειοψηφίας. Παράλληλα θα πρέπει να απαιτούν πλήρη ενημέρωση και στήριξη με ισχυρά επιχειρήματα τη λήψη σημαντικών αποφάσεων καθώς και τον περιορισμό σημαντικών συζητήσεων ώστε αυτές να καταλήγουν στην αντιμετώπιση ζητημάτων όπως είναι η αειφορία χωρίς να οδηγούν στο «πουθενά» ούτε να αναλίσκονται σε φαύλους κύκλους.

Η διδακτική της παιδείας έχει επίσης ανάγκη εκσυγχρονισμού (Manolas, 2006), και θα μπορούσε σε αυτό να βοηθήσει και η επιστήμη όπως η σωστή χρήση των μαθηματικών (Noss & Hoyles 2007) και η τεχνολογία όπως είναι η ανάπτυξη λογισμικού. Η διδακτική των μαθηματικών μπορεί επίσης να φέρει καλύτερα αποτελέσματα αν αυτά θεωρηθούν σαν το καλύτερο εργαλείο της λογικής η οποία το χρησιμοποιεί για να αυξήσει τις δυνατότητες της. Και τούτο διότι συνήθως οι άριστοι μαθηματικοί βλέπουν τα μαθηματικά σαν οντότητα με υπερφυσικές ιδιότητες κάτι που τους βοηθά στην έρευνα για την πρόοδο της επιστήμης, δεν τους βοηθά όμως να είναι καλοί εκπαιδευτικοί διότι αρέσκονται στη θεωρία και ο μέσος μαθητής δεν έχει κίνητρο να την παρακολουθήσει. Η ανάπτυξη λογισμικού, ιδιαίτερα λογισμικού ανοιχτού κώδικα, είναι ένα άλλο ζήτημα που αν αυτό καλλιεργηθεί στη δευτεροβάθμια εκπαίδευση θα βοηθήσει τους νέους να ξεφύγουν από τα έτοιμα πακέτα και παίγνια και θα τους ενισχύσει τη δημιουργική τους εφευρετικότητα γιατί έτσι θα αντιληφθούν ότι οι ίδιοι είναι πιο έξυπνοι από τη μηχανή.

Πολλά ζητήματα επίσης που αφορούν την αειφόρο ανάπτυξη έχουν να κάνουν με τεχνολογίες συλλογής περιβαλλοντικών δεδομένων όπως είναι η δορυφορική τηλεπισκόπηση καθώς και τη διαχείριση τέτοιων δεδομένων με Συστήματα Γεωγραφικών Πληροφοριών (Χατζόπουλος, 2011) και θα μπορούσαν τέτοιου είδους μαθήματα να διδάσκονται στη δευτεροβάθμια εκπαίδευση.

Συμπεράσματα

Με την ανάλυση που έγινε η παιδεία μπορεί να ορισθεί σαν *η προσπάθεια διαμόρφωσης υγιούς νου στον ενάρετο άνθρωπο* ενώ η εκπαίδευση μπορεί να ορισθεί σαν *η προσπάθεια ανάπτυξης*

δεξιοτήτων στον άνθρωπο με παιδεία οι οποίες θα χρησιμοποιούνται για την καλύτερη ποιότητα ζωής του κοινωνικού συνόλου και για εξερεύνηση.

Η αρετή και ο υγιής νους είναι μονόδρομος για ποιότητα ζωής που θα βασίζεται στο σεβασμό στο περιβάλλον και στην αειφορία καθώς και στην εξερεύνηση που θα συμβάλλει στην καλύτερη διαχείριση και αειφορική ανάπτυξη. Η αρετή κατά τον Αριστοτέλη δεν πρέπει να νοείται σαν ενέργεια που είναι αλάθητη, αλλά είναι η προσπάθεια που κάνει κανείς για να είναι ενάρετος μαθαίνοντας από τα λάθη του και προσπαθώντας να τα ελαχιστοποιήσει.

Η παιδεία συνεπώς πρέπει να υιοθετήσει επίσημα τα μοντέλα που προαναφέρθηκαν και να δομήσει τις διαδικασίες που απαιτούνται ώστε να συμβάλλει στη διαμόρφωση ενάρετων ανθρώπων. Παράλληλα θα πρέπει και οι ανθρωπιστικές επιστήμες να ακολουθήσουν τα μοντέλα αυτά ιδιαίτερα η νομική επιστήμη που πρέπει να βασισθεί στην επιστημονική ανάλυση του ανθρώπινου λάθους, ώστε το σύστημα δικαιοσύνης να έχει τις απαραίτητες βάσεις να διακρίνει την απαιδευσιά από το δόλο και μέσα από ένα ουσιαστικό σωφρονιστικό σύστημα να προάγει την παιδεία και να ελαχιστοποιεί την προκατάληψη. Υπόψη ότι η δικαιοσύνη είναι η κορυφαία των αρετών και εμπεριέχει όλες τις αρετές …εν δε δικαιοσύνη συλλήβδην πας' αρετή 'νι…(Ηθικά Νικομάχεια Ε-10). Αλλά και οι άλλες επιστήμες όπως είναι οι κοινωνικές επιστήμες πέραν της ανθρώπινης συμπεριφοράς την οποία μελετούν, θα πρέπει να εξετάζουν με επιστημονικά κριτήρια και τα βαθύτερα αίτια που προκαλούν την συμπεριφορά αυτή.

Έχει τεράστια σημασία να επανενωθεί η φιλοσοφία με τις επιστήμες οπότε θα μπορέσει να σταθεί ξανά στα πόδια της, διαθέτοντας επιστημονικά τεκμήρια που είναι απαραίτητα για να μπορεί να θέτει τα κατάλληλα ερωτηματικά όταν παραβιάζονται τα όρια της αρετής και να ασκεί κριτική εκεί που οι ενέργειες δεν είναι ενάρετες.

Η πείρα έχει δείξει ότι η ποικιλότητα του καλού κάνει το καλό καλύτερο (βιοποικιλότητα) ενώ η ποικιλότητα του κακού κάνει το κακό χειρότερο (προκατάληψη). Η σημερινή ποικιλότητα προκαταλήψεων που φαίνεται στο Σχήμα 5 είναι η κύρια αιτία των δεινών της ανθρωπότητας και της αδυναμίας της να αντιμετωπίσει το ζήτημα της αειφορίας με αποτέλεσμα ο πλανήτης γη να κινδυνεύει. Όμως οι προκαταλήψεις των ομάδων αυτών συνήθως συνοδεύονται και με αξιόλογα πολιτισμικά στοιχεία, οπότε μια πιθανή αντιμετώπιση του ζητήματος θα ήταν: Να ισχυροποιήσουν τα πολιτισμικά τους στοιχεία και να αποδυναμώσουν τα συγκρουσιακά τους ενδιαφέροντα όπως είναι ο ηγεμονισμός και η μεγιστοποίηση του κέρδους σε βάρος του περιβάλλοντος και του κοινωνικού συνόλου.

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Η Συμβολή των Τ.Π.Ε. στη Βιωσιμότητα της Γνώσης και στην Υιοθέτηση Νέας Στάσης Ζωής στη Σύγχρονη Εποχή

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Περίληψη

Στην παρούσα εργασία προσεγγίζουμε την αειφόρο ανάπτυξη ως προς τον περιβαλλοντικό άξονα και εξετάζουμε τη συμβολή των ΤΠΕ στη «βιωσιμότητα της γνώσης» και στη συνειδητοποίηση, ανάπτυξη κριτικής σκέψης και υιοθέτηση νέου τρόπου ζωής από τους εκπαιδευομένους. Για το σκοπό αυτό υλοποιήθηκε ένας αριθμός μαθησιακών δραστηριοτήτων με τη συνδυασμένη υποστήριξη των συστημάτων Moodle και LAMS και διεξήχθη μια μικρής κλίμακας εκπαιδευτική έρευνα με τη συμμετοχή διδασκόντων και μαθητών για την αξιολόγηση της εφαρμογής.

Λέξεις κλειδιά: Εκπαιδευτική Διαδικασία, Βιωσιμότητα, Αειφόρος Ανάπτυξη, Περιβάλλον, LMS, Moodle, Βιώσιμο μέλλον, Τρόπος ζωής

Abstract

In this paper we approach the Sustainable Development from the point of view of the environment and we investigate the contribution of ICTto the "sustainability of knowledge" and the awareness, the development of critical thinking and the adoption of a new lifestyle from learners. Towards this end, a number of learning activities was implemented by using the combination of Moodle and LAMS systems. Furthermore, a small-scale educational research was conducted involving faculty and students in order to evaluate the application.

Keywords: Educational Process, Sustainability, Sustainable Development, Environment, LMS, Moodle, Sustainable future, Lifestyle

Εισαγωγή

Τα τελευταία χρόνια η αυξανόμενη σημασία της πληροφορίας και της συνεχιζόμενης μάθησης έχει καταστήσει τη χρήση των τεχνολογιών πληροφορικής και επικοινωνιών (Τ.Π.Ε.) στην εκπαίδευση καθώς και την παροχή εξ' αποστάσεως εκπαίδευσης με χρήση υπηρεσιών e-learning ως επιτακτική ανάγκη (Rosenberg, 2001). Οι σύγχρονες μέθοδοι εκπαίδευσης βασίζονται σε συστήματα διαδικτυακής μάθησης και σε σύγχρονες τεχνολογίες υποστήριξης του διδακτικού έργου. «*Η ανάπτυξη ενός διαδικτυακού εργαλείου για το σχεδιασμό προγραμμάτων Περιβαλλοντικής Εκπαίδευσης απαντά στην ανάγκη διαβίου μάθησης σε θέματα περιβάλλοντος*» (Γαβριλάκης & Σοφούλης 2002).
«*Η Περιβαλλοντική Εκπαίδευση (Π.Ε.) είναι η διαδικασία αναγνώρισης αξιών και διασαφήνισης εννοιών για την ανάπτυξη των ικανοτήτων και των στάσεων που είναι απαραίτητες για την κατανόηση και την εκτίμηση της αλληλοσυσχέτισης ανθρώπου, πολιτισμού και βιοφυσικού περιβάλλοντος. Η Π.Ε. συνεπάγεται επίσης άσκηση στη διαδικασία λήψης αποφάσεων και τη διαμόρφωση ενός κώδικα συμπεριφοράς του κάθε ατόμου γύρω από τα προβλήματα που αφορούν στην ποιότητα του περιβάλλοντος.*» (I.U.C.N,1970 στο Palmer, 1998).

Οι βασικές αρχές της Π.Ε. περιλαμβάνουν τη βιωματική προσέγγιση, την ομαδοσυνεργατική μέθοδο και την ενίσχυση κριτικής σκέψης και μπορούν να αναδειχθούν χρησιμοποιώντας τις Τεχνολογίες της Πληροφορίας και των Επικοινωνιών στην Περιβαλλοντική Εκπαίδευση.

Η Περιβαλλοντική Εκπαίδευση πρέπει να συνιστά μία συνεχή διαδικασία η οποία ξεκινά από την προσχολική ηλικία και συνεχίζεται σε όλη τη διάρκεια της ζωής του ανθρώπου μέσω της τυπικής και άτυπης εκπαίδευσης. Στην πραγματικότητα όμως δεν έχουν διαμορφωθεί οι κατάλληλες συνθήκες για την υποστήριξη οργανωμένης περιβαλλοντικής εκπαίδευσης στο σχολείο, με αποτέλεσμα να παρουσιάζονται διάφορα προβλήματα στην ανάπτυξη του εν λόγω θεσμού. Το βασικότερο από αυτά είναι η έλλειψη κατάλληλα διαμορφωμένου εκπαιδευτικού υλικού που θα βοηθήσει τον εκπαιδευτικό, καθώς και ο περιορισμένος αριθμός των επιμορφούμενων εκπαιδευτικών σχετικά με την Π.Ε. (ΙΤΥ & ΕΥΕ, 2008 αναφ. από Ιωαννίδου Ε., 2006).

Το κενό αυτό έρχεται να καλύψει η παρούσα εργασία παρουσιάζοντας μία πρόταση ενσωμάτωσης των Τ.Π.Ε. στην Περιβαλλοντική Εκπαίδευση που συμβάλει στην αειφόρο ανάπτυξη. Συγκεκριμένα, αναπτύξαμε στο περιβάλλον του πληροφοριακού συστήματος (Moodle) μαθησιακές δραστηριότητες για τον περιβαλλοντικό άξονα της αειφόρου ανάπτυξης. Η προσέγγισή μας συμβάλλει στη βιωσιμότητα της πληροφορίας (ως εκπαιδευτικό υλικό) αλλά και στη βιωσιμότητα της γνώσης των εκπαιδευομένων. Τέλος, η παρούσα εργασία στοχεύει να αναδείξει τις οικολογικές εξαρτήσεις του σύγχρονου κόσμου και να συντελέσει στην ανάπτυξη κριτικής σκέψης και υιοθέτηση νέου τρόπου ζωής.

Η δομή της παρούσας εργασίας περιλαμβάνει δέκα ενότητες. Μετά την εισαγωγή ακολουθεί μία ενότητα για το ρόλο της εκπαίδευσης στην αειφόρο ανάπτυξη. Η επόμενη ενότητα αναφέρεται στα συστήματα διαχείρισης γνώσης (Learning Management System - LMS) και ειδικότερα σε αυτά που χρησιμοποιούνται στην παρούσα εργασία. Ακολουθεί ο ορισμός της βιωσιμότητας γνώσης. Στη συνέχεια, δίνονται αναλυτικά οι ενότητες που αφορούν την προτεινόμενη εκπαιδευτική εφαρμογή, την υλοποίηση - πιλοτική εφαρμογή, τη μεθοδολογία συλλογής δεδομένων και την έκθεση των αποτελεσμάτων. Τέλος, παραθέτουμε τα συμπεράσματα της έρευνας αυτής και τις μελλοντικές προοπτικές.

Δεκαετία της Παιδείας για Βιώσιμη Ανάπτυξη (2005-2014)

Όλοι έχουν δικαίωμα στην πληροφόρηση ώστε να αναπτύξουν την ικανότητα να κάνουν τις σωστές επιλογές. Ο πιο σύγχρονος και ταυτόχρονα αποδοτικός τρόπος συνεχιζόμενης μάθησης είναι μέσω των νέων ισχυρών μοντέλων ηλεκτρονικής μάθησης. Παρέχουν τη δυνατότητα κατάλληλης διαχείρισης της γνώσης με στόχο τη συντήρηση και επαναχρησιμοποίηση της. Ακόμα, ενισχύουν τη δια βίου εκπαίδευση, η οποία έχει καταστεί εφικτή εξαιτίας της συνεχώς αυξανόμενης παροχής πληροφορίας μέσω του διαδικτύου, αλλά και απαραίτητη εξαιτίας της διαρκούς μεταβολής των κοινωνικών αναγκών.

Η βιώσιμη ανάπτυξη σχετίζεται άμεσα με τη βιώσιμη κατανάλωση, η οποία εμπεριέχει μία σειρά από κοινωνικές, οικονομικές και πολιτικές πρακτικές που αφορούν τον κάθε άνθρωπο ατομικά και τις κοινωνίες (Παναγιώτου, 2010). Οι πρακτικές αυτές υποστηρίζουν τη μείωση της επιβάρυνσης του περιβάλλοντος, την ικανοποίηση των βασικών ανθρώπινων αναγκών (νερό, τροφή, υγεία, παιδεία, κατοικία) και την κατανάλωση αγαθών και υπηρεσιών που συμβάλλουν θετικά στην υγεία. Δίνεται έμφαση στην ικανοποίηση των αναγκών του παρόντος χωρίς να υποθηκεύει την ικανότητα των μελλοντικών γενεών να ικανοποιήσουν τις δικές τους ανάγκες.

Ο ρόλος της εκπαίδευσης είναι πολύ σημαντικός και μετασχηματιστικός καθώς κάθε μορφή διδασκαλίας για αειφόρο ανάπτυξη πρέπει να στοχεύει στην ευαισθητοποίηση, στην υιοθέτηση οικολογικής συνείδησης και σε επιλογές που προάγουν την προσωπική υγεία και τη διατήρηση του φυσικού πλούτου. Η εκπαίδευση του κόσμου για το «αύριο» οφείλει να προσεγγίζει φυσικές και κοινωνικές παραμέτρους, και να παρέχει στα άτομα και στο κοινωνικό σύνολο τις απαραίτητες πληροφορίες, γνώσεις και αξίες (Πυξίδα της Πόλης, 2009).

Στο πλαίσιο της κριτικής παιδαγωγικής εξετάζουμε τα περιεχόμενα και τις μεθόδους που χρησιμοποιούνται με στόχο ο μαθητής/σπουδαστής να είναι σε θέση να κατανοήσει τα καθημερινά προβλήματα και να σκεφτεί τρόπους αντιμετώπισής τους (Πάντζος, 2011).

Παράλληλα θα πρέπει να προκληθεί το ενδιαφέρον του και να του γεννηθεί προθυμία να προβεί σε δράσεις, να γίνει ενεργός πολίτης του κόσμου, συνεισφέροντας σε ένα βιώσιμο μέλλον. Αυτό είναι εφικτό όταν τα μαθησιακά περιβάλλοντα αξιοποίησης των Τ.Π.Ε. στηρίζονται σε αυθεντικά προβλήματα της καθημερινότητας των μαθητών, επομένως έχουν νόημα διερεύνησης.

Συστήματα Διαχείρισης Γνώσης (LMS)

Αρκετά είναι τα διαθέσιμα συστήματα διαχείρισης γνώσης, οι βασικές λειτουργίες των οποίων καλύπτουν σε μεγάλο βαθμό τις ανάγκες της σημερινής εκπαιδευτικής διαδικασίας. Κάποια από τα συστήματα αυτά εστιάζουν στο περιεχόμενο (Learning Content Management System - LCMS) και άλλα κυρίως στον χρήστη (Learning Management System - LMS).

Για τις ανάγκες της εργασίας μας χρησιμοποιούμε δύο εκ των πλέον διαδεδομένων συστημάτων διαχείρισης γνώσης και περιεχομένου, τα Moodle και Lams αντίστοιχα. Τα συστήματα αυτά είναι δασκαλο-κεντρικά. Τόσο ο σχεδιασμός και όσο και η εποπτεία των εκπαιδευτικών δραστηριοτήτων στηρίζεται κυρίως από τους διδάσκοντες.

Οι κυριότερες δυνατότητες που παρέχονται στους διδάσκοντες είναι:

- Δυνατότητα διαρκούς εποπτείας, ελέγχου, άρα και καλής διαμόρφωσης του υλικού/πληροφορίας
- Σχεδιασμός εκπαιδευτικών δραστηριοτήτων από έναν ή/και ομάδα διδασκόντων ακόμα και από διαφορετικά πεδία ενισχύοντας έτσι τόσο τη διαθεματική προσέγγιση των θεμάτων όσο και τη δημιουργική συνεργασία ομάδων διδασκόντων που δραστηριοποιούνται σε κοινά θέματα.
- Ο συνδυασμός των δύο αυτών συστημάτων ενισχύει την :
- Πρόσβαση σε οργανωμένη πληροφορία και γνώση
- Άμεση ενημέρωση και δυνατότητα διαχείριση αυτής ανάλογα με τις ανάγκες του εκάστοτε χρήστη
- Δυνατότητα παράθεσης Υλικού σε Εναλλακτικές μορφές ανάλογα με τις απαιτήσεις και τις προτιμήσεις του χρήστη
- Ένταξη αυτόνομων δομών μικροδιδασκαλιών
- Ανατροφοδότηση του χρήση
- Δυνατότητα παροχής ερεθισμάτων για ενεργή συμμετοχή και έκφραση απόψεων σε θέματα άμεσα τόσο με τη καθημερινή του ζωή όσο και με θέματα διαμόρφωσης του αύριο.

Επιλογή λογισμικού Moodle για ανάπτυξη εκπαιδευτικού σεναρίου
Για την εργασία μας επιλέξαμε το λογισμικό Moodle, το οποίο είναι λογισμικό ανοικτού κώδικα, διατίθεται δωρεάν και εξυπηρετεί τις ανάγκες μίας πλήρους εκπαιδευτικής διαδικασίας (Πιλάβη, 2011).

Είναι εργαλείο ευέλικτο, εύκολο στην εκμάθηση και αρκετά ασφαλές για ασύγχρονη εκπαίδευση από απόσταση. Ενσωματώνει πληθώρα λειτουργιών και δυνατοτήτων που επιτρέπουν στο διδάσκοντα να διαμορφώσει ένα καλά οργανωμένο και ευχάριστο μάθημα με ευρεία κλίμακα δραστηριοτήτων. Έτσι ο μαθητής μπορεί να ενημερωθεί και να συμμετέχει στις εκπαιδευτικές δραστηριότητες συγκεντρωτικά σε μία ηλεκτρονική πλατφόρμα, ανεξάρτητα από τη χρονική στιγμή και την τοποθεσία.

Ένας παράγοντας που ενισχύει την **ομαλή** διεξαγωγή της εκπαιδευτικής διαδικασίας και την καλή οργάνωση της πληροφορίας είναι η **διάκριση ρόλων** που υποστηρίζει το πληροφοριακό σύστημα. Συγκεκριμένα, διακρίνουμε τους ρόλους Εκπαιδευτικού, Μαθητή/Σπουδαστή και Επισκέπτη οι οποίοι έχουν διαφορετικά δικαιώματα στη διαμόρφωση της πληροφορίας.

Ενσωμάτωση λογισμικού LAMS για την ανάπτυξη εκπαιδευτικής δραστηριότητας
Το LAMS (Learning Activity Management System ή Σύστημα Διαχείρισης Μαθησιακών Δραστηριοτήτων) παρέχει τη δυνατότητα δημιουργίας και εκτέλεσης ψηφιακών σχεδίων

μαθημάτων. Κάθε ψηφιακό σχέδιο μαθήματος LAMS έχει τη μορφή μίας ακολουθίας μαθησιακών δραστηριοτήτων, που μπορεί να περιλαμβάνει μία ποικιλία εξατομικευμένων ή ομαδικών δραστηριοτήτων ή δραστηριοτήτων που αφορούν την ολομέλεια της τάξης, οι οποίες βασίζονται στο περιεχόμενο ή/και στη συνεργασία (Παπαδάκης, 2010). Αυτή η ακολουθία δραστηριοτήτων διευκολύνει την επίτευξη της μάθησης.

Οι δυνατότητες και οι λειτουργίες του LAMS είναι παρόμοιες των αντίστοιχων του Moodle αλλά σε επίπεδο μικροδιδασκαλίας. Δηλαδή, ο έλεγχος του περιβάλλοντος μάθησης είναι αυστηρότερος και η πλοήγηση του χρήστη-εκπαιδευόμενου είναι περιορισμένη.

Βιωσιμότητα Γνώσης

Με τον όρο «βιωσιμότητα γνώσης» εννοούμε τη διατήρηση, την ανανέωση/αναπροσαρμογή και μετασχηματισμό της αρχικής πληροφορίας μέσα από διαδικασίες συμπερίληψης μεθόδων και εκπαιδευτικών τεχνικών. Ουσιαστικά, γίνεται λόγος για μετασχηματίζουσα γνώση/μάθηση (Mezirow, J., 1991) και διαδικασίες εποικοδομισμού.

Η «βιωσιμότητα γνώσης» εμπλέκει θέματα διαθεματικότητας και ενσωμάτωσης, άρα και εξέλιξης της γνώσης σε διάφορα πεδία της καθημερινής μας ζωής. Έτσι, από τη διαδικασία αυτή απορρέουν στοιχεία που συμβάλλουν στη κατάλληλη διαμόρφωση μιας νέας στάσης και ματιάς σε σύγχρονα θέματα που αφορούν την αειφόρο/βιώσιμη ανάπτυξη.

Συγκρίνοντας τα χαρακτηριστικά των συστημάτων και τον ορισμό που αποδώσαμε παραπάνω, διαπιστώνουμε ότι η «βιωσιμότητα γνώσης» υποστηρίζεται σε πολύ μεγάλο βαθμό από τα εν λόγω συστήματα διαχείρισης γνώσης. Απόρροια όλων των παραπάνω είναι η υλοποίηση της πρότασης που παρουσιάζεται σε αυτή την εργασία.

Προτεινόμενη εκπαιδευτική διαδικασία

Η Περιβαλλοντική Εκπαίδευση είναι πολύ σημαντική για την κατανόηση και εκτίμηση της αλληλεξάρτησης ανθρώπου, κοινωνίας και φυσικού περιβάλλοντος. Στοχεύει στο άνοιγμα του σχολείου στην κοινωνία, στην πληροφόρηση, στη συνεργασία μεταξύ μαθητών, στην οργάνωση περιβαλλοντικών δράσεων στα πλαίσια περιβαλλοντικών εργασιών, στην ενίσχυση της κριτικής σκέψης και στην ανάπτυξη περιβαλλοντικής συνείδησης. Όλα αυτά έχουν ως απώτερο στόχο τη συνειδητοποίηση, την κάλυψη των βασικών αναγκών και στην προστασία του περιβάλλοντος. Έτσι, μπορεί να υπάρξει ελπίδα για βιώσιμο μέλλον.

Επομένως, η πρότασή μας είναι η εξής :

Ανάπτυξη εκπαιδευτικής διαδικασίας αποτελούμενης από ολοκληρωμένες δραστηριότητες και μεθόδους μάθησης σε σύστημα διαχείρισης γνώσης και δραστηριοτήτων (LMS / LCMS) – περιβάλλοντα Moodle & Lams - με στόχο την αειφόρο ανάπτυξη και ιδιαίτερα την προστασία του περιβάλλοντος.

Για την ενίσχυση της πρότασής μας παραθέτουμε το πλαίσιο/σενάριο διεξαγωγής της εφαρμογής. Συγκεκριμένα, αναπτύξαμε τον περιβαλλοντικό άξονα της αειφόρου ανάπτυξης και τον τρόπο με τον οποίο η προσέγγισή μας συμβάλλει στη βιωσιμότητα της πληροφορίας γύρω από ένα συγκεκριμένο θέμα (στην περίπτωση αυτή του περιβάλλοντος), συντελώντας στη συνειδητοποίηση, ανάπτυξη κριτικής σκέψης και υιοθέτηση νέου τρόπου ζωής.

Στη συνέχεια, παρουσιάζονται οι εκπαιδευτικές δραστηριότητες συνοδευόμενες από ενδεικτικά παραδείγματα.

Ανάπτυξη Δραστηριοτήτων για την Εκπαιδευτική Διαδικασία στην πλατφόρμα Moodle
Από τις δυνατότητες - δραστηριότητες τις οποίες παρέχει η ηλεκτρονική πλατφόρμα Moodle (Moodle Community, 2012), επιλέξαμε να χρησιμοποιήσουμε για την ανάπτυξη της εκπαιδευτικής δραστηριότητας στα πλαίσια της εργασίας, εκείνες που ενισχύουν την παροχή γνώσης, την ενημέρωση, την έκφραση και ανταλλαγή διαφορετικών απόψεων καθώς και την ανάπτυξη κριτικής σκέψης μέσω διαλόγου και συνεργασίας.

Δραστηριότητες στην κεντρική σελίδα της εφαρμογής :

▸ **Πρόσβαση στην πληροφορία και ενημέρωση** για διάφορα εκπαιδευτικά ζητήματα, αλλά και θέματα περιβαλλοντικά, κοινωνικά, οικονομικά και πολιτικά που πραγματεύονται τις καταστάσεις της καθημερινής ζωής. Αυτή η ενημέρωση μπορεί να προέρχεται από διάφορα περιβαλλοντικά sites.

  ▸ **Διδακτικό υλικό**

- Ενημέρωση για τη διδακτέα ύλη του μαθήματος και λέξεις-κλειδιά.
- Οργάνωση του διδακτικού υλικού σύμφωνα με μία δομή (διδακτικές ενότητες).
- Παροχή διδακτικού υλικού σε ψηφιακή μορφή, το οποίο είναι εύκολα προσπελάσιμο από τον εκπαιδευόμενο και διαθέσιμο για ανάγνωση οποιαδήποτε χρονική στιγμή.

Το διδακτικό υλικό αποτελείται από αρχεία που παρέχουν πληροφορία για το περιβάλλον, κινδύνους, τρόπους αντιμετώπισης, ανάγκη για ανακύκλωση και τους τρόπους προστασίας του.

  ▸ **Λεξικό Όρων** το οποίο μπορεί ο μαθητής να συμβουλεύεται και να εμπλουτίζει. Η αξία του Λεξικού Όρων ενισχύει τη δημιουργία κοινού κώδικα επικοινωνίας μεταξύ των μαθητών ώστε να κατανοούν με τον ίδιο τρόπο κάποιες βασικές έννοιες π.χ. ανακύκλωση, εξοικονόμηση ενέργειας.

  ▸ **Γραπτές Εργασίες**

- Ανάρτηση εκφώνησης γραπτής εργασίας και βοηθητικού υλικού από το διδάσκοντα.
- Υποβολή εργασίας από το μαθητή συνοδευόμενη από σχόλια αν αυτό είναι απαραίτητο.
- Διόρθωση εργασίας από το διδάσκοντα, καταχώρηση βαθμολογίας συνοδευόμενη από σχόλια προς το μαθητή και με επισυναπτόμενη διορθωμένη εργασία.

▸ **Ομάδα συζητήσεων** όπου οι μαθητές/σπουδαστές ανταλλάσουν απόψεις σχετικά με τα μαθήματά τους και τις δραστηριότητες. Επίσης, ο διδάσκων δίνει κατευθύνσεις ώστε να διευκολύνει τους μαθητές να κινηθούν προς τη λύση, και παρέχει ερεθίσματα και προβληματισμούς ώστε να αναπτύσσουν κριτική σκέψη και ικανότητα για επίλυση.

▸ **Αυτοτελή μαθήματα/μικροδιδασκαλία LAMS**

Διεξαγωγή μικροδιδασκαλίας μέσω δημιουργίας κλειστής ακολουθίας δραστηριοτήτων με σκοπό την ολοκλήρωση μιας άσκησης από τον εκπαιδευόμενο.

▸ **Εκπαιδευτικά ηλεκτρονικά παιχνίδια** τα οποία επιδρούν στη μάθηση. Η συνεισφορά των παιχνιδιών είναι δισδιάστατη. Ο μαθητής/σπουδαστής μπορεί είτε να συμμετέχει σε ένα έτοιμο παιχνίδι και να λάβει άμεση απάντηση για τις σωστές απαντήσεις, είτε να δημιουργήσει δικό του.

▸ **Wiki** το οποίο είναι ένα ισχυρό εργαλείο υποστήριξης ελεύθερης έκφρασης των χρηστών όπου καλούνται να καταγράψουν τις απόψεις τους για ένα θέμα και να προσθέσουν υλικό.

  ▸ Δυνατότητα παράθεσης του υλικού **σε εναλλακτικές μορφές** ανάλογα με τις απαιτήσεις και τις προτιμήσεις του εκάστοτε εκπαιδευόμενου, περιηγητή κτλ. Αυτό συνηγορεί στη χρήση δραστηριοτήτων όπως **ανάρτηση Webpage**, **URL**, **video** κ.α.

  ▸ **Site News,** το πεδίο αυτό περιλαμβάνει τα νέα-ανακοινώσεις. Η θεματολογία σχετίζεται είτε με το μάθημα, είτε γενικότερα με το περιβάλλον και σχετικές δράσεις.

Δημιουργία μικρών πλαισίων (blocks) στα δεξιά της σελίδας

  ▸ «**Δραστηριότητες**» στο οποίο διατίθεται μία λίστα με τις δραστηριότητες που έχουν αναπτυχθεί στο μάθημα και στις οποίες μπορεί εύκολα και γρήγορα να μεταβεί ο μαθητής.

  ▸ «**Συνδεδεμένοι Χρήστες**» στο οποίο εμφανίζονται οι χρήστες που είναι συνδεδεμένοι τη συγκεκριμένη χρονική στιγμή στην υπηρεσία.

  ▸ «**Επικείμενα Γεγονότα**» για την καταγραφή σημαντικών για το μάθημα γεγονότων (π.χ. την καταληκτική ημερομηνία υποβολή μίας εργασίας που έχει οριστεί).

  ▸ «**Τελευταία Νέα/Προσθήκη Υλικού**» για ενημέρωση του χρήστη που αφορά την προσθήκη νέου υλικού, θέματος για συζήτηση ή δραστηριότητας όπου μπορεί να συμμετέχει.

  ▸ «**Ημερολόγιο**» με δυνατότητα αναζήτησης σημαντικών ημερομηνιών π.χ. διεξαγωγής ενός συγκεκριμένου γεγονότος.

Ανάπτυξη δραστηριοτήτων στην πλατφόρμα LAMS

Το LAMS (Learning Activity Management System ή Σύστημα Διαχείρισης Μαθησιακών Δραστηριοτήτων) παρέχει τη δυνατότητα δημιουργίας και εκτέλεσης ψηφιακών σχεδίων

μαθημάτων σε επίπεδο μικροδιδασκαλίας. Τα εργαλεία που παρέχει κατατάσσονται σε τέσσερις μεγάλες κατηγορίες: πληροφόρησης, αξιολόγησης, ανατροφοδότησης και συνεργασίας. Για τις ανάγκες της δραστηριότητας που ενσωματώθηκε στην πλατφόρμα Moodle έγινε χρήση εργαλείων πληροφόρησης και αξιολόγησης. Το περιβάλλον του LAMS είναι αρκετά εύκολο στη χρήση και φιλικό προς τον εκπαιδευόμενο. Ο μαθητής καλείται να ακολουθήσει σειριακά κάποιες δραστηριότητες έως ότου ολοκληρώσει όλα τα βήματα. Στην αριστερή πλευρά διακρίνεται ένα διάγραμμα ροής της διαδικασίας που του υποδεικνύει σε ποιο σημείο βρίσκεται, ποιο έχει προσπελάσει και τι ακολουθεί.

Υλοποίηση
Περιγραφή πιλοτικής εφαρμογής
Η διεξαγωγή της συγκεκριμένης πιλοτικής εφαρμογής απευθύνεται σε μαθητές Δευτεροβάθμιας Εκπαίδευσης, με προοπτικές γενίκευσης της εφαρμογής σε οποιαδήποτε εκπαιδευτική βαθμίδα. Συγκεκριμένα, στη διαδικασία έλαβαν μέρος δύο ομάδες μαθητών της Γ' τάξης του Γυμνασίου και της Α΄ τάξης Λυκείου. Συμμετείχαν συνολικά 43 άτομα, σε δύο ομάδες των 25 και 18 ατόμων, αντίστοιχα.

Η πιλοτική εφαρμογή πραγματοποιήθηκε εντός εργαστηρίου σχολικού συγκροτήματος στην περιοχή του Ηρακλείου Κρήτης. Οι οδηγίες προς τους εκπαιδευομένους δόθηκαν από τους εκπαιδευτικούς που ανέλαβαν καθήκοντα καθοδηγητή καθ' όλη τη διάρκεια της πιλοτικής εφαρμογής. Οι εκπαιδευτικοί είχαν λάβει ενημέρωση για τη διεξαγωγή του συγκεκριμένου σεναρίου.

Για τις ανάγκες του σεναρίου υλοποιήθηκε ένα αυτοτελές μάθημα με ένα πλήθος εκπαιδευτικών δραστηριοτήτων. Το σενάριο είναι σχεδιασμένο ώστε να μπορεί να ολοκληρωθεί εντός δύο διδακτικών ωρών, όμως έχει προοπτικές για επιπλέον περιήγηση των εκπαιδευομένων. Στο τέλος της πιλοτικής εφαρμογής όλοι οι μαθητές συμπλήρωσαν ερωτηματολόγιο που αποτελούνταν από οκτώ ερωτήσεις σύντομης απάντησης.

Τεχνική περιγραφή του συστήματος
Για τις ανάγκες υλοποίησης της πρότασης, έγινε εγκατάσταση του λογισμικού Moodle έκδοση 2.2.1+ σε servers του Ελληνικού Ανοικτού Πανεπιστημίου (Ε.Α.Π.) τους οποίους διαχειρίζεται το Εργαστήριο Εκπαιδευτικού Υλικού και Εκπαιδευτικής Μεθοδολογίας (Ε.Ε.Υ.Ε.Μ.). Επίσης, εγκαταστάθηκε το game module για την ανάπτυξη των εκπαιδευτικών παιχνιδιών και το LAMS lesson για τη διεξαγωγή μικροδιδασκαλίας.

Ακόμα, επιλέχθηκε ένα κατάλληλο θέμα για την εμφάνιση του συστήματος το οποίο τροποποιήθηκε κατάλληλα ώστε να είναι ευχάριστο για το χρήστη και τέλος, δημιουργήθηκαν λογαριασμοί χρηστών για κάθε έναν από τους μαθητές και διδάσκοντες που συμμετέχουν στην πιλοτική εφαρμογή του συστήματος.

Αναλυτική περιγραφή του συστήματος
Στα πλαίσια υλοποίησης της πρότασης και ανάπτυξης μίας καινοτόμας εφαρμογής που συνδυάζει την εκπαίδευση με το περιβάλλον, δημιουργήθηκε μία νέα υπηρεσία με όνομα «**Περιβαλλοντική Εκπαίδευση**». Ιδιαίτερη έμφαση έχει δοθεί στην εμφάνιση όλου του περιεχομένου της εφαρμογής ώστε να προσελκύει το ενδιαφέρον των χρηστών – μαθητών (λαμβάνοντας υπόψη την ηλικία τους).

Διαμόρφωση του συστήματος
Σε κάθε σελίδα της υπηρεσίας «Περιβαλλοντική Εκπαίδευση» εμφανίζεται μία εικόνα σχετική με το περιβάλλον, που αναπαριστά μία μορφή «καθηγητή» που διδάσκει σε έναν μαθητή για το περιβάλλον και τη συσχέτιση αυτού με όλο τον πλανήτη.

Αρχική σελίδα
Στο κεντρικό μέρος της αρχικής σελίδας εμφανίζεται ένα εισαγωγικό κείμενο για την περιβαλλοντική εκπαίδευση και τη σημασία της.

Στη συνέχεια εμφανίζεται το μάθημα το οποίο έχει δημιουργηθεί και έχει όνομα *«Περιβαλλοντικά Θέματα»*. Στο μάθημα έχουν δημιουργηθεί όλα τα πεδία - δραστηριότητες που αναφέρονται στην πρόταση, και περιγράφονται στην παρακάτω ενότητα. Επίσης, έχουν εγγραφεί όλοι οι χρήστες που συμμετέχουν στην πιλοτική εφαρμογή (μαθητές και καθηγητές) και έχουν κατηγοριοποιηθεί σε δύο ομάδες, Γυμνασίου και Λυκείου. Επιπλέον, έχει δοθεί στον κάθε χρήστη διακριτός ρόλος *«Μαθητή»* ή *«Διδάσκοντα»* με τα αντίστοιχα δικαιώματα.

Κάτω από το μάθημα, εμφανίζονται τα νέα – ανακοινώσεις της σελίδας **«Site news»**. Σε αυτά έχουν δημιουργηθεί τρία διαφορετικά θέματα, τα οποία αφορούν την ανακύκλωση, τη διασύνδεση περιβάλλοντος και μαθηματικών, και τη δημιουργία έξυπνων κατασκευών από διάφορα ανακυκλώσιμα υλικά.

Πλαίσια (Blocks) στο δεξί και αριστερό μέρος της αρχικής σελίδας

Στο δεξί μέρος της αρχικής σελίδας έχει προστεθεί και εμφανίζεται το block *«Παγκόσμια Ημέρα»* με τις σημαντικές παγκόσμιες ημέρες που σχετίζονται με το περιβάλλον και τις αντίστοιχες ημερομηνίες. Π.χ. *Παγκόσμια Ημέρα Περιβάλλοντος 5/6/2012*

Στο αριστερό μέρος της σελίδας εμφανίζεται τα blocks :

«Είσοδος», για την καταχώρηση από το χρήστη των στοιχείων πρόσβασης ώστε να συνδεθεί στην υπηρεσία και να αποκτήσει πρόσβαση στο μάθημα και τις δραστηριότητες.

«Πλοήγηση» όπου μπορεί να ανατρέξει ο χρήστης για να δει τα περιεχόμενα της ηλεκτρονικής πλατφόρμας και τη λίστα των μαθημάτων.

«Κύριο Μενού» που περιλαμβάνει ένα σύνδεσμο για τα Site news, όπου εμφανίζεται μία λίστα με όλα τα νέα της σελίδας καθώς και οι αναλυτικές οδηγίες χρήσης της υπηρεσίας.

Διαμόρφωση μαθήματος – Ενότητες και Πλαίσια

Το μάθημα *«Περιβαλλοντικά Θέματα»* βρίσκεται στο κέντρο της αρχικής σελίδας. Αναπτύχθηκαν σε αυτό 7 πεδία (ένα εισαγωγικό και 6 ενότητες) : Περιγραφή θέματος, Εκπαιδευτικό Υλικό, Ενημέρωση, Γραπτές Εργασίες, Συζήτηση (φόρουμ), Μαθαίνω Παίζοντας, Motto-Παίγνια.

Διάρθρωση ενοτήτων μαθήματος

Η *«Περιγραφή θέματος»* είναι το πρώτο πεδίο που εμφανίζεται κατά την είσοδο στο μάθημα. Αποτελείται από ένα σύντομο εισαγωγικό κείμενο για το μάθημα και τις ενοτήτες - δραστηριότητες που θα ακολουθήσουν.

1η ενότητα - Εκπαιδευτικό Υλικό

Αυτό το πεδίο περιλαμβάνει μία μικρή εισαγωγή, λέξεις/φράσεις – κλειδιά και τη διδακτέα ύλη. Επίσης περιλαμβάνει το λεξικό όρων στο οποίο υπάρχουν οι λέξεις - κλειδιά και η σημασία τους, την οποία μπορεί ο μαθητής να αναζητήσει. πχ. «ανακύκλωση», «Εξοικονόμηση ενέργειας» κ.α. Ακόμα, αναρτήθηκε ένα αρχείο το οποίο είναι εκπαιδευτικό πακέτο για μαθητές με τίτλο «Παίζοντας με τα απορρίμματα».

2η ενότητα - Ενημέρωση

Περιλαμβάνει διάφορες ιστοσελίδες σχετικές με περιβαλλοντικά θέματα και οργανώσεις, στα οποία μπορεί να ανατρέξει ο μαθητής για να ενημερωθεί και αν το επιθυμεί να λάβει μέρος σε κάποιες δράσεις που τον ενδιαφέρουν. Π.χ. *WWF, Greenpeace, ΑΡΚΤΟΥΡΟΣ*

3η ενότητα - Γραπτές Εργασίες

Αναρτήθηκε η εκφώνηση της γραπτής εργασίας και δημιουργήθηκε η φόρμα υποβολής της. Ως βοηθητικό υλικό για την εργασία αναρτήθηκε ένας σύνδεσμος που αντιστοιχεί σε βίντεο μικρής διάρκειας με μορφή animation, σχετικά με την κλιματική αλλαγή. Από αυτό το βίντεο μπορούν οι μαθητές να αντλήσουν γνώση κι ένα ερέθισμα για να απαντήσουν στην ερώτηση που σχετίζεται με τη συμβολή της περιβαλλοντικής εκπαίδευσης στην προστασία του περιβάλλοντος.

Στη συνέχεια υπέβαλαν την εργασία τους μέσω της φόρμας υποβολής ακολουθώντας συγκεκριμένα βήματα και όσοι το επιθυμούσαν συμπεριέλαβαν και σχόλια προς το διδάσκοντα.

Όλες οι εργασίες των φοιτητών διαβάστηκαν από την ομάδα μας και βαθμολογήθηκαν στο σύστημα, συνοδευόμενες από σχόλια προς τον κάθε μαθητή, με σκοπό να αντιληφθούν οι μαθητές την αλληλεπίδραση μαθητή - καθηγητή – συστήματος, και να δουν ένα νέο τρόπο υποβολής και βαθμολόγησης των εργασιών τους.

4�η ενότητα - Συζήτηση για το περιβάλλον

Αναπτύχθηκε ένας «χώρος» συζήτησης για το μάθημα και τα περιβαλλοντικά θέματα, στο οποίο συμμετέχουν όλοι οι μαθητές κάθε ομάδας και ο καθηγητής με ανάρτηση θεμάτων και δυνατότητα απαντήσεων σε αυτά. Έχει διαμορφωθεί με τέτοιο τρόπο ώστε οι συζητήσεις της μίας ομάδας να μην εμπλέκονται με τις συζητήσεις της άλλης.

Δημιουργήθηκαν τα θέματα συζήτησης με τίτλο «*Προτάσεις για Περιβαλλοντική Εργασία*» και «*Ρύπανση του περιβάλλοντος*».

Επίσης, προστέθηκε ένα θέμα κατά τη διάρκεια της περιήγησής τους με μήνυμα «*Παιδιά τα πάτε πολύ καλά με τις δραστηριότητες ! Θα σας άρεσε να κάνατε το μάθημα μέσω μίας τέτοιας ηλεκτρονικής πλατφόρμας; »*.

Στόχος της δημιουργίας νέου θέματος παράλληλα με την εκτέλεση των δραστηριοτήτων του μαθήματος, ήταν να διαπιστώσουν οι μαθητές ότι αναρτήθηκε νέο θέμα και να απαντήσουν. Με αυτό τον τρόπο μπορούν να αντιληφθούν καλύτερα και την έννοια της αλληλεπίδρασης.

5�η ενότητα – Μαθαίνω Παίζοντας !

Αποτελείται από δύο δραστηριότητες και ένα σύνδεσμο που παραπέμπει σε σύντομο βίντεο που σχετίζεται με την προστασία των δασών. Οι δραστηριότητες είναι οι εξής :

Δραστηριότητα σε LAMS

Η ακολουθία δραστηριοτήτων αυτή αποτελείται από μια σύντομη εισαγωγή-παρουσίαση των στόχων, ένα ενημερωτικό video σχετικά με την ανακύκλωση, ένα σύντομο κείμενο με σχετικό περιεχόμενο και τέλος ερωτήσεις πολλαπλής επιλογής που αναφέρονται στο περιεχόμενο των προηγούμενων δραστηριοτήτων.

Οικολογικο-μιούχος

Πρόκειται για το γνωστό παιχνίδι «Εκατομμυριούχος», με κατάλληλα προσαρμοσμένες ερωτήσεις. Συγκεκριμένα, ο μαθητής καλείται να απαντήσει σε ερωτήσεις περιβαλλοντικού περιεχομένου και δίνοντας τη σωστή απάντηση ανεβαίνει επίπεδο.

6�η ενότητα - Motto-Παίγνια

Η δραστηριότητα αυτή περιλαμβάνει ένα Wiki. Πρόκειται για μια «ιστοσελίδα» με συγκεκριμένο θέμα. Εδώ ο μαθητής καλείται να προσθέσει ή να επεξεργαστεί το περιεχόμενό της καταγράφοντας το δικό του Οικολογικό μήνυμα. Έχει τη δυνατότητα να διαβάσει τα μηνύματα όλων των συμμετεχόντων αλλά και να γράψει σχόλια.

Πλαίσια στα αριστερά και δεξιά του μαθήματος

Στο αριστερό μέρος εμφανίζονται τα blocks «Πλοήγηση», «Κύριο Μενού» και «Ρυθμίσεις». Εφόσον ο χρήστης συνδεθεί στο σύστημα, στο μενού «***Πλοήγηση***» βλέπει τη δομή του μαθήματος και τις δραστηριότητες. Στο block «***Ρυθμίσεις***» δίνεται επιπλέον η δυνατότητα στο χρήστη να επεξεργαστεί το προφίλ και να στείλει προσωπικό μήνυμα σε κάποιο άλλο χρήστη.

Στο δεξί μέρος εμφανίζονται τα πλαίσια : «Τελευταία Νέα», «Επικείμενα Γεγονότα», «Δραστηριότητες» και «Συνδεδεμένοι Χρήστες», οι λειτουργίες των οποίων αναπτύχθηκαν στην ενότητα 5.2.

Παρακάτω παρουσιάζονται κάποια στιγμιότυπα της εφαρμογής στην πλατφόρμα του Moodle.

Εικόνα 1: Αρχική σελίδα της υπηρεσίας «Περιβαλλοντική Εκπαίδευση».

Περιβαλλοντικά Θέματα

E.E.Y.E.M.

Περιβαλλοντικά θέματα

Αρχή ► Τα μαθήματά μου ► Περιβαλλοντικά Θέματα

Πλοήγηση

Αρχή
- Αρχική μου
- Περιβαλλοντική Εκπαίδευση
- Προφίλ
- Τα μαθήματά μου
  - Περιβαλλοντικά Θέματα
    - Συμμετέχοντες
    - Γενικά
    - Εκπαιδευτικό Υλικό
    - Ενημέρωση
    - Γραπτές Εργασίες
    - Συζήτηση (Φόρουμ)
    - Μαθαίνω... παίζοντας!
    - Motto – Παίγνια
    - Εναλλακτική παρουσίαση της δραστηριότητας σε LAMS

Κύριο μενού

Ομάδα συζητήσεων ειδήσεων

Ρυθμίσεις

- Διαχείριση μαθήματος
  - Βαθμοί
- Ρυθμίσεις προφίλ

Περιγραφή θέματος

Καλώς ήρθατε στο διαδικτυακό τόπο του μαθήματος

"Περιβαλλοντικά Θέματα"

Τι θα συναντήσουμε στο μάθημα...

διδακτικό υλικό,

πηγές πληροφόρησης για περιβαλλοντικά θέματα,

εκφωνήσεις και υποβολή γραπτών εργασιών,

ομάδα συζήτησεων (forum),

εργαλείο μικροδιδασκαλίας LAMS,

εκπαιδευτικά παιχνίδια,

wiki,

λεξικό όρων

και εναλλακτικές μορφές υλικού.

Ενημέρωση · **Ευαισθητοποίηση** · **ΔΡΑΣΗ** · **Προστασία**

Ομάδα συζητήσεων ειδήσεων

1 **Εκπαιδευτικό Υλικό**

Εδώ θα βρείτε το εκπαιδευτικό υλικό για το μάθημα, την ύλη του μαθήματος, καθώς και λέξεις/φράσεις κλειδιά (των οποίων τη σημασία μπορείτε να αναζητήσετε στο λεξικό όρων).

Λέξεις – κλειδιά : Ανακύκλωση, Αιολικά πάρκα, Ανανεώσιμες Πηγές Ενέργειας, Ανεμογεννήτρια, Βιοδιάσπαση,Ενεργειακή αλυσίδα, Εξοικονόμηση ενέργειας, Ηλεκτρική ενέργεια, Όζον, Οικοσύστημα, Όξινη βροχή, Πόροι, Ρύποι, Υβριδικό σύστημα, Φωτοβολταϊκά στοιχεία.

Περιβάλλον και Απορρίμματα
Λεξικό Χρήσιμων Όρων
Διδακτέα Ύλη

Τελευταία νέα

Άρια Σκουληκάρη **17 Μάι, 12:12**
Παγκόσμια Ημέρα Περιβάλλοντος περισσότερα...

Γεωργία Αντωνέλου **7 Μάι, 14:21**
Περιβαλλοντικές Δράσεις Σχολείων περισσότερα...

Παλαιότερα θέματα ...

Επικείμενα γεγονότα

Δεν υπάρχουν επικείμενα γεγονότα

Μετάβαση στο ημερολόγιο...
Νέα γεγονός...

Δραστηριότητες

- LAMS Lessons
- Wikis
- Εκπαιδευτικοί πόροι
- Εργασίες
- Κουίζ
- Λεξικά
- Ομάδες Συζητήσεων
- Παιχνίδια

Συνδεδεμένοι Χρήστες (τελευταία 5 λεπτά)

- Μαθητής Test
- Άρια Σκουληκάρη

Εικόνα 2: Μάθημα «Περιβαλλοντικά Θέματα», 1η ενότητα.

2 Ενημέρωση

Ενημερωθείτε για οργανώσεις και περιβαλλοντικά θέματα.

Εστιάστε σε εκείνο που σας ενδιαφέρει περισσότερο, ώστε να ενημερωθείτε κατάλληλα για μελλοντικές ενέργειες.. και γιατί όχι? να λάβετε δράση !

- WWF - Δουλέουμε στη φύση
- ΘΑΛΑΣΣΙΑ ΘΗΛΑΣΤΙΚΑ
- GREENPEACE
- ΑΡΚΤΟΥΡΟΣ
- Ελληνική Εταιρεία Προστασίας της Φύσης
- Ανακύκλωση και Απορρίμματα

3 Γραπτές Εργασίες

»Ανακοινώνονται οι εκφωνήσεις των γραπτών εργασιών

»Αναρτάται βοηθητικό υλικό και φόρμα υποβολής της εργασίας

»Υποβάλλετε την εργασία σας και σχόλια προς το διδάσκοντα

»Μπορείτε να δείτε τη βαθμολογία και τη διορθωμένη εργασία

- Εκφώνηση 1ης Γραπτής Εργασίας (.pdf)
- Εκφώνηση 1ης Γραπτής Εργασίας (.doc)
- Υποβολή 1ης Γραπτής Εργασίας

Βοηθητικό υλικό: βιντεάκι που περιγράφει την κλιματική αλλαγή με "ευχάριστο" τρόπο.

- Κλιματική Αλλαγή

4 Συζήτηση (Φόρουμ)

Η ομάδα συζητήσεων σας δίνει τη δυνατότητα να συνομιλείτε με τους συμμαθητές σας και το διδάσκοντα, για θέματα που αφορούν το μάθημα, τις δραστηριότητες αλλά και γενικότερα το περιβάλλον.

- Συζήτηση (Forum) για το περιβάλλον

5 Μαθαίνω... παίζοντας!

- Δραστηριότητα σε LAMS
- Γίνε εσύ ο επόμενος...Οικολογικο-μιούχος !
- Αρκούδος ο Περιβαλλοντολόγος... για τα Δάση

6 Motto - Παίγνια

Πολλά είναι τα λογοπαίγνια που μπορούν να γίνουν με γνωστές μας "Περιβαλλοντολογικές" και "Οικολογικές" ορολογίες.

Σκέψου και εσύ μερικές "ατάκες" ή ψάξε και βρες ...!

Πρόσθεσε αγαπημένες σου φράσεις με **"οικο - λογικό"** περιεχόμενο!

"Κάνοντας ξανά Ποδηλατάδα (Re-cycling) ΜΕ τη γη.. ΓΙΑ τη ΓΗ"

- Δημιούργησε το δικό σου....μήνυμα!

7 Εναλλακτική παρουσίαση της δραστηριότητας σε LAMS

Παρακάτω ακολουθεί η εναλλακτική παρουσίαση της Δραστηριότητας του LAMS με εργαλεία του MOODLE.

Γνωρίζουμε τί είναι..ΑΝΑΚΥΚΛΩΣΗ;

Ακολουθεί ένα ενημερωτικό video σχετικά με την ανακύκλωση. Δείτε το με προσοχή ώστε να είστε σε θέση να απαντήσετε... γρήγορα... σε ερωτήσεις που θα ακολουθήσουν.

Το video αυτό θα μας δώσει πληροφορίες σχετικά με :

- τί είναι ανακύκλωση
- ποιά υλικά ανακυκλώνονται
- πώς μπορούμε εμείς να ενισχύσουμε το "έργο" της ανακύκλωσης

- Ενημέρωση για την Ανακύκλωση
- Video- Quiz

Εικόνα 3: Συνοπτική παρουσίαση των ενοτήτων 2-7 της υπηρεσίας «Περιβαλλοντική Εκπαίδευση».
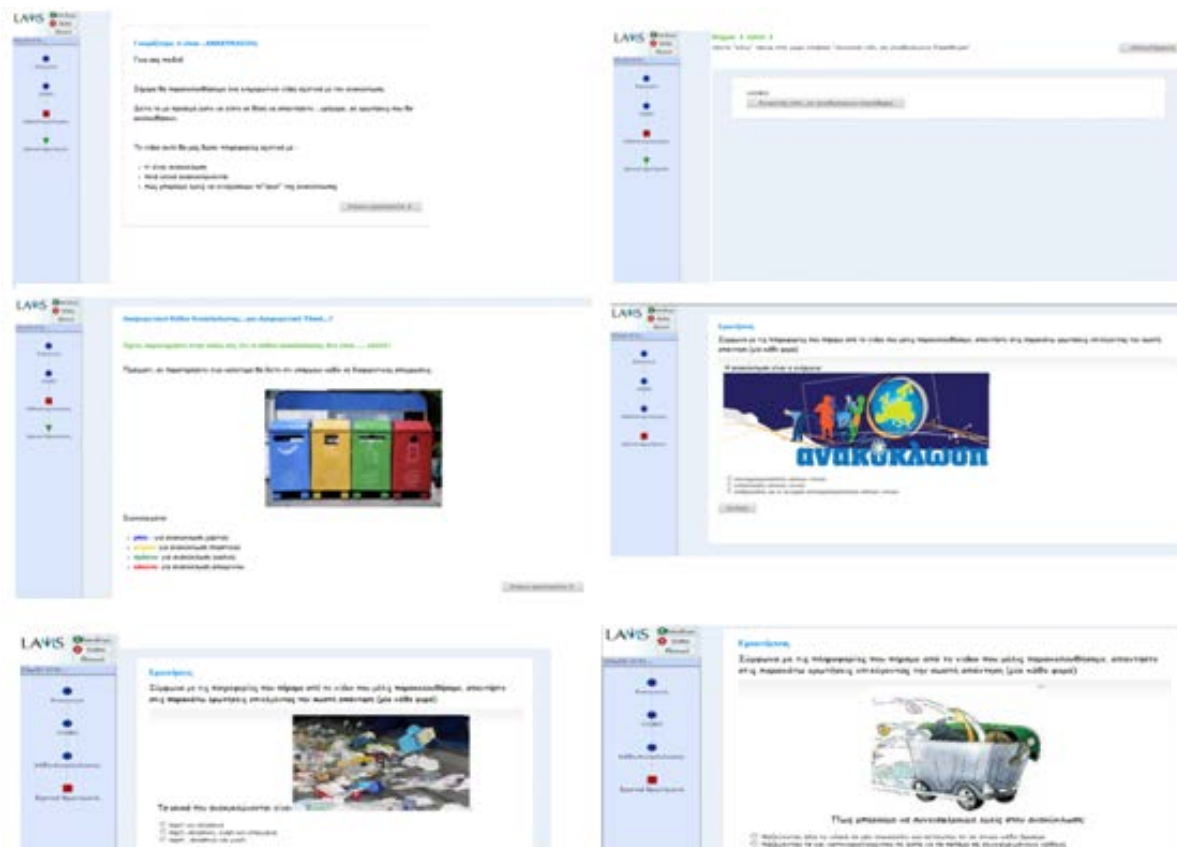
Εικόνα 4: Δραστηριότητα σε LAMS.

Μεθοδολογία συλλογής δεδομένων

Η συλλογή των δεδομένων έγινε στη βάση τεσσάρων διαφορετικών τεχνικών. Αυτές είναι οι εξής: ερωτηματολόγιο, αρχεία καταγραφής του συστήματος, προσωπική επικοινωνία με τους καθηγητές σχετικά με τη διεξαγωγή του πειράματος και τις εντυπώσεις των μαθητών, περιήγηση των ερευνητών στην ηλεκτρονική πλατφόρμα μετά την πιλοτική εφαρμογή στο σχολείο.

Το **ερωτηματολόγιο** αποτελείται από οκτώ ερωτήσεις σύντομης απάντησης. Πιο συγκεκριμένα, δύο ερωτήσεις πολλαπλής επιλογής, δύο ερωτήσεις με απάντηση ΝΑΙ/ΟΧΙ, μία με απάντηση ΝΑΙ/ΟΧΙ και σύντομη απάντηση, και τρεις ερωτήσεις ανοικτού τύπου – σύντομης απάντησης.

Από τα **αρχεία καταγραφής** του συστήματος αντλήσαμε επιπλέον πληροφορίες που συμπληρώνουν τα αποτελέσματα που προκύπτουν από τα ερωτηματολόγια. Αυτό ενισχύει την εξαγωγή ολοκληρωμένων συμπερασμάτων που αφορούν τόσο τις ενέργειες των χρηστών του συστήματος, όσο και τις προτιμήσεις τους. Παρακολουθήσαμε τις ενέργειες των χρηστών κατά τη διάρκεια της πλοήγησής τους, ποιες δραστηριότητες επισκέφθηκαν πάνω από μία φορά και πού διέθεσαν λίγο περισσότερο χρόνο.

Υπήρξε προσωπική **επικοινωνία με τους καθηγητές** των δύο τμημάτων Γυμνασίου και Λυκείου, όπου πραγματοποιήθηκε η πιλοτική εφαρμογή, σχετικά με τη διεξαγωγή του πειράματος. Συζητήθηκαν οι συνθήκες κάτω από τις οποίες διεξήχθη το πείραμα, ο καταμερισμός του χρόνου ανά δραστηριότητα, και κυρίως οι εντυπώσεις που είχαν οι μαθητές κατά τη διάρκεια της διαδικασίας αλλά και ιδιαίτερα τα τελικά συμπεράσματα.

Τέλος, όσο αφορά την τέταρτη συνιστώσα, τα δεδομένα τα οποία συλλέξαμε κατά την **περιήγηση στην ηλεκτρονική πλατφόρμα μετά την πιλοτική εφαρμογή**, αφορούν κυρίως τις γραπτές εργασίες που υπέβαλλαν οι οποίες σχολιάστηκαν και βαθμολογήθηκαν, τις συζητήσεις που έγιναν στο φόρουμ και τις προσθήκες που έκαναν οι μαθητές στο wiki.

Έκθεση αποτελεσμάτων

Στην ενότητα αυτή γίνεται έκθεση των αποτελεσμάτων των ερωτηματολογίων που συμπληρώθηκαν από τους μαθητές. Το δείγμα των μαθητών είναι 43 στο σύνολο, 25 μαθητές γυμνασίου και 18 λυκείου. Στη συνέχεια ακολουθεί ο συνδυασμός αυτών των αποτελεσμάτων με τις πληροφορίες που αντλήσαμε από τα αρχεία καταγραφής, από τους διδάσκοντες και την περιήγηση στην πλατφόρμα αφότου ολοκληρώθηκε το πείραμα.

Ερωτήσεις ερωτηματολογίου και απαντήσεις των μαθητών

Ερώτηση 1η : Πώς θα χαρακτηρίζατε την υπηρεσία «Περιβαλλοντική Εκπαίδευση» ;

Μαθητές	ενδιαφέρουσα	πρωτότυπη	διασκεδαστική	επίκαιρη	διαδραστική
Γυμνασίου	20	10	7	1	0
Λυκείου	9	9	4	0	1

Σημείωση : Πολλές από τις απαντήσεις ήταν συνδυαστικές, δηλαδή ο μαθητής έδωσε πάνω από μία απαντήσεις, π.χ. "ενδιαφέρουσα, πρωτότυπη, διασκεδαστική".

Ερώτηση 2η : Θα σας άρεσε να χρησιμοποιείτε μία τέτοια υπηρεσία για να παρακολουθείτε το μάθημά σας καθ' όλη τη διάρκεια της χρονιάς ?

Μαθητές	ΝΑΙ	ΟΧΙ
Γυμνασίου	24	1
Λυκείου	18	0

Ερώτηση 3η : Πόσο συχνά θα επιθυμούσατε να την επισκέπτεστε ?
a. Μία μόνο φορά στην αρχή, για να δω το περιεχόμενο (από περιέργεια)
b. Μία φορά την εβδομάδα, για να έχω συνεχή ενημέρωση
c. Καθόλου, δεν μου άρεσαν οι δυνατότητες – δραστηριότητες που προσφέρει
(εκπαιδευτικό υλικό, ενημέρωση, εκπαιδευτικά παιχνίδια, συζήτηση, υποβολή γραπτών εργασιών, ανακοίνωση νέων στη σελίδα κ.α.)
d. Κάθε φορά που χρειάζεται να κάνω μία δραστηριότητα για το μάθημα

Μαθητές	a	b	c	d
Γυμνασίου	1	10	0	14
Λυκείου	1	10	0	7

Ερώτηση 4η : Ποια δραστηριότητα σας άρεσε περισσότερο ?
a. Πρόσβαση στο «Εκπαιδευτικό υλικό» σε ψηφιακή μορφή
b. «Λεξικό όρων»
c. Ενημερωτικά sites, π.χ. Greenpeace, ΑΡΚΤΟΥΡΟΣ, WWF, Θαλάσσια Θηλαστικά
d. «Γραπτές Εργασίες», πρόσβαση σε εκφώνηση, βοηθητικό υλικό και υποβολή εργασιών
e. «Συζήτηση (Forum)» για το μάθημα και γενικότερα το περιβάλλον
f. «Γίνε εσύ ο επόμενος... Οικολογικο-μιούχος! », παιχνίδι ερωτήσεων
g. «Δραστηριότητα σε LAMS», μικροδιδασκαλία : ακολουθία δραστηριοτήτων
h. «Motto- παίγνια», "Δημιούργησε το δικό σου... μήνυμα"
i. Σύνδεσμοι – Βιντεάκια με οικολογικό – εκπαιδευτικό περιεχόμενο
j. «Site news», ανακοίνωση νέων στη σελίδα (π.χ.Ανακύκλωση, Περιβάλλον και Μαθηματικά, Έξυπνες eco-κατασκευές)

Μαθητές	a	b	c	d	e	f	g	h	i	j
Γυμνασίου	5	0	13	5	7	4	1	2	1	3
Λυκείου	2	0	8	5	3	7	2	0	3	2

Σημείωση : Κάποιες από τις απαντήσεις των μαθητών ήταν συνδυαστικές, δηλαδή ο μαθητής έδωσε πάνω από μία απαντήσεις.

Ερώτηση 5η : <u>Θα επιθυμούσατε να συμμετάσχετε και εσείς στη διαμόρφωση του περιεχομένου της πλατφόρμας;</u> Δηλαδή να κατασκευάζετε δικά σας παιχνίδια , να γράψετε κάποιο δικό σας άρθρο στη συζήτηση κ.α.

Μαθητές	ΝΑΙ	ΟΧΙ
Γυμνασίου	21	4
Λυκείου	14	4

Ερώτηση 6η : <u>Ποιά από τις δραστηριότητες – δυνατότητες βρήκατε λιγότερο ενδιαφέρουσα ;</u>

Μαθητές	Καμία, όλες ήταν ωραίες	Motto-παίγνια	Συζήτηση	Λεξικό όρων
Γυμνασίου	17	1	1	3
Λυκείου	7	1	0	3

Μαθητές	Σύνδεσμοι - Video	Ενημερωτικά sites	LAMS	Γραπτές εργασίες
Γυμνασίου	1	1	1	0
Λυκείου	5	0	0	2

Ερώτηση 7η : <u>Θεωρείτε ότι η υπηρεσία «Περιβαλλοντική Εκπαίδευση» μπορεί να σας προσφέρει γνώση για το περιβάλλον, τους κινδύνους και τρόπους αντιμετώπισής τους;</u>

Μαθητές	ΝΑΙ	ΟΧΙ
Γυμνασίου	24	1
Λυκείου	18	0

<u>Σε τι βαθμό σας ενδιαφέρει αυτή η γνώση ?</u>

Μαθητές	Καθόλου	Λίγο	Αρκετά	Μεγάλο	Πολύ μεγάλο
Γυμνασίου	0	0	2	13	10
Λυκείου	0	0	2	2	14

Ερώτηση 8η : <u>Με την πλοήγησή σας στην υπηρεσία και τις δραστηριότητες, λάβατε κάποιο ερέθισμα για την υιοθέτηση φιλοπεριβαλλοντικού τρόπου ζωής;</u>

Μαθητές	ΝΑΙ	ΟΧΙ
Γυμνασίου	24	1
Λυκείου	18	0

Σημείωση : Στην 8η ερώτηση πολλοί από τους μαθητές έδωσαν ολοκληρωμένη απάντηση. Παραθέτουμε κάποιες χαρακτηριστικές απαντήσεις:

«έμαθα περισσότερα που θα ακολουθήσω…!», «…το βίντεο της κλιματικής αλλαγής με τη μορφή animation με συγκίνησε πάρα πολύ και θεωρώ ότι είναι ένα ισχυρό ερέθισμα για να ευαισθητοποιηθούν όλοι», «…Θα ήθελα πολύ να συμβάλλω σ'αυτή την ομάδα, να δράσω, ώστε να δοθούν και σε άλλους ανθρώπους αυτές οι πληροφορίες και να προσπαθήσουμε για ένα καλύτερο μέλλον για όλους μας!», «ευαισθητοποιήθηκα με τις συμβουλές και τις πληροφορίες, ήταν διασκεδαστικό και καθόλου βαρετό με τα παιχνίδια, τα βίντεο κ.ά»

Από την **επικοινωνία που είχαμε με τους καθηγητές** που συμμετείχαν στην πιλοτική εφαρμογή πήραμε σημαντικές πληροφορίες για την εξέλιξή της και τη συμπεριφορά των μαθητών. Το πείραμα διεξήχθη ομαλά με το ενδιαφέρον των μαθητών επικεντρωμένο στην ηλεκτρονική πλατφόρμα, καθώς τους κέντρισε αρχικά το ενδιαφέρον τόσο η ιδέα μίας νέας μορφής μαθήματος, όσο και το γραφικό περιβάλλον. Στη συνέχεια, κατά τη διάρκεια εξέλιξης του πειράματος οι μαθητές παρέμειναν αφοσιωμένοι στην εκπαιδευτική διαδικασία προκειμένου να συμμετέχουν ενεργά στις δραστηριότητες.

Ακόμα, σύμφωνα με τους διδάσκοντες οι μαθητές εξοικειώθηκαν πολύ γρήγορα με το περιβάλλον της εφαρμογής και χρησιμοποίησαν δυνατότητες εκτός εκπαιδευτικού σεναρίου όπως την αποστολή προσωπικών μηνυμάτων και την επεξεργασία του προφίλ. Όλα τα παραπάνω διαφαίνονται και από τα αρχεία καταγραφής του συστήματος.

Όλα τα παραπάνω αποδεικνύονται και από τα **αρχεία καταγραφής του συστήματος** καθώς φαίνεται ο χρόνος που επένδυσαν στις δραστηριότητες και το γεγονός ότι τις επισκέφτηκαν περισσότερες φορές. Παρατηρήσαμε ότι όλες οι υποομάδες των δύο ατόμων που δημιουργήθηκαν εκτέλεσαν με επιτυχία όλες τις δραστηριότητες που περιελάμβανε το εκπαιδευτικό σενάριο. Επίσης, κάποιοι μαθητές αξιοποίησαν επιπλέον δυνατότητες που προσφέρει η εφαρμογή.

 Τέλος, από τα αρχεία καταγραφής διαπιστώσαμε πως αρκετοί από τους μαθητές συνδέθηκαν στην υπηρεσία και μετά το μάθημα στον ελεύθερο χρόνο τους, ενδεχομένως από το σπίτι. Αυτό συνέβη την ίδια ημέρα αλλά και τις επόμενες, γεγονός το οποίο δηλώνει πως έδειξαν ιδιαίτερο ενδιαφέρον στην καινοτόμα αυτή ηλεκτρονική πλατφόρμα και το περιεχόμενό της.

Παρακάτω παραθέτονται ενδεικτικά κάποιες απαντήσεις των μαθητών σε δραστηριότητες, τις οποίες αντλήσαμε κατά την **πλοήγηση στην πλατφόρμα μετά την πιλοτική εφαρμογή**.

Στην ενότητα «Motto-Παίγνια» στο wiki αναρτήθηκαν τα μηνύματα : *"Είναι στο χέρι μας να προστατεύσουμε τις ακτές και τις θάλασσες", "να μην αφήσουμε τη μόλυνση του περιβάλλοντος να γίνει μόδα!"*.

Στην ενότητα «Συζήτηση για το περιβάλλον» στο θέμα «Προτάσεις για περιβαλλοντική εργασία» προτάθηκαν *"μεσόγειος θάλασσα", "προστασία δασών", "αξιοποίηση φυσικών πόρων στη χώρα μας"*. Επιπλέον, στην ερώτηση αν θα επιθυμούσαν να χρησιμοποιούν μία τέτοια πλατφόρμα για το μάθημα απάντησαν : *"..ενδιαφέρον αυτός ο τρόπος διδασκαλίας και η ώρα θα περνούσε ευχάριστα μαθαίνοντας", " ... ιδιαίτερα ενδιαφέρον, απλά το βιβλίο θεωρώ και τον καθηγητή δεν μπορεί να τα αντικαταστήσει ένας Η/Υ με τίποτα!", " ίσως ό,τι έχει να κάνει με τρισδιάστατη προβολή πειραμάτων που δεν έχουμε τη δυνατότητα να πραγματοποιήσουμε εντός τάξεως.. εξαιρετικά ενδιαφέρον!"*.

Τέλος, παραθέτουμε μία ενδεικτική απάντηση που δόθηκε στις γραπτές εργασίες.

"Είναι σημαντικό να υπάρχει περιβαλλοντική εκπαίδευση στα σχολεία και μέσω υπολογιστών διότι τα παιδιά από μικρή ηλικία πρέπει να γνωρίζουν πόσο σημαντικό ρόλο παίζει η προστασία του περιβάλλοντος στη ζωή μας και ο σεβασμός προς αυτό. Είναι καλό να γίνονται στα σχολεία διάφορα περιβαλλοντικά project και εκδρομές οι οποίες θα βοηθήσουν στην ευαισθητοποίηση και στην απόκτηση περιβαλλοντικής και οικολογικής συνείδησης. Με αυτόν τον τρόπο θα μάθουμε να σεβόμαστε και να αγαπάμε το περιβάλλον καθώς και να το προστατεύουμε."

Συμπεράσματα

Οι πρώτες ενδείξεις που αποκομίσαμε από τη μικρή σε κλίμακα πιλοτική εφαρμογή είναι θετικές τόσο από την πλευρά των εκπαιδευομένων όσο και των εκπαιδευτών. Οι μαθητές έδειξαν

ιδιαίτερο ενδιαφέρον στην υπηρεσία «Περιβαλλοντική Εκπαίδευση» και τις δραστηριότητες που αναπτύχθηκαν.

Κατά το σχεδιασμό του εκπαιδευτικού σεναρίου έγιναν κάποιες υποθέσεις τις οποίες και θα παραθέσουμε παρακάτω. Η έρευνα που διεξήχθη είχε σκοπό την αξιολόγηση και τεκμηρίωση των υποθέσεων αυτών, βάσει των οποίων σχεδιάστηκαν και τα ερωτηματολόγια. Η τεκμηρίωση των υποθέσεων γίνεται μέσω της ανατροφοδότησης που λάβαμε τόσο από τη συλλογή των ερωτηματολογίων όσο και από τις υπόλοιπες τεχνικές συλλογής δεδομένων (αρχεία καταγραφής, περιήγηση στη πλατφόρμα, συνέντευξη εκπαιδευτών). Παρακάτω ακολουθούν οι υποθέσεις:

Μια πρώτη υπόθεση ήταν ότι η χρήση μιας ψηφιακής πλατφόρμας όπως το Moodle **θα αποτελούσε για τους εκπαιδευόμενους μια ενδιαφέρουσα και διαφορετική εκπαιδευτική προσέγγιση** σε θέματα περιβαλλοντικά και γενικότερου σκοπού.

Πράγματι, οι εκπαιδευόμενοι βρήκαν την υπηρεσία αρκετά ενδιαφέρουσα, πρωτότυπη και διασκεδαστική, όπως προκύπτει από την αξιολόγηση των αποτελεσμάτων του ερωτηματολογίου καθώς και από την συνέντευξη των εκπαιδευτών. Η άμεση εξοικείωση των μαθητών με τον ψηφιακό χώρο σε συνδυασμό με το γεγονός ότι άρχισαν να αξιοποιούν τις διαφορετικές δυνατότητες που προσφέρει το περιβάλλον (καταγραφή σχετικών δεδομένων στα αρχεία του συστήματος) συνηγορεί στην ενίσχυση της υπόθεσής μας.

Επόμενη υπόθεση που θέσαμε είναι ότι θα προέκυπτε **η επιθυμία της ενεργούς συμμετοχής τους στη διαμόρφωση και επεξεργασία του περιεχομένου/υλικού που παρατίθεται στην πλατφόρμα,** με αφορμή την ενασχόληση τους με τις δραστηριότητες που υποστηρίζονται στο πλαίσιο του μαθήματος.

Πράγματι, όπως προκύπτει από τις απαντήσεις τους στις αντίστοιχες ερωτήσεις του ερωτηματολογίου, οι εκπαιδευόμενοι, αφού εξέφρασαν την προτίμηση τους για κάποιες εκ των δραστηριοτήτων, δήλωσαν ότι θα επιθυμούσαν να συμμετέχουν στη διαμόρφωση του περιεχομένου μιας τέτοιας εφαρμογής. Αυτό υποδεικνύει την τάση για συνεχή ενημέρωση και διατήρηση/βιωσιμότητα γνώσης προκειμένου να είναι σε θέση να αναρτούν έγκυρο υλικό .

Το παραπάνω γεγονός ενισχύει την επόμενη υπόθεση, η οποία ήταν ότι θα **υπήρχε η επιθυμία για χρήση μιας τέτοιας εφαρμογής σε όλο το εύρος της εκπαιδευτικής διαδικασίας ως συμπληρωματικό εργαλείο του διδάσκοντα χωρίς να έχει δεσμευτικό χαρακτήρα από την πλευρά των εκπαιδευομένων.**

Όπως προέκυψε και από σχετική ερώτηση για τη συχνότητα επισκεψιμότητας της εν λόγω εφαρμογής, οι εκπαιδευόμενοι εξέφρασαν την επιθυμία πρόσβασης ανά εβδομάδα ώστε να έχουν συνεχή ενημέρωση επί των θεμάτων ή κάθε φορά που στα πλαίσια του μαθήματος κρίνεται απαραίτητο. Αξιοσημείωτο είναι το γεγονός ότι η πλειοψηφία των μαθητών υποστήριξε ότι η παρουσία των εκπαιδευτών δεν αντικαθίσταται από καμία τέτοιας φύσεως εφαρμογή. Συγκεκριμένα, εξέφρασαν την επιθυμία τους να χρησιμοποιούν καθ' όλη τη διάρκεια της ακαδημαϊκής χρονιάς μία τέτοια εκπαιδευτική πλατφόρμα, επισημαίνοντας πως είναι ένα χρήσιμο και ευχάριστο εκπαιδευτικό εργαλείο, το οποίο θα ήθελαν να χρησιμοποιεί ο καθηγητής του μαθήματος συμπληρωματικά, αλλά σε καμία περίπτωση προς αντικατάσταση του ίδιου του διδάσκοντα. Η άποψη αυτή καταγράφεται και σε σχετικό σχολιασμό των μαθητών στο φόρουμ.

Τέλος, πιστεύαμε ότι **τα ερεθίσματα που θα λάμβαναν από την παρουσίαση του συγκεκριμένου υλικού μέσω των δραστηριοτήτων, θα συνέβαλλαν στην ευαισθητοποίηση** των μαθητών απέναντι σε περιβαλλοντικά θέματα με επέκταση σε κοινωνικο-πολιτικά θέματα.

Πολλοί εκπαιδευόμενοι δήλωσαν στο ερωτηματολόγιο ότι έμαθαν αρκετά πράγματα που δε γνώριζαν αναφορικά με τα περιβαλλοντικά θέματα, εξέφρασαν την ανάγκη για άμεση δράση και ένταξη σε παρόμοιες προσπάθειες καθώς και την επιθυμία ύπαρξης τέτοιων πηγών ερεθισμάτων που θα οδηγούσε στην ευαισθητοποίηση όλων. Επίσης, από την περιήγηση των ερευνητών στα forum διαπιστώθηκε η καταγραφή μηνυμάτων με θέμα τα ερεθίσματα και το αντίκτυπο που είχαν στη στάση τους.

Έτσι λοιπόν διαφαίνεται η ανάγκη για ενσωμάτωση τέτοιων εφαρμογών σε εκπαιδευτικές διαδικασίες. Είναι αξιοσημείωτο ότι μέσω των απλών δραστηριοτήτων και δυνατοτήτων που υποστηρίζονται από συστήματα όπως το Moodle, είναι εφικτή η πλοήγηση οποιουδήποτε χρήστη σε αυτό χωρίς να απαιτούνται εξειδικευμένες τεχνολογικές γνώσεις.

Η διεξαγωγή μαθημάτων μέσω πληροφοριακών συστημάτων δεν είναι απλά τρόπος εκπαίδευσης στο αυστηρό πλαίσιο ενός σχολικού μαθήματος αλλά σε ένα ευρύτερο πλαίσιο με κοινωνική, περιβαλλοντική και οικονομική διάσταση. Επομένως, συνηγορεί στη συνειδητοποίηση της ανάγκης για υιοθέτηση μιας διαφορετικής στάσης ζωής.

Μελλοντική πρόταση

Η διερεύνηση της περίπτωσης διεξαγωγής διαθεματικών εφαρμογών με ενεργό ρόλων των ίδιων των εκπαιδευομένων μελλοντικά, φαίνεται ενδιαφέρουσα. Συγκεκριμένα, οι ίδιοι οι χρήστες που συμμετέχουν σε μία αντίστοιχη ηλεκτρονική πλατφόρμα θα αναλαμβάνουν - με στοιχειώδη καθοδήγηση - την οργάνωση του περιεχομένου, τη διατήρηση και ενημέρωσή του. Με αυτό τον τρόπο επιτυγχάνεται η βιωσιμότητα της πληροφορίας στο σύστημα αλλά και η βιωσιμότητα της γνώσης του ατόμου. Αυτό θα έχει πρόσθετη αξία όχι μόνο για όσους συμμετέχουν αλλά και για ομάδες που μπορούν ερευνητικά να επεξεργαστούν τα δεδομένα που συλλέγονται μέσω τέτοιων εφαρμογών (πχ. κοινωνιολόγοι).
Αξίζει να επισημανθεί πως μία τέτοια εκπαιδευτική πλατφόρμα έχει προοπτικές γενίκευσης του περιεχομένου για ζητήματα οικονομικής ανάπτυξης, κοινωνικής εξέλιξης, προστασίας του περιβάλλοντος και τον τρόπο με τον οποίο αυτά αλληλο-συσχετίζονται. Ενισχύει την ευαισθητοποίηση των νεότερων στα περιβαλλοντικά προβλήματα και την απόκτηση πολύπλευρης γνώσης.
Προσπάθειες έκφρασης στάσεων και αναγκών θα πρέπει να υποστηρίζονται από όλους όσους επιθυμούν να συμμετέχουν ενεργά στη διαμόρφωση σωστής στάσης απέναντι στις σύγχρονες και μελλοντικές καταστάσεις.

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Εκπαιδευτικό Σενάριο με Χρήση ΤΠΕ "Δεν είναι όλα τα σκουπίδια, σκουπίδια"

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Περίληψη

Το εκπαιδευτικό σενάριο απευθύνεται σε μαθητές των τελευταίων τάξεων του δημοτικού, στόχος του είναι όμως να εμπλέξει ολόκληρη την σχολική μονάδα. Η βιώσιμη διάσταση του σεναρίου φαίνεται από το θέμα που πραγματεύεται και είναι η διαχείριση των απορριμμάτων. Η δομή και η ανάπτυξη του σεναρίου έχει βασιστεί στις θεωρίες του εποικοδομισμού και στην κριτική/χειραφετική σχολή, με το δάσκαλο να έχει ρόλο συντονιστή και το μαθητή να πρωταγωνιστεί. Ο πρωταγωνιστικός ρόλος του μαθητή είναι δυνατόν να επιφέρει τροποποιήσεις ή ακόμα και ολοκληρωτικές αλλαγές στον αρχικό σχεδιασμό του σεναρίου. Πρόκειται για ένα ενδιαφέρον και λειτουργικό εκπαιδευτικό σενάριο το οποίο χρησιμοποιεί καινοτόμα, δημιουργικά και ελκυστικά σχεδιαστικά υλικά. Ο σχεδιασμός του σεναρίου πραγματοποιήθηκε στα πλαίσια σεμιναρίου από απόσταση που διεξήγαγε το ΚΠΕ Έδεσσας το σχολικό έτος: 2009-2010.

Λέξεις κλειδιά: Νέες Τεχνολογίες, Περιβαλλοντική Εκπαίδευση, Δημοτικό, Βιωσιμότητα, Αειφορία

Abstract
This educational lesson plan targets to students of the last grades of primary school, but its goal is to involve the whole school. The sustainable dimension of the lesson plan accrues of its subject which is the waste management. The structure and the evolvement of this lesson plan are based on the theories of constructivism and the critical / emancipatory school, while the teacher has a coordinating role and the student is starring. The leading role of the student is possible to modify or even completely change the original design of this lesson plan. It is an interesting and functional educational lesson plan which uses innovative, creative and attractive design tools. The design of this lesson plan was part of a distance course conducted by KPE Edessas during the academic year: 2009-2010.

Keywords: New Technology, Environmental Education, Elementary school, Primary school, Sustainability

Εισαγωγή - Θεωρητικό Πλαίσιο
Χρησιμοποιώντας για τη βιώσιμη ανάπτυξη τον ορισμό της «Επιτροπής Για το Περιβάλλον και την Ανάπτυξη» (Έκθεση Brundtland), ορίζοντας δηλαδή ως βιώσιμη την ανάπτυξη εκείνη που ικανοποιεί τις ανάγκες του παρόντος, χωρίς να στερεί από τις μελλοντικές γενιές το δικαίωμά τους να ικανοποιήσουν τις δικές τους ανάγκες (WCED 1987, σ.43), μπορούμε να υποστηρίξουμε πως η βιωσιμότητα του σημερινού μοντέλου ανάπτυξης τίθεται υπό αμφισβήτηση από την ίδια την πραγματικότητα. Εύκολα αντιλαμβάνεται κανείς την ανάγκη για περιβαλλοντική εκπαίδευση.
Αναγνωρίζοντας τη σημασία της προαναφερθείσας αναζήτησης διαφορετικών διδακτικών στρατηγικών, οι οποίες θα συμβάλλουν στην αναδόμηση της κοινωνίας, η Γενική Συνέλευση του ΟΗΕ, στην 57η συνεδρία, το Σεπτέμβριο του 2002, αποφάσισε να κηρύξει την περίοδο 2005-2014 ως τη δεκαετία της εκπαίδευσης για τη βιώσιμη ανάπτυξη. Η εκπαίδευση για τη βιώσιμη ανάπτυξη καλύπτει μια ευρεία σειρά θεμάτων που σχετίζονται όχι μόνο με το περιβάλλον, αλλά και με την κοινωνία, όπως είναι ο ρατσισμός, ο κοινωνικός αποκλεισμός, ο σεβασμός στη διαφορά κ.ά. (UNESCO, 2004 στους Κωστούλα-Μακράκη, Ν. & Μακράκης, Β. Γ. 2006). Προτάσσει

επιτακτικά την ανάγκη βελτίωσης της ικανότητας των ανθρώπων να χειριστούν ζητήματα περιβάλλοντος, ανάπτυξης και πολιτισμικής ετερότητας (UNESCO, 2001 στους Κωστούλα-Μακράκη, Ν. & Μακράκης, Β .Γ. 2006) και προάγει στους μαθητές τόσο την πλανητική συνείδηση όσο και την εθνοπολιτισμική και γλωσσική τους ταυτότητα (Κωστούλα-Μακράκη, Ν. & Μακράκης, Β .Γ. 2006). Σύμφωνα με όλα τα παραπάνω το σενάριο που παρουσιάζεται προσπαθεί να προετοιμάσει τους μαθητές για να γίνουν μέλη μιας κοινωνίας που θα δρα βιώσιμα.

Το σενάριο δημιουργήθηκε στα πλαίσια του σεμιναρίου του ΚΠΕ Έδεσσας με τίτλο: Επιμόρφωση "από ρήματα και από απόσταση": Οραματίζομαι, Σχεδιάζω και Δημιουργώ εκπαιδευτικό υλικό για τη διαχείριση απορριμμάτων. Το σεμινάριο αυτό είχε στόχο να προκύψει ένα εκπαιδευτικό σενάριο για τη διαχείριση απορριμμάτων, με την ενσωμάτωση ενός μικρομαθήματος και μιας ιστοεξερεύνησης, με τη μορφή Wiki.

Οι ιστοεξερευνήσεις είναι σενάρια διδακτικών ενοτήτων, προβλημάτων ή ζητημάτων στα οποία βασικό ρόλο έχει η άντληση και επεξεργασία πληροφοριών από το Διαδίκτυο και τα οποία είναι οργανωμένα σε μορφή ιστοσελίδων (Dodge 2001).

Σε σχέση με τις ιστοεξερευνήσεις, τα μικρομαθήματα παρουσιάζουν μερικές μικρές διαφορές. Τα μικρομαθήματα μπορεί να μην βρίσκονται στο διαδίκτυο, γιατί δεν αξιοποιούν τόσο τις πηγές του διαδικτύου, όπως οι ιστοεξερευνήσεις. Τα μικρομαθήματα είναι περισσότερο μαθητοκεντρικές μαθησιακές δραστηριότητες, τα οποία όταν δημιουργούνται με την χρήση πολυμέσων γίνονται πιο εύχρηστα και αποδοτικά. Σύμφωνα με τον Richards 2005, σ.60-79, οι ιστοεξερευνήσεις κυρίως προωθούν την ενεργό συμμετοχή με τους διαδικτυακούς πόρους ενώ τα μικρομαθήματα ενθαρρύνουν τους εκπαιδευτικούς να χρησιμοποιήσον τα προγράμματα παρουσιάσεων για την παραγωγή πολυμεσικών μαθησιακών δραστηριοτήτων εκτός από τις απλές παρουσιάσεις.

Το συγκεκριμένο σενάριο έχει αναπτυχθεί με τη θεωρία του δομικού εποικοδομισμού, ακολουθεί τη κριτική/χειραφετική σχολή και χρησιμοποιεί τη μέθοδο Project. Σύμφωνα με το δομικό εποικοδομισμό ο άνθρωπος δεν είναι παθητικός δέκτης των γνώσεων, ούτε μαθαίνει μέσα από την προοδευτική συσσώρευση γνώσεων που βρίσκονται έξω από αυτόν. Η μάθηση συντελείται μέσα από αλληλεπιδραστικά περιβάλλοντα στα οποία ο μαθητής αναλαμβάνει την ευθύνη για το «πώς» θέλει να μάθει και για το «ποιες» πληροφορίες θέλει να προσλάβει. (Perkins, 1991, στο Μακράκης Β. 2000, σ.31) Η αλληλεπίδραση και η πρωτοβουλία του μαθητή μπαίνουν σε πρώτο πλάνο και θέτονται ως πρωταρχικοί μας στόχοι κατά τη δημιουργία αυτού του σεναρίου.

Σύμφωνα με την κριτική/ χειραφετική σχολή η εκπαίδευση οφείλει να συνδέεται με τις έννοιες του στοχαζόμενου και του ενεργού εκπαιδευτικού/ μαθητή/ πολίτη και να έχει τη δυνατότητα να συμβάλλει δυναμικά στον κοινωνικό μετασχηματισμό. Το σχολείο δεν θα πρέπει να μένει αμέτοχο στα πολιτισμικά, κοινωνικά και περιβαλλοντικά δρώμενα και οι μαθητές δεν θα πρέπει μόνο να αποκτούν γνώσεις και δεξιότητες, ούτε μόνο να κατανοούν τα κοινωνικά δρώμενα, αλλά και να τα αλλάζουν (Κωστούλα-Μακράκη, Ν. & Μακράκης, Β .Γ. 2006). Ουσιαστικά η εν λόγω σχολή προσδίδει στην εκπαίδευση το στοιχείο ενός σκεπτικισμού που συνδέεται με τον προσωπικό/ συλλογικό αναστοχασμό και έχει ως στόχο όχι μόνο τη βελτίωση της διδασκαλίας και της μάθησης, αλλά και το γενικότερο προβληματισμό πάνω στο θέμα του ρόλου της εκπαίδευσης (Colwell, 2005).

Η μέθοδος Project είναι μια μέθοδος διδασκαλίας. Είναι μία ανοιχτή διαδικασία μάθησης τα όρια και οι διαδικασίες της οποίας δεν είναι αυστηρά καθορισμένα και εξελίσσεται ανάλογα με την εκάστοτε κατάσταση και τα ενδιαφέροντα των συμμετεχόντων. Συνιστά μια ομαδική διαδικασία μάθησης, όπου συμμετέχει ενεργά, ρυθμιστικά και αποφασιστικά όλη η ομάδα (Frey, σ. 9). Ως δυναμική μέθοδος που εξαρτάται άμεσα από τις επιλογές των συμμετεχόντων, δεν μπορεί να έχει σταθερά και συγκεκριμένα όρια και δομή.

Σενάριο Διδασκαλίας

Παιδαγωγική Αξία

Η χρήση πολυμορφικών μέσων (έντυπο υλικό, οπτικοακουστικά, νέες τεχνολογίες κ.α.) σε συνδυασμό με την αξιοποίηση διαφόρων αρχών μάθησης και διδασκαλίας, οδηγούν στην πολυμορφική εκπαίδευση. Έτσι, ο όρος «πολυμορφική» στη περίπτωση αυτή λαμβάνει μια ιδιαίτερη αξία και υποδηλώνει την ποιοτική εκπαίδευση που λειτουργεί με όλες τις αρχές μάθησης και διδασκαλίας.

Πλαίσιο Εφαρμογής

Το σενάριο απευθύνεται σε μαθητές Τετάρτης, Πέμπτης και Έκτης δημοτικού και προτείνεται εφαρμογή του για όλη τη διάρκεια της σχολικής χρονιάς. Ο χρόνος υλοποίησης κυμαίνεται από 1-3 ώρες εβδομαδιαία. Ως προαπαιτούμενες γνώσεις, οι μαθητές θα πρέπει να έχουν τις βασικές γνώσεις χειρισμού ηλεκτρονικού υπολογιστή καθώς και να φτιάχνουν ραβδογράμματα στον υπολογιστή. Σχετικά με τα υλικά και τα εργαλεία, θα χρειαστούμε φύλλα εργασίας και αρκετά απορρίμματα που θα επαναχρησιμοποιήσουμε για να δημιουργήσουμε το οικολογικό περίπτερο, τα σκηνικά της θεατρικής παράστασης και ό,τι άλλο χρειαστεί.

Οι μαθητές θα χωριστούν και θα ενεργούν σε περιβαλλοντικές ομάδες. Οι ομάδες θα δουλεύουν ανεξάρτητα αλλά και ομαδικά. Για τους μαθητές θέτουμε στόχους σε τρία επίπεδα: γνωστικό, συναισθηματικό και ψυχοκινητικό.

Γνωστικοί:

-Να ρίξουν μια κριτική ματιά οι μαθητές στα απορρίμματα μέσα από την καθημερινή τους ζωή.

-Να αποκτήσουν γνώσεις πάνω στην παραγωγή και την διαχείριση των απορριμμάτων.

-Να μελετήσουν οι μαθητές το πρόβλημα των απορριμμάτων στην περιοχή τους.

-Να ενημερωθούν για τους τρόπους διαχείρισης των απορριμμάτων που εφαρμόζονται σε άλλες χώρες.

Συναισθηματικοί:

-Να γίνουν ευαισθητοποιημένοι και σκεπτόμενοι καταναλωτές.

-Να ευαισθητοποιηθούν οι μαθητές για το θέμα της προστασίας του περιβάλλοντος και της επαναχρησιμοποίησης απορριμμάτων.

-Να γνωρίσουν οι μαθητές το περιβάλλον τους και να το αγαπήσουν.

-Να δεθούν με τους συμμαθητές τους και με τους υπόλοιπους μαθητές του σχολείου.

Ψυχοκινητικοί:

-Να ελευθερώσουν την φαντασία τους και την δημιουργικότητά τους.

-Να αφήσουν ελεύθερη την όποια καλλιτεχνική τους φύση.

Οι στόχοι που θέτουμε ως προς τη μαθησιακή διαδικασία είναι:

-Να απομακρυνθούμε από το δασκαλοκεντρικό μοντέλο.

-Ο εκπαιδευτικός να λειτουργήσει ως υποστηρικτής, συντονιστής, μεσολαβητής και εμψυχωτής.

-Να υπάρξει καθοδήγηση των μαθητών μόνο αν και εφόσον το ζητήσουν.

-Να συνεργαστούν οι μαθητές

Τέλος, οι στόχοι που θέτουμε ως προς τη χρήση των νέων τεχνολογιών είναι:

- Να αποκτήσουν οι μαθητές εξοικείωση με τα λογισμικά που θα χρησιμοποιηθούν.

➢ Να μάθουν οι μαθητές μια καινούρια τεχνική παραγωγής βίντεο.

➢ Να μάθουν οι μαθητές να αξιοποιούν τα κοινωνικά μέσα δικτύωσης.

Εφαρμογή του σεναρίου

Το εκπαιδευτικό σενάριο περιλαμβάνει 9 στάδια υλοποίησης. Όλα τα βήματα υλοποιούνται ομαδοσυνεργατικά και με το δάσκαλο στο ρόλο συντονιστή - εμψυχωτή. Τα προτεινόμενα στάδια υλοποίησης είναι τα εξής:

1. Ερωτηματολόγιο για τα απορρίμματα, καταγραφή της εμπειρίας κάθε παιδιού για τα απορρίμματα, *κατασκευή συνολικών ραβδογραμμάτων της τάξης, αξιολόγηση των αποτελεσμάτων. (φύλλο* εργασίας 1)

2. Δημιουργία ιστοσελίδας ή σελίδας σε χώρο κοινωνικής δικτύωσης όπου θα προσπαθήσουμε μέσα από τις δράσεις μας να ευαισθητοποιήσουμε τους κατοίκους της περιοχής μας οικολογικά (χωρίς να εκτυπώσουμε φυλλάδια κτλ) http://reuseadvertisment.wikispaces.com

3. Προετοιμασία οικολογικού περίπτερου για το σχολείο μας (συλλογή υλικού για ενημέρωση δική μας αλλά και του σχολείου μας) http://reducewaste.wikispaces.com

4. Συνέντευξη μέσω τηλεδιάσκεψης με σχολεία Ευρωπαϊκών χωρών σχετικά με τη μείωση και τη διαχείριση των απορριμμάτων. (φύλλο εργασίας 2)

5. Διερεύνηση για τις δράσεις που γίνονται για μείωση και διαχείριση των απορριμάτων στην περιοχή μας. (συνέντευξη με τις αρχές κτλ) Συγκριτική μελέτη.

6. Χρήση του εκπαιδευτικού λογισμικού: «Δεν το θες; Μην το πετάς!»

7. Επίσκεψη σε ΚΠΕ του δικτύου: «Απορρίμματα» (φύλλο εργασίας 3)

8. Συγγραφή θεατρικού έργου αντλώντας έμπνευση από τις δράσεις μας (φύλλο εργασίας 4)

9. Παρουσίαση του θεατρικού μας έργου στην τελική μας γιορτούλα και έκθεση με τις δράσεις μας

Ανακεφαλαίωση - Ρόλοι εκπαιδευτή/εκπαιδευόμενου

Όπως έχει προαναφερθεί το σενάριο μπορεί να αλλάξει από τους μαθητές. Προτείνεται ο δάσκαλος ως συντονιστής της διαδικασίας να ακολουθήσει τον δρόμο που τον οδηγούν οι μαθητές και όχι τα βήματα του σεναρίου κατά γράμμα. Με άλλα λόγια, είναι σημαντικότερη η φαντασία και η διάθεση των μαθητών να δημιουργήσουν από μόνοι τους, παρά η ολοκλήρωση του σεναρίου.

Γενικά, σε όλο το σενάριο οι μαθητές και ο δάσκαλος θα έχουν συγκεκριμένους ρόλους. Οι μαθητές θα έχουν πρωταγωνιστικό ρόλο, θα κληθούν να αυτοσχεδιάσουν και να δημιουργήσουν με τις δικές τους ικανότητες αποκλειστικά. Θα πρέπει να έχουν συζητηθεί και να έχουν λυθεί όλες οι απορίες των μαθητών σχετικά με το περιεχόμενο του σεναρίου. Επιπλέον, θα πρέπει να γνωρίζουν ποιος είναι ο στόχος τους και ακριβώς το ρόλο τους στην ομάδα καθ'όλη τη διάρκεια υλοποίησης του σεναρίου.

Από την άλλη μεριά, ο δάσκαλος, θα συντονίζει τη διεξαγωγή και θα είναι υπεύθυνος για τυχόν τεχνικά προβλήματα. Θα φροντίσει για τη σωστή και εύρυθμη λειτουργία του εργαστηρίου. Θα έχει εγκαταστήσει τα λογισμικά που θα χρησιμοποιηθούν και θα έχει δοκιμάσει τη λειτουργία τους σε κάθε υπολογιστή. Θα έχει ετοιμάσει τα φύλλα εργασίας που θα δοθούν στις ομάδες. Και τέλος, θα έχει προβλέψει τυχόν απρόοπτα και απρόσμενες εξελίξεις κατά τη διεξαγωγή της διδασκαλίας (επάρκεια μελανιού στον εκτυπωτή, τυχόν διακοπή ηλεκτρικού ρεύματος κλπ)

Ετοιμάσου να μιλήσεις με άτομα από διάφορα μέρη του κόσμου για να...

Φύλλο Εργασίας 1

Γίνε κατάσκοπος στο ίδιο σου το σπίτι για να...

Τρόποι Μείωσης Απορριμάτων

το ήξερες ότι...

...στην Ευρώπη, αδειάζουμε 3.500 σκουπιδοτενεκέδες, το λεπτό!

...αν μαζέψεις τα σκουπίδια που παράγεις σε ένα χρόνο, θα ζυγίζουν 10 φορές όσο ζυγίζεις εσύ.

Φύλλο Εργασίας 2

Γράψε το δικό σου τραγουδάκι για τα σκουπίδια που δεν είναι σκουπίδια και για το πώς μπορούμε να τα ξαναχρησιμοποιήσουμε!

Αν δεν έχεις έμπνευση και δεν ξέρεις πως να ξεκινήσεις
απάντησε τις παρακάτω ερωτήσεις, χρησιμοποιώντας μια μεγάλη δόση φαντασίας
και ίσως οι απαντήσεις σου, να σου δώσουν κάποιες ιδέες...

Όταν λέω σκουπίδια, τι χρώμα σκέφτεσαι;
Αν κάποιο σκουπίδι δεν είναι σκουπίδι, τότε τι χρώμα έχει;
Τι θα έλεγες σε ένα σκουπίδι που θέλει να το ξαναχρησιμοποιήσουμε;
Τι θα μας έλεγε ένα σκουπίδι που δεν είναι σκουπίδι;
Πώς νιώθουν τα σκουπίδια που τα πετάμε;
Ποια επίθετα ή μετοχές θα έβαζες μπροστά από τη λέξη σκουπίδια;
Πώς θα μας περιέγραφες έναν άνθρωπο που πετάει συνέχεια σκουπίδια που δεν είναι όμως σκουπίδια;

ΣΗΜΕΙΩΣΕΙΣ

Να και ένα τραγουδάκι για να πάρεις μια ιδέα!

Αλλιώς την είχα φανταστεί, τη ζωή μου τη μικρή,
δεν ήθελα να πεταχτώ και σ'ένα κάδο να βρεθώ!
Αν μπορείς κάνε με δώρο και άμα δεν σου κάνει κόπο,
μια ζωή θα μου χαρίσεις και θα με ευχαριστήσεις,
Και μπορεί μετά από χρόνια να σκεφτώ για σένα δώρο
πάλι πίσω να γυρίσω και εσύ τότε να με θέλεις,
να με πάρεις να με πλύνεις και να με χρησιμοποιήσεις!!!

Φύλλο Εργασίας 3

Τι θα γίνει αν τα σκουπίδια, που δεν είναι σκουπίδια, παραμείνουνε σκουπίδια;
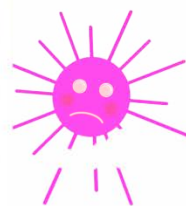
Αν δεν μειώσουμε σύντομα τα σκουπίδια μας, σε λίγο καιρό δεν θα έχουμε μέρος για να τα βάλουμε! Ο πλανήτης Γη θα γίνει ένας τεράστιος σκουπιδότοπος! Γράψε, με την ομάδα σου, ένα θεατρικό, που θα μας περιγράψει πως θα ζούμε αν γεμίσει ο κόσμος μας με σκουπίδια.

Διαβάζουμε τα θεατρικά όλων των ομάδων στην τάξη.
Συζητάμε και διαλέγουμε αυτό που μας αρέσει περισσότερο, μπορούμε να διαλέξουμε 2 ή και παραπάνω θεατρικά και να τα ενώσουμε!
Αναλαμβάνουμε ρόλους: σκηνοθέτες, σκηνογράφοι, ηθοποιοί.
Κάνουμε πρόβες και φτιάχνουμε φυλλάδια με όλους τους τρόπους μείωσης απορριμάτων που έχουμε σκεφτεί μέχρι τώρα.
Ορίζουμε την ημερομηνία για την παράσταση, διαφημίζουμε την παράσταση στην πόλη μας.
Τέλος, την ημέρα που έχουμε την παράσταση, παρουσιάζουμε τις αφίσες με τους τρόπους μείωσης απορριμάτων και μοιράζουμε στους θεατές τα φυλλάδια με τους τρόπους, που έχουμε βρει, για να μειώσουν τα απορρίματά τους.

Φύλλο Εργασίας 4

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Δημιουργώντας με τη Χρήση ενός Διαδικτυακού Περιβάλλοντος Σχεδιασμού, μια Μαθησιακή Ενότητα με Τίτλο: «Η παιδική εργασία»

Κρύστη Φώλια

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Δικτυακός τόπος: Εκπαίδευση για την Αειφόρο Ανάπτυξη 2005-2014
Ιστολόγιο: http://kristifolia.wordpress.com/

Περίληψη

Η εργασία αυτή περιγράφει τη δημιουργία μιας μαθησιακής ενότητας, με εκτεταμένη χρήση των Νέων Τεχνολογιών σε ένα διαδικτυακό περιβάλλον σχεδιασμού. Η μαθησιακή ενότητα έχει τον τίτλο «Η παιδική εργασία» και εντάσσεται στο πλαίσιο της θεματικής χρονιάς 2011-2012 Εκπαίδευση για την Αειφόρο Ανάπτυξη (ΕΑΑ) με θέμα «Παραγωγικές Διαδικασίες & Υγεία».
Το διαδικτυακό περιβάλλον σχεδιασμού που επιλέχθηκε είναι η ηλεκτρονική πλατφόρμα «Μάθηση μέσω Σχεδιασμού» σε πιλοτική εφαρμογή και αποτελεί μία δράση του εγχειρήματος που ονομάζεται «Νέο Σχολείο» με στόχο την ενεργή συμμετοχή των μαθητών ως παραγωγοί γνώσης και τον μετασχηματισμό του νέου επαγγελματικού ρόλου των εκπαιδευτικών, λειτουργώντας ως σχεδιαστές μαθησιακών περιβαλλόντων (ηλεκτρονικών υβριδικών και δια ζώσης) μάθησης.
Ο σχεδιασμός της μαθησιακής ενότητας υλοποιήθηκε με βάση τις κοινωνικοεποικοδομητικές και κοινωνικοπολιτισμικές θεωρίες μάθηξη, καθώς και σύγχρονες αντιλήψεις για τη χρήση των ΤΠΕ στη διδακτική και μαθησιακή διαδικασία που τεκμηριώνουν τη σημασία της συνεργατικής διερεύνησης και της από κοινού οικοδόμησής της.

Λέξεις κλειδιά: Παιδική εργασία, Μαθησιακή ενότητα, Ηλεκτρονική πλατφόρμα «Μάθηση μέσω Σχεδιασμού», Κοινωνικοεποικοδομητική – κοινωνικοπολιτισμική μάθηση, Συνεργατική διερεύνηση

Abstract

This essay describes the creation of a learning unit in a design web planner with the use of ICT. The learning unit is entitled 'Child Labour' and it is integrated in the general framework of Education for Sustainable Development and, particularly, in the thematic approach of the year 2011-2012 on 'Productive Processes and Health'.
The chosen design web planner is an e-platform named 'Learning by Design' tested on a pilot basis as part of the New School, a place where learners are actively engaged as knowledge producers and in which teachers have assumed a transformed professional role as designers of hybrid online and face-to-face learning environments.
The design of this learning element is based on the social-constructivist and sociocultural learning theories as well as the contemporary conceptions of the ICT use in the teaching and learning process which prove the importance of collaborative exploration of knowledge and its shared construction.

Εισαγωγή

Η Εκπαίδευση για την Αειφόρο Ανάπτυξη σηματοδοτεί ένα νέο όραμα και μία διαφορετική εκπαιδευτική προσέγγιση που επιτρέπει στους μαθητές και τις μαθήτριες να κατανοήσουν καλύτερα τον κόσμο μέσα στον οποίο ζουν, να αντιληφθούν τη διασύνδεση των προβλημάτων (π.χ. υπερκατανάλωση, εξάντληση φυσικών πόρων, παρακμή των πόλεων, ανισότητα των φύλων και φυλών, παραβίαση των ανθρωπίνων δικαιωμάτων, περιβαλλοντική υποβάθμιση κ.ά.) και τελικά να καταστούν ικανοί να αντιμετωπίσουν την πολυπλοκότητα της πραγματικότητας.

Εισάγοντας στην εκπαίδευση τον όρο «Αειφόρος Ανάπτυξη», ουσιαστικά παραδεχόμαστε τη σχέση αλληλεξάρτησης μεταξύ ανθρώπου και φυσικού περιβάλλοντος. Επιπροσθέτως, το Περιβάλλον, η Κοινωνία, η Οικονομία και οι Θεσμοί, αποτελούν τους βασικούς πυλώνες της Α.Α., ενώ, η Εκπαίδευση αποτελεί τον κύριο μοχλό για την οικοδόμηση γνώσεων, την ανάπτυξη δεξιοτήτων και ικανοτήτων, τη διαμόρφωση θετικών στάσεων και συμπεριφορών προς το Περιβάλλον καθώς και την καλλιέργεια πανανθρώπινων αξιών.

Η στροφή προς την «εκπαίδευση για την αειφορία» ή τη «βιώσιμη ή αειφόρο ανάπτυξη», την ανάπτυξη «που ικανοποιεί της σημερινής γενιάς χωρίς να στερεί τη δυνατότητα από τις μελλοντικές γενιές να ικανοποιήσουν τις δικές τους ανάγκες» έλαβε χώρα τη δεκαετία του 1980 (World Commission on Environment and Development, 1987, "Our common future").

Ενώ στη δεκαετία του 1990 υιοθετείται πλέον ο όρος «Εκπαίδευση για την αειφορία» στη θέση του όρου «Περιβαλλοντική Εκπαίδευση». Ζητήματα όπως η φτώχεια, ο πληθυσμός, η σίτιση, η δημοκρατία και τα ανθρώπινα δικαιώματα διευρύνουν την «παραδοσιακή» Π.Ε «για το περιβάλλον, μέσα στο περιβάλλον και για χάρη του περιβάλλοντος». Η διεύρυνση αυτή του αντικειμένου της ΠΕ διχάζει την επιστημονική και εκπαιδευτική κοινότητα. Άλλοι διαβλέπουν μια συντηρητική στροφή και απώλεια του ριζοσπαστικού χαρακτήρα της ΠΕ προς όφελος μιας εκπαίδευσης στην υπηρεσία της οικονομικής ανάπτυξης και άλλοι εκτιμούν τις δυνατότητες μιας δημιουργικής συνύπαρξης της νέας και της παραδοσιακής θεματολογίας (Γαβριλάκης- Σοφούλης, 2005).

Στο διδακτικό μαθησιακό πεδίο Περιβάλλον και Εκπαίδευση για την Αειφόρο Ανάπτυξη (Π.Ε.Α.Α) η έννοια «αειφορία» και οι βασικές αρχές της εκφράζουν τη συμπυκνωμένη εμπειρία τριών αιώνων, αρχής γενομένης από την περίοδο μεγάλης έλλειψης ξυλείας στην Ευρώπη. Καθώς, όμως, ο πλανήτης δοκιμάζεται από έντονες αλλαγές και η κοινή γνώμη διχάζεται εξαιτίας της επιστημονικής αβεβαιότητας για το μέλλον του, η έννοια «αειφορία» επανέρχεται στο προσκήνιο και η Εκπαίδευση για την Αειφόρο Ανάπτυξη θεωρείται ως μία ιδανική απάντηση στο αίτημα της παγκόσμιας κοινότητας για την αντιμετώπιση της περιβαλλοντικής κρίσης και της κρίσης αξιών. (Παιδαγωγικό Ινστιτούτο «Οδηγός εφαρμογής Π.Σ», 2011:5).

Σύμφωνα με την UNESCO[1]-UNEP[2] και UNECE[3], οι γενικές αρχές της Ε.Α.Α. παραπέμπουν σε γνώσεις, δεξιότητες και ικανότητες, στάσεις και συμπεριφορές. Τα παραπάνω εξειδικεύονται σε διδακτικούς και μαθησιακούς στόχους, σχετικούς με την αειφόρο ανάπτυξη, μέσω της οποίας, οι ανάγκες των γενεών του παρόντος να ικανοποιούνται χωρίς να υποσκάπτονται οι δυνατότητες των μελλοντικών γενεών να ικανοποιήσουν τις δικές τους ανάγκες. Ειδικότερα, οι μαθητές/τριες, ως υπεύθυνοι ενεργοί πολίτες, πρέπει να κατανοούν και να εφαρμόζουν στην καθημερινή ζωή γνώσεις και διαδικασίες σχετικές με :

• *Τις βασικές ανθρώπινες ανάγκες,* δηλαδή του δικαιώματος όλων των ανθρώπων και των κοινωνιών στην πρόσβαση σε φυσικούς πόρους για την επιβίωση και την ποιότητα ζωής, μέσα στη φέρουσα ικανότητα του πλανήτη.

• *Τα ανθρώπινα δικαιώματα και τις* **θεμελιώδεις αρχές**, οι οποίες εξασφαλίζουν την πρόσβαση στη συμμετοχική δημοκρατία.

• *Την αλληλεξάρτηση / αλληλεπίδραση* μεταξύ όλων των μορφών ζωής, συμπεριλαμβανομένης της ανθρώπινης μέσα στα φυσικά συστήματα.

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[1] http://unesdoc.unesco.org/images/0021/002152/215280e.pdf

[2] United Nations Enviroment for development-U.N.E.P http://www.unep.org/

[3] United Nations Economic Commission for Europe http://www.unece.org/

• **Την αναγνώριση** ότι η παραγωγή ή η κατανάλωση ενός προϊόντος ή μίας υπηρεσίας, σε ένα μέρος του πλανήτη, εξαρτάται από τους φυσικούς πόρους σε άλλα μέρη του πλανήτη και ότι αυτό δημιουργεί δυναμικές ευκαιριών αλλά και απώλειες περιβαλλοντικών, κοινωνικών και οικονομικών στοιχείων σε άλλα σημεία της τοπικής - παγκόσμιας αλυσίδας.

• **Το οικολογικό αποτύπωμα**, δηλαδή της έκτασης γης και των φυσικών πόρων που καταναλώνονται από ένα άτομο, μία κοινότητα ή έναν πληθυσμό, καθώς και των επιπτώσεών τους στο περιβάλλον και κυρίως στην εξάντληση των πόρων και στη ρύπανση ή μόλυνση.

• **Την αρχή της πρόληψης,** δηλαδή της γνώσης των συνεπειών στο περιβάλλον από ανθρώπινες δραστηριότητες.

Ως εκ τούτου, τα έτη 2005-2014 έχουν οριστεί ως η «Δεκαετία της εκπαίδευσης για **την Αειφόρο Ανάπτυξη**». Το έτος 2012 είναι αφιερωμένο στην εκπαίδευση για το πώς η Υγεία επηρεάζεται από τις παραγωγικές διαδικασίες. Στο πλαίσιο των θεματικών ετών η διευρυμένη έννοια του περιβάλλοντος ως φυσικής δεξαμενής αλλά και πεδίο κάθε ανθρώπινης δραστηριότητας, οι ολιστικές αντιλήψεις για την Υγεία (όχι ως απουσία ασθένειας αλλά ως συνολική ποιότητα ζωής με πολλαπλές παραμέτρους) και βέβαια ο Πολιτισμός λειτουργούν ως αλληλένδετα πεδία μελέτης και δράσεων. Αναγνωρίζοντας το ζήτημα της υγείας ως κοινωνικό ζήτημα οι παράμετροι ειρήνη, καταφύγιο – κατοικία, εκπαίδευση, τροφή, εισόδημα, σταθερό οικοσύστημα, αειφόρος διαχείριση φυσικών πόρων, κοινωνική ισότητα και δικαιοσύνη, έχουν συμφωνηθεί και υπογραφεί ως βασικές συνθήκες και προϋποθέσεις για την προαγωγή της σωματικής και ψυχικής υγείας. Ένα βιώσιμο μέλλον υπηρετείται από υγιείς ανθρώπους που ζουν σε υγιείς κοινότητες, μέσα σε ευκαιρίες και δυνατότητες που παρέχει ένα υγιές φυσικό περιβάλλον.

Η μαθησιακή ενότητα με τίτλο «Η παιδική εργασία» παρουσιάζει, μέσω ενός εκπαιδευτικού σχεδιασμού, μια διδακτική προσέγγιση αυτού του σημαντικού κοινωνικού ζητήματος, η οποία συνδέεται άρρηκτα με την θεματική του έτους 2012 «Παραγωγικές Διαδικασίες & Υγεία», καθώς περιλαμβάνει τον σχεδιασμό δραστηριοτήτων, σχετικά με την εργασιακή εκμετάλλευση των παιδιών αλλά και τις επιπτώσεις των συνθηκών εργασίας στην σωματική αλλά και στη ψυχική τους υγεία.

Το φαινόμενο της εκμετάλλευσης της παιδικής εργασίας έχει πάρει εκρηκτικές διαστάσεις σήμερα και εκτιμάται ότι η υπεύθυνη ενημέρωση είναι ένα βήμα προς τη συνειδητοποίηση του μεγέθους του κοινωνικού αυτού ζητήματος. Επιπλέον, επειδή ελλοχεύει ο κίνδυνος της αδιαφορίας μπροστά σε ένα φαινόμενο που επηρεάζει την ανθρωπιά και την αξιοπρέπειά μας, καθώς παιδιά που εργάζονται σε ποικίλες εργασίες υπάρχουν πολλά γύρω μας, καθημερινά ακούμε ειδήσεις και διαβάζουμε έρευνες για την παιδική εκμετάλλευση που παίρνει ιδιαίτερα επικίνδυνες μορφές, κρίνεται επιβεβλημένη η ενασχόληση με αυτό το θέμα (Ρηγίνος 1995).

Απώτερος στόχος της μαθησιακής ενότητας που ακολουθεί είναι, μέσω της διερευνητικής μάθησης, η αποτελεσματικότερη διδασκαλία, η ανάπτυξη κριτικής σκέψης και πρωτοβουλίας, η διαμόρφωση υπεύθυνων στάσεων από τους μαθητές απέναντι σε σοβαρά κοινωνικά ζητήματα.

Περιγραφή του διαδικτυακού εκπαιδευτικού εργαλείου «Μάθηση μέσω Σχεδιασμού»

Ο συγκεκριμένος εκπαιδευτικός σχεδιασμός φιλοδοξεί μέσα από την εφαρμογή του να συμβάλλει στην ανάπτυξη και κυρίως στον μετασχηματισμό του σχολείου σε ζωντανό οργανισμό μάθησης. Αποτελεί ένα ευέλικτο *διαδικτυακό εργαλείο*[4], το οποίο προωθεί την επαγγελματική ανταλλαγή πρακτικών και δεν εγκλωβίζεται σε παραδοσιακές πρακτικές δόμησης της διδακτέας ύλης και των διαδικασιών σχεδιασμού των μαθημάτων, ή σε πλαίσια που συνδέονται με τα μεμονωμένα προγράμματα των εκπαιδευτικών.

Ανταποκρίνεται πιο αποτελεσματικά στην διαφορετικότητα των εκπαιδευομένων, με τη μετάφραση διδακτικών σχεδίων μαθημάτων που μπορούν να προσπελαστούν από άτομα ή ομάδες, και να διδαχθούν αυτόνομα ή ημι-αυτόνομα αλλά και ασύγχρονα, στην τάξη ή οπουδήποτε πέρα

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[4] Διατίθεται στον εξής κόμβο: http://cglearner.com/site «Μάθηση μέσω Σχεδιασμού» - Εργαλεία Κοινωνικής Δικτύωσης για τη Δημιουργία και την Κοινή Χρήση Μαθησιακών Σχεδιασμών

από την τάξη. Επίσης είναι δυνατόν και περισσότερες από μία ενότητα σπουδών (δηλ. περισσότερες από μια Μαθησιακή Ενότητα) να διδαχθούν ταυτόχρονα σε διαφορετικούς μαθητές στην ίδια τάξη ενώ παρέχει αποτελεσματικότερη και πιο ρητή διατύπωση των γενικών προτύπων του προγράμματος σπουδών στα διδακτικά σχέδια μάθησης (Μαθησιακές Ενότητες) που είναι προσαρμοσμένα στις ειδικές ανάγκες των εκπαιδευομένων και των τοπικών συνθηκών.

Επιπλέον, επιχειρεί να καλύψει μέσα από τις προτεινόμενες διδακτικές δραστηριότητες τους στόχους του Νέου Προγράμματος Σπουδών «ΝΕΟ ΣΧΟΛΕΙΟ (Σχολείο 21ου αιώνα), ήτοι: **Καινοτόμο:** διότι στηρίζει τη δημιουργικότητα των μαθητών στη μάθηση, με έμφαση τόσο στη μύηση των μαθητών σε ερευνητικές διαδικασίες και διεργασίες όσο και στην κατανόηση βασικών εννοιών, διαδικασιών και γεγονότων, **Αειφόρο:** διότι διαχειρίζεται τις ιδέες της προστασίας του περιβάλλοντος και της αειφόρου ανάπτυξης, αποβλέποντας να βοηθήσει τους μαθητές να αναπτύξουν συμπεριφορές, δεξιότητες και γνώσεις απέναντι στις συνεχείς αλλαγές τόσο στο κοινωνικό όσο και στο φυσικό περιβάλλον, προκειμένου να συμβάλλουν στην βελτίωση της ποιότητας ζωής και στην ανάπτυξη του ανθρώπινου πολιτισμού. **Ενταξιακό:** διότι αντιμετωπίζει τις διακρίσεις αλλά και τα προσωπικά μαθησιακά προβλήματα των μαθητών ενεργητικά, με έμφαση στη διαφοροποιημένη διδασκαλία, στην καλλιέργεια κινήτρων για συμμετοχή, στην καλλιέργεια κλίματος για αναγνώριση, στην καλλιέργεια επικοινωνίας για συνεργασία και στην καλλιέργεια συμμετοχής των μαθητών στη διαχείριση της μάθησής τους. **Ψηφιακό:** διότι προωθεί τη χρήση των Νέων Τεχνολογιών στην μάθηση, χωρίς να υποβαθμίζει την αξίας της κλασσικής «εγγραμματοσύνης».

Η χρήση του υπολογιστή λειτουργεί ως ένας «διανοητικός συνεργάτης» του μαθητή με στόχο την οικοδόμηση της γνώσης και την κατανόηση των αρχών σχεδίασης εποικοδομητικών πληροφορικών μαθησιακών περιβαλλόντων.

Θεωρίες Μάθησης

Η παιδαγωγική προσέγγιση «Μάθηση μέσω Σχεδιασμού», βασίζεται στην ιδέα ότι τα παιδιά έχουν διαφοροποιημένες μαθησιακές ανάγκες και τρόπους απόκτησης της μάθησης και ότι αυτά τα χαρακτηριστικά διαφοροποιούνται πάρα πολύ από αυτά των γονιών ή των παππούδων/γιαγιάδων τους. Θεωρείται λοιπόν αναγκαίο, τα παιδιά να κατανοούν την ποικιλία των καναλιών επικοινωνίας, των μέσων και των τεχνολογιών και να μπορούν να χρησιμοποιούν όλα τα παραπάνω σε πολυτροπικά περιβάλλοντα δημιουργίας νοήματος που περιλαμβάνουν προφορικούς, γραπτούς, οπτικούς, ηχητικούς, σωματικούς, χωροαντιληπτικούς και απτικούς τρόπους.

Η μαθησιακή ενότητα με τίτλο «Η παιδική εργασία» υιοθετεί σύγχρονες κοινωνικοπολιτισμικές αρχές και βασίζεται κυρίως στο ότι μαθητές στο πλαίσιο υλοποίησης των διδακτικών δραστηριοτήτων, ανακαλύπτουν αρχές ή αναπτύσσουν δεξιότητες μέσω Αλληλεπιδραστικών Υπολογιστικών Περιβαλλόντων Μάθησης, Πειραματισμού και Πρακτικής (ανακαλυπτική μάθηση) αλλά και στο γεγονός ότι η μάθηση με τη χρήση των ΤΠΕ είναι μια κοινωνικοπολιτισμική διεργασία, η οποία αφυπνίζει μια ποικιλία εσωτερικών αναπτυξιακών διαδικασιών που είναι δυνατόν να λειτουργήσουν μόνον όταν οι μαθητές αλληλεπιδρούν με ανθρώπους στο περιβάλλον τους και σε συνεργασία με τους συνομηλίκους τους» (Γνωστικός & Κοινωνικός Εποικοδομισμός[5]).

Ο ρόλος του εκπαιδευτικού είναι καθοδηγητικός, διαμεσολαβητικός, διευκολυντικός. Αξιοποιεί τις δυνατότητες των ΤΠΕ για να σχεδιάσει, να οργανώσει, να επεξεργαστεί και να αναλύσει τα δεδομένα του θέματος που εξετάζει μαζί με τους μαθητές του, στο πλαίσιο μιας ενεργητικής και ομαδοσυνεργατικής διδακτικής διαδικασίας. Η επικοινωνία εκπαιδευτικού-μαθητών δεν εξυπηρετεί τη «μεταφορά» γνώσεων μέσω της τεχνολογίας από τον εκπαιδευτικό στον μαθητή, αλλά επιτρέπει τη γνωστική επεξεργασία και αξιοποίηση, μέσω των δυνατοτήτων που η ίδια η

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[5] «Υλικό επιμόρφωσης εκπαιδευτικών πληροφορικής -800 ολοήμερα-ΕΑΕΠ»,2011, ΟΕΠΕΚ, (*Γνωστικός & Κοινωνικός Εποικοδομισμός*: σελ.21,Θεωρίες που υποστηρίζουν Συνεργατικά Διαδικτυακά Περιβάλλοντα Μάθησης: σελ.22, Μετασχηματιστική θεωρητική προσέγγιση των ΤΠΕ στην εκπαίδευση: σελ.23),Πηγή από: http://www.oepek.gr/pdfs/tpe_eaep_800sch.pdf , ανακτήθηκε στις 06/03/2012

τεχνολογία παρέχει στην ανάλυση και την κατασκευή νέων εννοιών (Θεωρίες που υποστηρίζουν Συνεργατικά Διαδικτυακά Περιβάλλοντα Μάθησης).

Επισημαίνεται δε, ότι η μάθηση στην προτεινόμενη διδακτική πρακτική, διενεργείται μέσω ομαδοσυνεργατικών μεθόδων επίλυσης προβλημάτων, συνδέοντας τη μαθησιακή διαδικασία και το περιεχόμενο της Μάθησης με τον πραγματικό κοινωνικό κόσμο, καθιστώντας έτσι την αγωγή μια πράξη κοινωνικοποίησης και ήθους μέσω του στοχασμού και της δράσης του μαθητή. (Μετασχηματιστική θεωρητική προσέγγιση των ΤΠΕ στην εκπαίδευση: Κριτικός Εποικοδομισμός – Κριτικός Αναστοχασμός).

Η αρχιτεκτονική της μαθησιακής ενότητας

Η Μαθησιακή Ενότητα όπως αναπτύσσεται στο σχεδιαστικό περιβάλλον «Μάθηση Μέσω Σχεδιασμού», διαρθρώνεται σε πέντε (5) βασικά πεδία (βλ.Σχήμα 1), ως εξής:

ΜΑΘΗΣΙΑΚΗ ΕΣΤΙΑΣΗ — **Μαθησιακή Εστίαση**: η γνωστική περιοχή στο πρόγραμμα σπουδών και το μαθησιακό επίπεδο.

ΓΝΩΣΤΙΚΟΙ ΣΤΟΧΟΙ — **Γνωστικοί Στόχοι**: προσδοκώμενα μαθησιακά αποτελέσματα και σύνδεση με τα προκαθορισμένα πρότυπα και τα αποτελέσματα αξιολόγησης του προγράμματος σπουδών.

Γνωστικές Διαδικασίες: δραστηριότητες, κατάλληλες για 'το είδος της γνώσης' που απαιτείται από το μαθητή, συνδεδεμένες με αλληλουχία και κατάλληλο τρόπο, ώστε να ανταποκρίνονται στη διαφορετικότητα/πολυμορφία των μαθητών.

ΓΝΩΣΤΙΚΕΣ ΔΙΑΔΙΚΑΣΙΕΣ

Γνωστικά αποτελέσματα: οι διαδικασίες αξιολόγησης: διαμορφωτική και αθροιστική.

ΓΝΩΣΤΙΚΑ ΑΠΟΤΕΛΕΣΜΑΤΑ

Μαθησιακές διαδρομές: περαιτέρω δραστηριότητες που συνιστώνται στους μαθητές όπως άλλες Μαθησιακές Ενότητες.

ΜΑΘΗΣΙΑΚΕΣ ΔΙΑΔΡΟΜΕΣ

Σχήμα 1

Το ηλεκτρονικό εργαλείο της Μαθησιακής Ενότητας στο σχεδιαστικό περιβάλλον «Μάθηση Μέσω Σχεδιασμού», επιτρέπει τον συνδυασμό δραστηριοτήτων με τις Γνωστικές Διαδικασίες. Οι Γνωστικές Διαδικασίες (βλ. Σχήμα 2) αντιπροσωπεύουν ένα φάσμα διαφορετικών τρόπων λήψης και παραγωγής της γνώσης. Πρόκειται για μορφές δράσης, ή πράγματα που κάνουμε για να μαθαίνουμε, οι οποίες παρουσιάζουν μια τεράστια ποικιλομορφία στη μαθησιακή εμπειρία και κατηγοριοποιούνται ως εξής:

- Η βιωματική μάθηση : α) η γνωστή – οι μαθητές αναστοχάζονται τις εμπειρίες, τα ενδιαφέροντά τους και τις απόψεις τους, β) η νέα – οι μαθητές παρατηρούν ή συμμετέχουν σε άγνωστες μαθησιακές καταστάσεις και εμβαπτίζονται σε νέες καταστάσεις ή περιεχόμενο.
- Η εννοιολόγηση: α)με ορολογία – οι μαθητές ομαδοποιούν πράγματα σε κατηγορίες, εφαρμόζουν κριτήρια κατηγοριοποίησης των όρων και τους ορίζουν, β) με θεωρία – οι μαθητές κάνουν γενικεύσεις χρησιμοποιώντας τις έννοιες, και συνδέουν τους όρους σε εννοιολογικούς χάρτες ή θεωρίες.
- Η ανάλυση: α) με λειτουργικό τρόπο – οι μαθητές αναλύουν λογικές συνδέσεις, σχέσεις αιτίου-αποτελέσματος, δομές και λειτουργίες, β) με κριτικό τρόπο – οι μαθητές αξιολογούν τις δικές τους απόψεις, ενδιαφέροντα και κίνητρα, καθώς και των άλλων ανθρώπων.

- Η εφαρμογή: α) με κατάλληλο τρόπο – οι μαθητές εφαρμόζουν τη νέα μάθηση σε πραγματικές καθημερινές καταστάσεις και δοκιμάζουν την εγκυρότητά των καταστάσεων αυτών, β) με δημιουργικό τρόπο – οι μαθητές κάνουν μια παρέμβαση στον κόσμο που ζουν, η οποία είναι καινοτόμα και δημιουργική ή μεταφέρουν αυτό που έμαθαν σε διαφορετικά περιβάλλοντα/καταστάσεις.
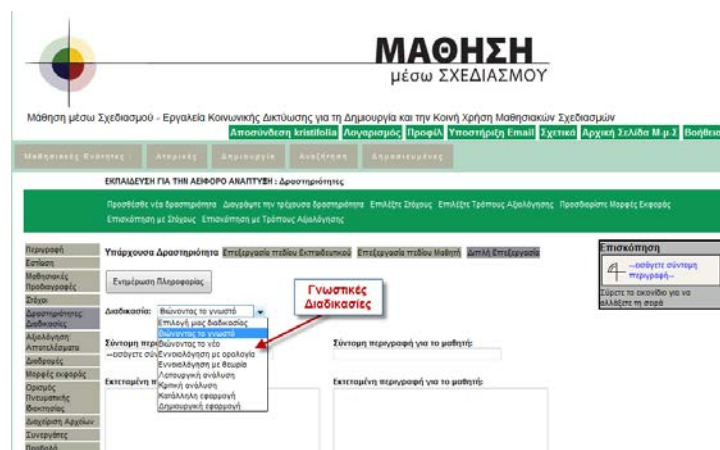
Σχήμα 2

Οι Γνωστικές Διαδικασίες (δραστηριότητες) της Μαθησιακής Ενότητας δύνανται να αντλούν και συνδυάζουν θεωρητικές θέσεις :

- από τη Γνωστική Ψυχολογία με το **«Τριαρχικό Μοντέλο της Σκέψης» του Sternberg** [6], με στόχο την αξιοποίηση των νοητικών δυνατοτήτων των μαθητών και τη βελτίωση της επίδοσης. Σύμφωνα με το μοντέλο, ο μαθητής πρέπει να χειριστεί δραστηριότητες που καλλιεργούν τρία είδη σκέψης το αναλυτικό, το δημιουργικό και το πρακτικό. *Συγκεκριμένα, (α) ανάλυση και ταξινόμηση πληροφοριών με στόχο την καταχώρησή τους στη μακροπρόθεσμη μνήμη, (β) η αναδιοργάνωσή τους με δημιουργικό, πρωτότυπο τρόπο, (γ) η εφαρμογή τους σε καταστάσεις της καθημερινής ζωής (καταστασιακή μάθηση)*

- από την περίφημη θεωρία του Howard Gardner, περί της πολλαπλής ευφυΐας στον άνθρωπο[7], η οποία αποτελεί μία διαφορετική προσέγγιση της μέτρησης του «IQ», λαμβάνοντας υπόψη της την έφεση του ατόμου σε διαφορετικούς τομείς της έκφρασης της προσωπικότητάς του, για τους οποίους φαίνεται να ευθύνονται διαφορετικά σημεία του εγκεφάλου. Σύμφωνα με αυτόν η νοημοσύνη έχει εφτά βασικά επίπεδα που είναι τα εξής : (i) Γλωσσική Νοημοσύνη -- Ένα πλεονέκτημα που χαρακτηρίζει αυτούς που είναι πολύ καλοί στο χειρισμό της γλώσσας, της γραμματικής, της ποίησης, στο διάβασμα και στο γράψιμο, π.χ. δικηγόροι, φιλόσοφοι, συγγραφείς, διερμηνείς κ.α. (ii) Λογικο-μαθηματική Νοημοσύνη -- Χαρακτηρίζεται από λογικό, ορθολογιστικό, μαθηματικό ή επιστημονικό πνεύμα, π.χ. γιατροί, μηχανικοί, προγραμματιστές, επιστήμονες κ.α. (iii) Χωροταξική νοημοσύνη -- Η αντιληπτική ικανότητα να δημιουργούμε ένα νοητικό μοντέλο ενός χώρου και μετά να το χειριζόμαστε και να λειτουργούμε χρησιμοποιώντας αυτό το μοντέλο. Ναυτικοί, μηχανικοί, αρχιτέκτονες, διακοσμητές, γλύπτες και καλλιτέχνες (ζωγράφοι) πιθανόν όλοι έχουν ανεπτυγμένη χωροταξική νοημοσύνη, (iv) Μουσική Νοημοσύνη -- Φανερά χαρακτηρίζει μουσικούς, συνθέτες κ.α. (v) Σωματοκινητική Νοημοσύνη -- Το είδος της νοημοσύνης που δημιουργεί ένα μεγάλο αθλητή, χορευτή, τεχνίτη, ξυλουργό, γλύπτη κ.α. (vi)Διαπροσωπική Νοημοσύνη -- Η ικανότητα να κατανοούμε και να εργαζόμαστε με άλλους ανθρώπους. Πιθανότερα αυτή παρουσιάζεται σε καλούς πωλητές, πολιτικούς, μεσίτες, δασκάλους κ.α, (vii) Ενδοπροσωπική Νοημοσύνη -- Η ικανότητα να κατανοεί κανείς τον εαυτό του, να χρησιμοποιεί κάποιος τις ικανότητές του πιο επιτυχημένα. Τέτοιοι άνθρωποι μπορούν να πετύχουν σχεδόν σε κάθε

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[6] Παιδαγωγικό Ινστιτούτο Κύπρου:http://www.pi.ac.cy/pi/files/tekmiriosi/ekdoseis/deltia/deltio11_jul2009.pdf

[7] Παιδαγωγικό Ινστιτούτο: http://www.pi-schools.gr/special_education/harismatika/harismatika-part-02.pdf

τομέα που έχει σχέση με το εαυτό τους και από την Κοινωνιολογία, τα ερευνητικά ευρήματα και τις προτάσεις του προγράμματος «Σύνθετη Διδασκαλία» των E. Cohen και R. Lotan (Cohen κ.ά., 1994, Cohen & Lotan, 1997)[8] με τρεις κυρίως στόχους: (1) την οργάνωση της ομαδοσυνεργατικής τάξης, (2) το σχεδιασμό παιδαγωγικών δραστηριοτήτων που να απευθύνονται σε διαφορετικά επίπεδα επίδοσης και να απαιτούν συνεργασία, (3) παιδαγωγικούς χειρισμούς με στόχο την ίση μεταχείριση μαθητών διαφορετικού κύρους. Η προστασία του «κύρους» κάθε μαθητή έχει μεγάλη σημασία για την ένταξη των «διαφορετικών» μαθητών.

Αναφορικά με τους στόχους της Μαθησιακής Ενότητας, διακρίνονται σε: (α) Βιωματικούς, (β) Εννοιολογικούς, (γ) Αναλυτικούς, (δ) Εφαρμοσμένους. Επισημαίνεται δε ότι οι ανωτέρω στόχοι συνδέονται:

- με μερικά γνωστά παιδαγωγικά σχήματα όπως η ταξινομία του Bloom[9]: (i) Γνωστική περιοχή (cognitive domain): στόχοι απόκτησης γνώσεων και την ανάπτυξη διανοητικών ικανοτήτων, (ii) Συναισθηματική περιοχή (affective domain): στόχοι σε αισθήματα, στάσεις, πιστεύω και αξίες, (iii) Ψυχοκινητική περιοχή (psychomotor domain): στόχοι ανάπτυξης δεξιοτήτων, καθώς και

- με τα τέσσερα επίπεδα της UNESCO (1996)[10]: (i) Να μάθουμε πώς να μαθαίνουμε: Γνωρίζοντας και κατανοώντας (γνώσεις), (ii) Να μάθουμε πώς να ενεργούμε: Διερευνώντας και εντοπίζοντας (δεξιότητες), (iii) Να μάθουμε πώς να συμβιώνουμε με τους άλλους: Επικοινωνώντας (και συνεργαζόμενος με τους άλλους), (iv) Να μάθουμε πώς να υπάρχουμε: Συνδέοντας με τη ζωή.

Οι παραπάνω στόχοι βρίσκονται σε αντιστοιχία με την επιδίωξη του Νέου Σχολείου προκειμένου οι μαθητές να αποκτήσουν **οριζόντιες ικανότητες**, όπως: δημιουργικότητα, κριτική σκέψη, ανάληψη πρωτοβουλιών – λήψη αποφάσεων (ενεργοί πολίτες), συνεργατικότητα – ομαδικό πνεύμα, ψηφιακή ικανότητα, μεταγνωστική ικανότητα, επικοινωνία κ.λπ. Στη σύγχρονη παιδαγωγική οι διδακτικοί στόχοι είναι αναγκαίο να γνωστοποιούνται και στους μαθητές, επειδή οι μαθητές είναι αυτοί που πρέπει να τους επιτύχουν. Θεωρείται λοιπόν απαραίτητο ο εκπαιδευτικός στην αρχή κάθε εργασίας, να ανακοινώνει με σαφήνεια τους διδακτικούς στόχους στους μαθητές του. Σε ορισμένες περιπτώσεις είναι καλό οι διδακτικοί στόχοι να συνδιαμορφώνονται και με τους μαθητές, ώστε να αποκτούν πραγματικό νόημα γι αυτούς (Vecchi,2003). Σύμφωνα με τον Mager(1975) οι μαθητές/τριες που έχουν σαφείς στόχους, μπορούν σ΄όλα τα στάδια της εκπαίδευσης να αποφασίσουν καλύτερα για τις ενέργειες που είναι κατάλληλες, ώστε να φτάσουν εκεί που θέλουν (Παιδαγωγικό Ινστιτούτο, «Μ.Π.Ε» ,2011:3).

Αναφορικά με την αξιολόγηση, προκρίνεται το είδος της διαμορφωτικής, δεδομένου ότι αποτιμάται με συστηματικό τρόπο η μαθησιακή συμπεριφορά, η οποία συγκρίνεται με τους αρχικούς στόχους και παράλληλα δίνει τη δυνατότητα να εξετάζεται και να βελτιώνεται οποιαδήποτε πτυχή της διδασκαλίας τη στιγμή που αυτή εξελίσσεται καθώς συνδέεται με τις μεταγνωστικές ικανότητες και την έννοια της σκέψης πάνω στον τρόπο, που δρα και μαθαίνει ένας μαθητής. Στην εν λόγω μαθησιακή ενότητα, χρησιμοποιείται η ρουμπρίκα αξιολόγησης της επίδοσης του μαθητή σε τρείς κλίμακες διαβάθμισης και επεκτείνεται σε όλες τις γνωστικές διαδικασίες της μαθησιακής ενότητας.

Επιπλέον, η ύπαρξη δύο χώρων σχεδιασμού, του εκπαιδευτικού (The Teacher Resource Space) και του μαθητή (Learner Resource Space), (βλ. Σχήμα 3), καθιστά τη διδασκαλία στοχαστική και αναστοχαστική πράξη για τον εκπαιδευτικό, ενισχύοντας τον πρωταγωνιστικό ρόλο του μαθητή δεδομένου του εξατομικευμένου χαρακτήρα της μάθησης και συμβάλλοντας στην ανταλλαγή διδακτικών σχεδίων μεταξύ εκπαιδευτικών, είτε πρόκειται για ένα μεμονωμένο συνάδελφο, είτε για τους εκπαιδευτικούς σε ένα σχολείο, είτε για άλλους συναδέλφους εκτός σχολείου καθώς και στη δυνατότητα αυτονομίας που έχει ο μαθητής να διαχειριστεί το πλαίσιο μάθησής του.

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[8] Κουλουμπαρίτση Αλεξάνδρα: http://www.pee.gr/wp-content/uploads/praktika_synedrion_files/pr_syn/s_nay/c/3/mer_g_th_en_3/koyloymparitsi.htm

[9] Πανεπιστήμιο Πειραιώς:http://dtps.unipi.gr/files/notes/2009-2010/eksamino_1/didaktikh_methodologia/10_dm_bloom.pdf

[10] http://blogs.sch.gr/stelam/files/2011/06/Dexiotites.pdf
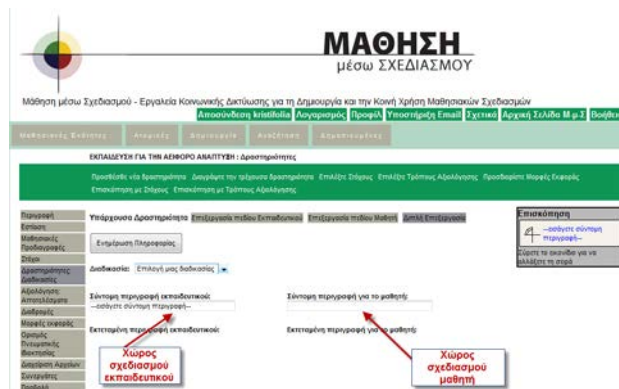
Σχήμα 3

Ανάπτυξη και εφαρμογή της μαθησιακής ενότητας «Η παιδική εργασία».[11]

- **Μαθησιακή εστίαση:** Κύριος τίτλος της Μαθησιακής Ενότητας είναι «Η παιδική εργασία» και αποτελεί μια διαθεματική προσέγγιση των Προγραμμάτων Σπουδών του Νέου Σχολείου. Για τον σχεδιασμό των γνωστικών διαδικασιών, χρησιμοποιήθηκε συμπληρωματικά ο *«Youth X Change : Οδηγός προς αειφορικούς τρόπους ζωής - εγχειρίδιο για την υπεύθυνη κατανάλωση»* και συγκεκριμένα η ενότητα: «Κάνε αγορές που δε βασίζονται στην εκμετάλλευση: Παιδική εργασία, Δικαίωμα στην εκπαίδευση, Συνθήκες εργασίας, Ανισότητα φύλων, Ανθρώπινα Δικαιώματα (σελ.46-51).». Ο οδηγός αποτελεί έκδοση της Unesco και του προγράμματος για το περιβάλλον Unep.
- **Στόχοι:** Οι στόχοι αποτελούν τα προσδοκώμενα μαθησιακά αποτελέσματα των γνωστικών διαδικασιών (δραστηριοτήτων) που συνθέτουν τη Μαθησιακή Ενότητα «Η παιδική εργασία» και αναλύονται παρακάτω ενώ αποτυπώνονται και στο σχεδιαστικό περιβάλλον της «Μάθησης μέσω Σχεδιασμού» (βλ.Σχήμα 4). Συγκεκριμένα: ΒΙΩΜΑΤΙΚΟΙ: Βιώνοντας το νέο: Εμπειρίες Γραμματισμού - Βιώνοντας το γνωστό: Εμπειρίες Πολυγραμματισμών, ΕΝΝΟΙΟΛΟΓΙΚΟΙ: Εννοιολογώντας με ορολογία: Διευκρίνιση Εννοιών - Εννοιολογώντας με θεωρία: Εννοιολογικός Χάρτης, ΑΝΑΛΥΤΙΚΟΙ: Αναλύοντας – λειτουργικά: Διάγραμμα Σύγκρισης (Venn) - Αναλύοντας – κριτικά: Αξιολόγηση Κινδύνων, ΕΦΑΡΜΟΣΜΕΝΟΙ: Εφαρμόζοντας κατάλληλα: Εφαρμογές Πολυγραμματισμών- Εφαρμόζοντας δημιουργικά: Κιναισθησία.

Σχήμα 4

- **Δραστηριότητες Διαδικασίες (Γνωστικές Διαδικασίες):** Σχεδιάστηκαν οκτώ (8) δραστηριότητες, σύμφωνα με τους στόχους της Μαθησιακής Ενότητας, των οποίων η περιγραφή ακολουθεί παρακάτω.

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[11] Διαθέσιμη στην ηλεκτρονική διεύθυνση: http://cglearner.com/learning_element/show_teacher/960.html?

Μαθησιακή Δραστηριότητα 1: Βιώνοντας – το νέο :Εμπειρίες Γραμματισμού - Δραστηριότητες Πρόσληψης

Αφόρμηση: προβολή εικόνων σχετικά με την παιδική εργασία.

Δ.1: Ο εκπαιδευτικός ζητά από τους μαθητές να μελετήσουν τις σελίδες 46-51 του *Youth X Change : Οδηγός προς αειφορικούς τρόπους ζωής - εγχειρίδιο για την υπεύθυνη κατανάλωση,* Ενότητα: «Κάνε αγορές που δε βασίζονται στην εκμετάλλευση: Παιδική εργασία, Δικαίωμα στην εκπαίδευση, Συνθήκες εργασίας, Ανισότητα φύλων, Ανθρώπινα Δικαιώματα» και να ανταλλάξουν απόψεις σχετικά με ενδεικτικά ερωτήματα: το πως κατανοούν οι μαθητές την εκμετάλλευση των παιδιών; τι εννοούμε όταν λέμε παιδική εργασία; ποιές μορφές έχει η παιδική εργασία; ποιοί είναι οι λόγοι που εργάζονται τα παιδιά;σε ποιές χώρες συναντάμε περισσότερο μορφές παιδικής εργασίας; και γιατί;)

Μαθησιακή Δραστηριότητα 2: Βιώνοντας – το γνωστό: Εμπειρίες Πολυγραμματισμών - Δραστηριότητες Πρόσληψης

Δ.2: Δημιουργία ενός πολυτροπικού κειμένου από τους μαθητές, λαμβάνοντας υπόψη τη συζήτηση που προηγήθηκε. Απαραίτητη σε αυτό το στάδιο είναι η δημιουργία μαθητικών ομάδων. (Τρόπος δημιουργίας ομάδων στην σχολική τάξη) Ο τίτλος του κάθε κειμένου δύναται να οριστεί από τον εκπαιδευτικό ή και από τους ίδιους τους μαθητές, κατόπιν συμφωνίας των μελών των ομάδων. Ο τίτλος θα πρέπει να είναι σχετικός με την παιδική εργασία. Η κάθε ομάδα αφού επιλέξει τον τίτλο του πολυτροπικού κειμένου, έχει τη δυνατότητα να επισκεφθεί τους προτεινόμενους δικτυακούς τόπους και μέσω της τεχνικής της ιστοεξερεύνησης (Webquest) εντοπίζει υλικό, πληροφοριακό/φωτογραφικό/ηχητικό και κατόπιν επεξεργασίας του, το αξιοποιεί ανάλογα στο πολυτροπικό κείμενο.

Μαθησιακή Δραστηριότητα 3: Εννοιολογώντας με ορολογία: Διευκρίνιση Εννοιών

Δ.3: Διευκρίνιση εννοιών (ενδεικτικές έννοιες: κοινωνικό κόστος, παιδική εργασία, ανθρώπινο κεφάλαιο, εθνικές μειονότητες, εξάλειψη της φτώχιας κλπ) από τους μαθητές τις οποίες εντοπίζουν στο κείμενο Οδηγός Youth X Change και μέσα από τη διαδικασία συνώνυμων και αντίθετων εννοιών ορίζουν τις έννοιες και συμπληρώνουν τον σχετικό πίνακα.

Μαθησιακή Δραστηριότητα 4: Εννοιολογώντας με θεωρία: Εννοιολογικός χάρτης

Δ.4: Χαρτογράφηση εννοιών (ενδεικτικές έννοιες: ανθρώπινα δικαιώματα, εξάλειψη της φτώχιας, συνθήκες εργασίας, ανισότητα κλπ) από τους μαθητές, με τη βοήθεια του εργαλείου χαρτογράφησης Inspiration ή με το online εργαλείο χαρτογράφησης Text 2 Mind Map .

Μαθησιακή Δραστηριότητα 5: Αναλύοντας – λειτουργικά: Διάγραμμα Venn

Δ.5: Δημιουργία διαγράμματος Venn από τους μαθητές, κάνοντας χρήση του γραφικού SmartArt (Οδηγίες χρήσης) σε ένα έγγραφο Word με στόχο τον εντοπισμό των διαφορετικών και επικαλυπτόμενων χαρακτηριστικών των εννοιών.

Μαθησιακή Δραστηριότητα 6: Αναλύοντας – κριτικά: Αξιολόγηση και σχεδιασμός κινδύνων.

Δ.6: Ο εκπαιδευτικός αναρτά φωτογραφικό υλικό παιδιών που εργάζονται σε λατομεία, χωράφια, ορυχεία, φανάρια, εργοστάσια, βιοτεχνίες κλπ. Κατόπιν ζητά από τους μαθητές:

- να καταγράψουν τους κινδύνους που διατρέχουν τα παιδιά κάτω από αυτές τις συνθήκες εργασίας.
- να εντοπίσουν ποια δικαιώματα του παιδιού καταπατούνται. Υλικό μελέτης: Unicef: Σύμβαση για τα δικαιώματα του παιδιού, Συνήγορος του παιδιού: Κύκλος δικαιωμάτων παιδιού

Μαθησιακή Δραστηριότητα 7: Εφαρμόζοντας κατάλληλα: Παραγωγικές Δραστηριότητες

Δ.7: Δημιουργία παρουσίασης από τους μαθητές με τη χρήση του PowerPoint με θεματικές (ενδεικτικές θεματικές: Παιδιά – ζητιάνοι, Παιδιά - εργάτες δρόμων, Παιδιά – αγρότες, Παιδιά -

"βιομήχανοι") από την Παιδική Εργασία. Ο εκπαιδευτικός δίνει οδηγίες για την παρουσίαση, καθοδηγεί τους μαθητές κατά την ιστοεξερεύνηση (Webquest) μέσα από προτεινόμενους διαδικτυακούς τόπους.

Μαθησιακή Δραστηριότητα 8: Εφαρμόζοντας δημιουργικά: Κιναισθησία

Δ.8: Η δραστηριότητα αυτή αφορά ομαδικές εργασίες μαθητών και περιλαμβάνει τριών ειδών δραστηριότητες με οδηγίες καθοδήγησης. Συγκεκριμένα: **Α.** Σχεδιασμός μια αφίσας (με το natural art πρόγραμμα ή με κολάζ φωτογραφιών ή με χειροτεχνία-ζωγραφική) με θέμα "Παιδιά στρατιώτες στο Κογκό" (amnesty.org - εκπαιδευτική δράση), **Β.**Οργάνωση ενός παιχνιδιού ρόλων (role-play) με θέμα "Τα παιδιά των φαναριών" και **Γ.** Δημιουργία ενός βίντεο με διάφορες εικόνες παιδικής εργασίας (movie maker)
(βλ. http://www.youtube.com/watch?v=C32laZnsNIE&feature=player_embedded

- **Γνωστικά Αποτελέσματα (αξιολόγηση):** Για τη βαθμολόγηση των γνωστικών διαδικασιών (δραστηριοτήτων) προσφέρονται ιδιαίτερα οι κλίμακες διαβαθμισμένων κριτηρίων αξιολόγησης, γνωστές ως ρουμπρίκες (rubrics), οι οποίες είναι κλίμακες περιγραφικής αξιολόγησης με διαβαθμισμένα κριτήρια αποτίμησης της ποιότητας μιας εργασίας σε συγκεκριμένο τομέα της (βλ. Κουλουμπαρίτση και Ματσαγγούρας 2004). Ο πίνακας (βλ. Πίνακα 1) που ακολουθεί, αποτελεί αξιολόγηση της επίδοσης των μαθητών στο πλαίσιο υλοποίησης των γνωστικών διαδικασιών (δραστηριοτήτων), η οποία περιλαμβάνει τρεις βαθμίδες αξιολόγησης για την κάθε γνωστική διαδικασία.

ΡΟΥΜΠΡΙΚΑ ΑΞΙΟΛΟΓΗΣΗΣ ΤΗΣ ΕΠΙΔΟΣΗΣ ΤΩΝ ΜΑΘΗΤΩΝ Μαθησιακή Ενότητα: «Η παιδική εργασία»				
ΚΡΙΤΗΡΙΑ	ΕΞΑΙΡΕΤΙΚΗ ΕΠΙΔΟΣΗ 3	ΜΕΤΡΙΑ ΕΠΙΔΟΣΗ 2	ΧΑΜΗΛΗ ΕΠΙΔΟΣΗ 1	ΑΠΟΤΕΛΕΣΜΑΤΑ
Περιεχόμενο				
ΒΙΩΜΑΤΙΚΟΣ ΣΤΟΧΟΣ Α)Βιώνοντας – το νέο Β)Βιώνοντας – το γνωστό				
ΕΝΝΟΙΟΛΟΓΙΚΟΣ ΣΤΟΧΟΣ Α)Διευκρίνιση Εννοιών Β)Εννοιολογικός Χάρτης				
ΑΝΑΛΥΤΙΚΟΣ ΣΤΟΧΟΣ Α)Διάγραμμα Venn Β)Αξιολόγηση και σχεδιασμός κινδύνων				
ΕΦΑΡΜΟΣΜΕΝΟΣ ΣΤΟΧΟΣ Α)Παρουσίαση σε Power-Point: Β)Κιναισθησία Β.1: Παιχνίδι ρόλων Β.2: Σχεδιασμός Αφίσας Β.3: Δημιουργία βίντεο				

Πίνακας 1

- **Μαθησιακές διαδρομές (επεκτάσεις):** η Μαθησιακή Ενότητα δύναται να συνδεθεί με περαιτέρω δραστηριότητες, που συνιστώνται στους μαθητές, όπως άλλες διαθεματικές Μαθησιακές Ενότητες ή να αξιοποιηθεί ως συμπληρωματικό ή κύριο υποστηρικτικό υλικό σε μία διδασκαλία και να αποτελέσει μια καλή πρακτική της εν λόγω ηλεκτρονικής τράπεζας.

Συμπεράσματα

Η ηλεκτρονική πλατφόρμα «Μάθηση Μέσω Σχεδιασμού» ενθαρρύνει τους εκπαιδευτικούς και τα σχολεία να υιοθετήσουν μια στρατηγική «διαχείρισης της γνώσης» για την τεκμηρίωση και την ανταλλαγή βέλτιστων πρακτικών, καλλιεργώντας μια κουλτούρα επαγγελματικής συνεργασίας και παράλληλα επιτρέπει στους μαθητές την αυτόνομη και ασύγχρονη πρόσβαση στην ηλεκτρονική τράπεζα διδακτικών ενοτήτων, οι οποίες υποστηρίζουν μια στοχευμένη και διαφοροποιημένη μάθηση.

Η «Παιδική Εργασία» ως κύρια θεματική της εν λόγω Μαθησιακής Ενότητας, δομείται, από γνωστικές διαδικασίες (δραστηριότητες), οι οποίες αναδεικνύουν την εργασιακή εκμετάλλευση των παιδιών υπό άθλιες συνθήκες ασφάλειας και υγιεινής, ευαισθητοποιούν τους μαθητές απέναντι σε αυτό το σημαντικό κοινωνικό ζήτημα, τους ενημερώνουν για τα δικαιώματα των παιδιών και παράλληλα τους καθιστούν δημιουργούς γνώσης, μέσα από την εφαρμογή των σύγχρονων εργαλείων κοινωνικής δικτύωσης (Web 2.0), εξασφαλίζοντας την πρόσβαση και τη διαφάνεια στο σχεδιασμό της εκπαιδευτικής διαδικασίας.

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Η Συμβολή των ΤΠΕ στην Καλλιέργεια Δεξιοτήτων σε Επιμορφούμενους εκπαιδευτικούς Α/θμιας και Β/θμιας Εκπαίδευσης, με Χρήση Μοντέλων Σχεδιασμού Μαθησιακών Δραστηριοτήτων ΤΠΕ, Αναφορικά με το Σχεδιασμό Μαθησιακών Δραστηριοτήτων στο Πλαίσιο της Εκπαίδευσης για την Αειφορία.

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Περίληψη

Ο εκπαιδευτικός σχεδιασμός που πραγματοποιείται μέσω σχεδιαστικών μοντέλων τα οποία αξιοποιούν και ενσωματώνουν τις ΤΠΕ στην εκπαιδευτική διαδικασία, αποτελεί μία από τις πλέον αναπτυσσόμενες περιοχές στην ηλεκτρονική μάθηση (Harper & Oliver, 2002; Laurillard, 2002). Βάσιμοι λόγοι για την ανάγκη αξιοποίησης νέων σχεδιαστικών μοντέλων διδασκαλίας προκύπτουν εξαιτίας της αδυναμίας των υπαρχουσών μεθόδων διδακτικού σχεδιασμού να αναδείξουν αποτελεσματικά τις δυνατότητες των ΤΠΕ. Οι Φεσάκης, Δημητρακοπούλου διαπιστώνουν την ανάγκη ανάπτυξης νέων μεθόδων, οι οποίες πέραν των άλλων θα πρέπει να είναι εφαρμόσιμες από το μέσο εκπαιδευτικό, καθώς αυτός θα αναλαμβάνει ενεργητικό ρόλο στο μαθησιακό σχεδιασμό που ενσωματώνει και αξιοποιεί εργαλεία και μέσα ΤΠΕ με τρόπο φυσικό και ολιστικό (Φεσάκης & Δημητρακοπούλου, 2009).
Λαμβάνοντας υπόψη τις ανωτέρω θέσεις, επιχειρήθηκε στην προκείμενη μελετητική προσπάθεια η διερεύνηση της συμβολής των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους συμμετέχοντες στην έρευνα εκπαιδευτικούς, για το σχεδιασμό μαθησιακών δραστηριοτήτων με χρήση μοντέλων εκπαιδευτικού σχεδιασμού με ΤΠΕ, ως απόρροια της επιμόρφωσής τους. Σχεδιαστικά μοντέλα, όπως είναι οι ιστοεξερευνήσεις (webquests), τα μικρομαθήματα (microLESSONSTM), τα σχέδια εργασίας (projects), αξιοποιήθηκαν για το σχεδιασμό μαθησιακών δραστηριοτήτων που αναφέρονταν στην Εκπαίδευση για την Αειφορία, αφού η τελευταία προσφέρει το όχημα σε διαφορετικούς κλάδους να συνεισφέρουν στην κατανόηση της Αειφορίας (Wade, 2008). Οι μελετητές, μεταξύ άλλων, ερεύνησαν και τη δυνατότητα της χρήσης των ΤΠΕ για τη δημιουργία διαδραστικού περιβάλλοντος μάθησης μέσα στο οποίο ο εκπαιδευτικός και ο μαθητής θα έχουν τη δυνατότητα να «συνδιαλέγονται» με τα στοιχεία που το συνιστούν.

Abstract

The educational planning conducted through models that integrate ICT techniques in educational procedure, is one of the most fast developing areas in e-learning (Harper & Oliver, 2002; Laurillard, 2002). Grounds for the need of building new teaching design patterns have been aroused due to the inability of the existing instructional design methods to highlight the strength of ICT techniques in educational methodology. Fesakis and Dimitrakopoulou determine the need of developing new methods, which, beside others, would be implementable by a typical educated teacher, concerning that he will play an active role in the educational design that integrates and effectively uses tools and ICT techniques in a natural and holistic point of view (Fesakis and Dimitrakopoulou, 2009).
Considering the above issues, an effort was attempted in order to investigate the contribution of ICT training tools, onto teacher training participants, focused on the design educational activities

using instructional design models with ICT. Educational design models, such as "istoexerevniseis" (webquests), "mikromathimata" (microLESSONSTM), "work-plans" (projects), were used to design educational activities related with Education for Sustainability, since the latter educational framework provides to various scientific fields the "transportation mechanism" to contribute onto the Sustainability understanding (Ros Wade, 2008). Authors also worked on the possibility of using ICT in order to create an interactive learning environment in which the teacher and the student will be able to "interact" with the structural elements-parameters, that this learning environment was constructed of.

Εισαγωγή

Η παρούσα εργασία διαπραγματεύεται τη συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων σε εκπαιδευτικούς Α/θμιας και Β/θμιας εκπαίδευσης αναφορικά με το σχεδιασμό μαθησιακών δραστηριοτήτων, μέσα από επιμορφωτικές παρεμβάσεις με την αξιοποίηση μαθησιακών περιβαλλόντων με χρήση ΤΠΕ[1] και στο πλαίσιο της Εκπαίδευσης για την Αειφορία (ΕΑ).
Διαφωνώντας ο Freire με την άποψη που θεωρεί την εκπαίδευση ως εφαλτήριο αλλαγής της πραγματικότητας, ισχυρίζεται, ότι αυτό μπορεί να συμβεί μόνο στην περίπτωση που η θεωρία για την εκπαίδευση ορίζεται από μια θεωρία για την κοινωνία και τον άνθρωπο. Επιχειρηματολογώντας στη συνέχεια σχετικά, λέει ότι «δεν είναι η εκπαίδευση η οποία δίνει μορφή στην κοινωνία αλλά είναι η κοινωνία που προδιαγράφει την εκπαίδευση, ώστε να προσαρμόζεται στις αξίες που στηρίζεται η κοινωνία» (Freire P. 1985: 170).
Διαπιστώσεις όπως οι παραπάνω, επισημαίνουν την ανάγκη ύπαρξης μίας ή και περισσότερων κοινωνικών θεωριών ως προϋπόθεση για να ασκηθεί στη συνέχεια η όποια κριτική παιδαγωγική. Επομένως δικαιώνουν αρχικά την επίκληση που επιχειρείται στην εργασία αυτή για το μεταμοντερνισμό στο χώρο της εκπαίδευσης, ως ένα κοινωνικό ρεύμα που επιχειρεί να ερμηνεύσει την τρέχουσα πραγματικότητα.
Επισημαίνεται από τους γράφοντες ότι: α)η άποψη υπέρ της αφομοίωσης του μεταμοντερνισμού από την εκπαίδευση ως κατάλληλου ιδεολογικού πλαισίου μέσα στο οποίο μπορούν να επέλθουν αλλαγές στο χώρο της εκπαίδευσης, επιχειρείται διότι μπορεί να αποτελέσει «εργαλείο ανάλυσης και στοχασμού για τις προοπτικές του ελληνικού σχολείου» (Λιάμπα, Α., Κάσκαρη, Ι., 2007). Εν τοις πράγμασι ο χώρος αυτός αναζητώντας λύσεις σε σημερινά αδιέξοδα, ενεργοποιεί δυνάμεις οι οποίες μέχρι σήμερα έμεναν αναξιοποίητες και απαξιωμένες (προσεγγίζει τον εκπαιδευτικό και το μαθητή σαν ατομικές οντότητες αποδίδοντας σε αυτούς δυνάμεις και δυνατότητες που προέρχονται από την εμπειρία τους, τη συναισθηματική[2] και κοινωνική[3] νοημοσύνη τους) β)η αλήθεια της θεωρίας αυτής μπορεί να γίνεται αποδεκτή ή όχι, γεγονός που συνάδει απόλυτα με τον πλουραλισμό και την πολυπλοκότητα του κόσμου που μας περιβάλλει, και του πλήθους των τάσεων που επιχειρούν να τον ερμηνεύσουν. Το πεδίο το οποίο πραγματεύεται η έρευνα,

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[1] Ο όρος Τ.Π.Ε. (Τεχνολογίες της Πληροφορίας και των Επικοινωνιών) είναι η απόδοση του όρου Informational and Communicational Technology (ICT). Περιγράφεται ως η τεχνολογία που χρησιμοποιείται για επικοινωνιακούς σκοπούς (Κυρίδης, Δρόσος & Ντίνας, 2003:35). Συναντάται επίσης και με τους όρους "Νέες Τεχνολογίες (ΝΤ), "Εκπαιδευτική Τεχνολογία" και Πληροφοριακή Επικοινωνιακή Τεχνολογία ή Π.Ε.Τ (Information and Communications Technologies). Οι Τεχνολογίες της Επικοινωνίας και των Πληροφοριών (Τ.Π.Ε), ορίζονται ως οι τεχνολογίες που επιτρέπουν την επεξεργασία και τη μετάδοση μιας ποικιλίας μορφών αναπαράστασης της πληροφορίας (σύμβολα, εικόνες, ήχος, βίντεο) και ως τα μέσα που είναι φορείς αυτών των μηνυμάτων (Κόμης, 2004-α: 16).
[2] Η συναισθηματική νοημοσύνη αναφέρεται στην ικανότητα του ατόμου να αναγνωρίζει και να κατανοεί τα συναισθήματα τόσο τα δικά του όσο και των άλλων, να τα χειρίζεται αποτελεσματικά και να δημιουργεί διαρκώς κίνητρα για τον εαυτό του. Σύμφωνα με τον Dr. Goleman, η κατοχή της ικανότητας αυτής σε υψηλό βαθμό, μπορεί να οδηγήσει ένα άτομο με μέτριο IQ ευκολότερα στην επιτυχία, από ένα ιδιαίτερα ευφυές άτομο, αρκεί να καλλιεργήσει τη συναισθηματική του νοημοσύνη.
[3] Ο Goleman θεωρεί ότι η κοινωνική νοημοσύνη αντανακλά τις διαπροσωπικές ικανότητες του κοινωνικού εγκεφάλου. «Η πιο ισχυρή δύναμη στην αρχιτεκτονική του εγκεφάλου είναι αδιαμφισβήτητα η ανάγκη να βρει το δρόμο του μέσα στον κοινωνικό κόσμο κι όχι η αριστεία στις εξετάσεις» (Goleman, 2006)

καθιστά άκυρες τις μονοσήμαντες θεωρήσεις, αξιολογείται όμως η αξιοποίησή τους ως ένα αναγκαίο πρώτο βήμα προσέγγισης της αλήθειας.

Προς εφαρμογή κι ενίσχυση των ανωτέρω θέσεων λειτουργεί ο εκπαιδευτικός σχεδιασμός που πραγματοποιείται μέσω σχεδιαστικών μοντέλων τα οποία αξιοποιούν και ενσωματώνουν τις ΤΠΕ στην εκπαιδευτική διαδικασία. Αποτελεί μία από τις πλέον αναπτυσσόμενες περιοχές στην ηλεκτρονική μάθηση (Harper & Oliver, 2002; Laurillard, 2002). Διατυπώνονται ήδη βάσιμοι λόγοι για την ανάγκη αξιοποίησης νέων σχεδιαστικών μοντέλων διδασκαλίας, εξαιτίας της αδυναμίας των υπαρχουσών μεθόδων διδακτικού σχεδιασμού να αναδείξουν αποτελεσματικά τις δυνατότητες των ΤΠΕ.

Θεωρητική προσέγγιση

Μέσα από την οπτική του μεταμοντερνισμού, αλλάζει τελείως όλο το τοπίο της μαθησιακής διαδικασίας, αφού πέρα από το έργο του εκπαιδευτικού στο σχολείο, διαμορφώνει και επηρεάζει την ίδια την οργάνωση της σχολικής γνώσης, τους τρόπους μάθησης, δηλαδή επηρεάζει τελικά την κοσμο-εικόνα που οικοδομούν οι μαθητές, καθώς στοχεύει «στην εμπλοκή των μαθητών στην εκπαιδευτική διαδικασία» (Μακρή-Μπότσαρη Ε. 2005: 10). Η θεώρηση του μεταμοντερνισμού αμφισβητεί τη σταθερότητα, την προβλεψιμότητα και τη μοναδικότητα της «αλήθειας», τη θέση της οποίας καταλαμβάνει η τάση του: *"anything goes, everything is acceptable"* (Feyerabend, 1988). Ενώ άξιο αναφοράς, ως ιδιαίτερο χαρακτηριστικό του μεταμοντερνισμού, είναι η τάση του για υποκειμενοκεντρική θεώρηση των πραγμάτων, η οποία διαφαίνεται κατά την αναζήτηση λύσης των αδιεξόδων όταν στρέφεται στο ίδιο το άτομο και όχι σε λύσεις που θα προέλθουν μέσω της αλλαγής των δομών που τα προκαλούν. Με αυτόν τον τρόπο «καταλήγει στο μεθοδολογικό ατομισμό» (Αλεξίου Θ. 2002: 210 - 228).

Συσχετίζεται η εμφάνιση του μεταμοντερνισμού με την εμφάνιση της τεχνολογίας των υπολογιστών, αφού η γνώση στις μεταμοντέρνες κοινωνίες χαρακτηρίζεται όχι μόνο από τη χρησιμότητά της, αλλά και από τον τρόπο που διανέμεται, αποθηκεύεται και διαμορφώνεται. Η ανάπτυξη των ΤΠΕ στη σύγχρονη κοινωνία επηρεάζει καταλυτικά τις μορφές της γνώσης, καθώς και τον τρόπο διαχείρισής της (παραγωγή, διανομή και κατανάλωση). Στη μεταμοντέρνα προσέγγιση, λοιπόν, παύει να είναι γνώση, οτιδήποτε δεν μπορεί να μορφοποιηθεί, να αναγνωριστεί και να αποθηκευθεί από έναν υπολογιστή - π.χ. οτιδήποτε μη ψηφιακό-. Πλέον το αντίθετο της γνώσης δεν είναι η άγνοια, όπως συμβαίνει στο μοντέρνο /ουμανιστικό παράδειγμα, αλλά το «παράσιτο» που δεν είναι δυνατό να αναγνωριστεί μέσα σε αυτό το σύστημα (Νάστος και συν., 2001).

Συμπληρωματικά προς την άποψη του Bonnet (1999, 2002) ο οποίος εντοπίζει ως βασικές αιτίες της μη βιώσιμης ανάπτυξης τις επικρατούσες αξίες και νόρμες αναφορικά με την κοινωνία, την οικονομία, την πολιτική και τον πολιτισμό, παρατίθενται απόψεις όπως αυτή του Friedman ο οποίος βρίσκει την απάντηση για την άρση των αδιεξόδων, αναφορικά με την ύφεση και την εκ νέου ανοικοδόμηση των κατεστραμμένων από αυτήν κοινωνιών, να εξαρτάται από τη δημιουργικότητα και την καινοτομία που θα επιδείξουν οι συλλογικότητες και τα άτομα «Όσοι έχουν φαντασία να επινοήσουν ευφυέστερους τρόπους για τις παλιότερες εργασίες, ενεργειακούς τρόπους για την προσφορά νέων υπηρεσιών …νέους τρόπους συνδυασμού των υπαρχόντων τεχνολογιών, αυτοί θα προκόψουν. Ο ρόλος που καλείται να διαδραματίσει η εκπαίδευση σε αυτό το νέο αξιακό περιβάλλον, είναι αντιφορμαλιστικός, ενισχυμένος από εκείνους τους βαθμούς ελευθερίας που επιτρέπουν στους εμπλεκόμενους στη μαθησιακή διαδικασία (εκπαιδευτικούς, μαθητές) να δρουν με λόγο αφηγηματικό, οποίος επέχει πλέον ισότιμη θέση με τον επιστημονικό.

Στις μεταμοντέρνες κοινωνίες όλοι οι άνθρωποι έχουν τη δυνατότητα να είναι κοινωνοί και συμμέτοχοι μιας ανοικτής εκπαίδευσης. Ως ανοικτή εκπαίδευση ή και ανοικτή παιδεία θα μπορούσε να χαρακτηρισθεί ένα ιδεώδες ή μια φιλοσοφία σύμφωνα με την οποία η μόρφωση είναι δικαίωμα όλων των ανθρώπων και θα πρέπει να την απολαμβάνουν σε όλη τη διάρκεια της ζωής τους (Λιοναράκης & Λυκουργιώτης, 1999). Η συγκεκριμένη αναφορά στη δια βίου εκπαίδευση προσδιορίζει έναν πλήρη κύκλο μάθησης, ο οποίος συμπεριλαμβάνει τη μάθηση από την παιδική ηλικία, την επίσημη εκπαίδευση σε όλα τα επίπεδα αλλά και την ανεξάρτητη

εκπαίδευση των ενηλίκων σε όλη τη διάρκεια της ζωής τους. Στη δια βίου εκπαίδευση συμπεριλαμβάνεται και η εξ αποστάσεως εκπαίδευση (Σεμερτζάκη, 2004) και εμπεριέχονται όροι όπως η επιμόρφωση και η κατάρτιση.

Ειδικότερα και σύμφωνα με τη θεωρία της «δραστηριότητας» (activity theory) (Kuutti, 1996. Bellamy, 1996. Bodker, 1991. Jonassen, 2000, στο Δημητρακοπούλου, 2001), η οποία επικεντρώνεται στη δραστηριότητα ως βασική μονάδα ανάλυσης, δύο είναι οι σημαντικές αρχές για τη μάθηση που συντελείται μέσω ενός συστήματος εκπαίδευσης από απόσταση:

- Η μάθηση είναι εγγενής κοινωνική διαδικασία και όχι υπόθεση ενός ατόμου.
- Η μάθηση δε γίνεται απλά μέσω μεταφοράς της γνώσης.

Η θεωρία της δραστηριότητας είναι περισσότερο μια φιλοσοφική άποψη που μελετά τις ανθρώπινες πρακτικές ως εξελικτικές διεργασίες στις οποίες συμπλέκονται ταυτόχρονα ατομικοί και κοινωνικοί δεσμοί (Nardi, 1996). Οι ρίζες της βρίσκονται στον Vygotsky και η θεωρία εντάσσεται στην κοινωνιο-πολιτισμική «σχολή» μάθησης. Προσεγγίζει ερμηνευτικά την αλληλεπίδραση ανάμεσα σε ανθρώπινες, κοινωνικές, τεχνολογικές, και οργανωτικές διαδικασίες στο πλαίσιο των σύγχρονων συνθηκών εργασίας και μάθησης, ώστε να βοηθήσει στο σχεδιασμό αποδοτικότερων και καταλληλότερων τεχνημάτων. Τα τεχνήματα μπορεί να είναι εργαλεία, μηχανές, διαδικασίες, μέθοδοι, ακόμη και μορφές οργάνωσης της εργασίας.

Ο εκπαιδευτικός σχεδιασμός που πραγματοποιείται μέσω σχεδιαστικών μοντέλων τα οποία αξιοποιούν και ενσωματώνουν τις ΤΠΕ στην εκπαιδευτική διαδικασία, αποτελεί μία από τις πλέον αναπτυσσόμενες περιοχές στην ηλεκτρονική μάθηση (Harper & Oliver, 2002; Laurillard, 2002). Υπηρετεί την ανάγκη αξιοποίησης νέων σχεδιαστικών μοντέλων διδασκαλίας, εξαιτίας της αδυναμίας των υπαρχουσών μεθόδων διδακτικού σχεδιασμού να αναδείξουν αποτελεσματικά τις δυνατότητες των ΤΠΕ. Οι Φεσάκη, Δημητρακοπούλου διαπιστώνουν την ανάγκη ανάπτυξης νέων μεθόδων, οι οποίες πέραν των άλλων θα πρέπει να είναι εφαρμόσιμες από το μέσο εκπαιδευτικό, καθώς αυτός θα αναλαμβάνει ενεργητικό ρόλο στο μαθησιακό σχεδιασμό που ενσωματώνει και αξιοποιεί εργαλεία και μέσα ΤΠΕ με τρόπο φυσικό και ολιστικό (Φεσάκης & Δημητρακοπούλου, 2009)

Μεταξύ των προτεινόμενων νέων σχεδιαστικών μοντέλων μαθησιακών δραστηριοτήτων που αξιοποιούν ΤΠΕ συγκαταλέγονται σχεδιαστικά μοντέλα όπως είναι οι ιστοεξερευνήσεις (webquests), τα μικρομαθήματα (microLESSONSTM), τα σχέδια εργασίας (projects). Τα μοντέλα αυτά ενδείκνυνται να χρησιμοποιηθούν και για το σχεδιασμό μαθησιακών δραστηριοτήτων που αναφέρονται στην εκπαίδευση για το περιβάλλον και την αειφορία[4] –στοιχείο που αξιοποιείται από τη μελετήτρια στην έρευνά της-. Η δομή τους επιτρέπει την επικοινωνία μέσω ΤΠΕ, διευκολύνει τη δημιουργία διαδραστικού περιβάλλοντος μάθησης μέσα στο οποίο ο μαθητής έχει τη δυνατότητα να «συνδιαλέγεται» με τα στοιχεία που το συνιστούν. Με αυτόν τον τρόπο παρέχεται η ευχέρεια στο μαθητή, ανάμεσα σε πολλά, α)να εντοπίζει και να κατανοεί τα στοιχεία που συνιστούν μία περιβαλλοντική κατάσταση, β)να διερευνά και να αξιολογεί τις επιπτώσεις που επιφέρουν οι παρεμβάσεις που ο ίδιος δημιούργησε προηγουμένως στη λειτουργία της, γ) να αναπτύσσει στρατηγικές δράσεις για την αντιμετώπιση ενός προβλήματος και να αξιολογεί την αποτελεσματικότητά του (Δημητρίου 2009).

Έρευνα

Κατά τη διάρκεια της ερευνητικής διαδικασίας[5] για τις ανάγκες της παρούσας εργασίας διερευνήθηκε και καταγράφηκε η συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους

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[4] Η Εκπαίδευση για την Αειφορία (ΕΑ), ως διαδικασία αγωγής, στοχεύει να διαμορφώνει στάσεις και συμπεριφορές που διέπονται από αξίες όπως η προστασία του περιβάλλοντος, η κοινωνική δικαιοσύνη, η κοινωνική συνοχή και η οικονομική ευημερία, οι οποίες θα οδηγούν την ανθρωπότητα σε βιώσιμο μέλλον. … συνδέεται άρρηκτα με την αειφόρο ανάπτυξη, αφού συνυφαίνεται μαζί της με μια διαδικασία συνεχούς μάθησης, που μεταξύ άλλων διευρύνει και την έννοια της Περιβαλλοντικής Εκπαίδευσης ενσωματώνοντάς την σε αυτήν –την ΕΑ-. (Θεοδωρίδου, Τόλης, Κυριακίδης& Τσαγκάρης, 2009).

[5] Θεματικό σεμινάριο μικτής εκπαίδευσης (blended) με τίτλο «Blended Εκπαίδευση στην υπηρεσία της Εκπαίδευσης για την Αειφορία»: Διαμόρφωση σχεδίων project, ιστοεξερευνήσεων και μικρομαθημάτων

συμμετέχοντες εκπαιδευτικούς, αναφορικά με το σχεδιασμό μαθησιακών δραστηριοτήτων στο πλαίσιο της ΕΑ, σε περιβάλλοντα με χρήση ΤΠΕ. Το περιεχόμενο της επιμόρφωσης των εκπαιδευτικών του δείγματος, που δεν περιορίστηκε στην απόκτηση γνώσεων τεχνολογικού χαρακτήρα, αλλά στόχευσε με τις ΤΠΕ στην καλλιέργεια νέων παιδαγωγικών και μαθησιακών προοπτικών που σχετίστηκαν με εκπαιδευτικές εφαρμογές (Oliver 1994) μέσα στο σχολικό γίγνεσθαι (σχολικές δραστηριότητες και όχι μόνο), αναγνωρίστηκε ως επιτυχές και αποτελεσματικό. Λήφθηκε υπόψη ότι η υλοποίηση κάθε δραστηριότητας (θεωρία της δραστηριότητας) προϋποθέτει τη χρήση εργαλείων από τα άτομα, εσωτερικών (νόηση, σχεδιασμοί, μέθοδοι) ή εξωτερικών (υπολογιστές, τεχνικά εξαρτήματα, αντικείμενα) για την επίτευξη των στόχων τους (Κόμης, 2004).

Τα εργαλεία που χρησιμοποιήθηκαν για αυτήν **τη διερεύνηση** ανήκουν επίσης σε παρόμοια περιβάλλοντα, αφού ως μέσο συλλογής δεδομένων αξιοποιήθηκε το **focus group και συνεντεύξεις που πραγματοποιήθηκαν μέσω chat από πλατφόρμα τηλεκπαίδευσης (ποιοτική έρευνα)**. Έτσι καταρχήν διευκολύνθηκε η επικοινωνία και συνεργασία των εκπαιδευτικών και των επιμορφωτών τους ανεξάρτητα από χωρικούς και χρονικούς περιορισμούς και έγινε δυνατή η λειτουργία του focus group και των συνεντεύξεων αφού είχε ολοκληρωθεί η επιμορφωτική παρέμβαση (υβριδική, εκ του σύνεγγυς και από απόσταση).

Στόχος της 'Ομάδας Εστίασης' (Focus group) είναι να προκληθεί συζήτηση σε βάθος, γύρω από ένα συγκεκριμένο θέμα, αφού προηγουμένως έχει γίνει μέσα από τις απόψεις των συμμετεχόντων ο εντοπισμός των σημαντικότερων ζητημάτων που σχετίζονται με αυτό. Στο πλαίσιο της συζήτησης ζητούμενο είναι η το δυνατόν μεγαλύτερη συμμετοχή του κοινού στη διαδικασία λήψης αποφάσεων γύρω από το προς συζήτηση θέμα. Καθοριστικό επομένως, ρόλο διαδραματίζει στη συζήτηση ό,τι το κοινό αντιλαμβάνεται ως σημαντικό. (Gooch et al, 2003). Ο Morgan (1997) διακρίνει τέσσερα στάδια στη διαδικασία των 'Ομάδων Εστίασης' (Gooch et al, 2003): Το σχεδιασμό, τη στρατολόγηση των συμμετεχόντων τη διεξαγωγή της συζήτησης και την ανάλυση των δεδομένων. Ενδεδειγμένος αριθμός συμμετεχόντων σε μια 'Ομάδα Εστίασης, ώστε η συζήτηση να διεξαχθεί ομαλά και αποτελεσματικά, είναι μεταξύ 5 και 15 ατόμων. Η αριθμητική αυτή διακύμανση εξασφαλίζει τη δυνατότητα έκφρασης της άποψης όλων (χαρακτηριστικό μικρής ομάδας) διεκδικώντας ικανοποιητικό αριθμό απόψεων που θα κατατεθούν. Σύμφωνα με τους Gooch et al ό. π. από μεγαλύτερο αριθμό συμμετεχόντων μπορεί να προκύψουν περισσότερα προβλήματα, σε ότι αφορά τους περισσότερο ή λιγότερο ομιλητικούς συμμετέχοντες

Τα ερευνητικά ευρήματα προσφέρονται για διατύπωση προτάσεων περαιτέρω διερεύνησης του χώρου της εκπαίδευσης μέσα από την οπτική του μεταμοντερνισμού με χρήση ΤΠΕ, καθώς αλλάζει τελείως όλο το τοπίο της μαθησιακής διαδικασίας ανάγοντας τον εκπαιδευτικό σε ρόλο δημιουργού της, μέσα από πρωτότυπες μαθησιακές παρεμβάσεις, οι οποίες ενσωματώνουν και αξιοποιούν το σύνολο των εμπειριών του -οι εκπαιδευόμενοι χαρακτηρίζονται από την τάση για αυτοκαθορισμό και ενεργητική συμμετοχή από το πλήθος εμπειριών και γνώσεων που έχουν αποκτήσει και από τον αποκρυσταλλωμένο τρόπο με τον οποίο μαθαίνουν (Κόκκος, 1999)- και αντικατοπτρίζουν τις προσωπικές του παιδαγωγικές στάσεις.

Κατά την ερευνητική διαδικασία επιλέχθηκε η χρησιμοποίηση της μεθόδου **Ομάδες Εστίασης** (**focus group), ως μέσο συλλογής δεδομένων** που θα επέτρεπε την εξαγωγή συμπερασμάτων αναφορικά με τα διερευνητικά ερωτήματα: Δ.1, υποερωτήματα Δ.1.1, Δ.1.2. Η συγκεκριμένη μέθοδος προτιμήθηκε, επειδή το διερευνητικό ερώτημα Δ.1 και τα υποερωτήματα Δ.1.1, Δ.1.2 προσφέρονται να προσεγγιστούν μέσα από την καταγραφή των απόψεων των συμμετεχόντων εκπαιδευτικών στην περιοχή θεμάτων που τα απασχολούν. Ο αριθμός του δείγματος (ομάδα των 11 ατόμων) ήταν κατάλληλος σύμφωνα με τα χαρακτηριστικά της μεθόδου για τις διεργασίες συζήτησης με εμπλοκή όλου του κοινού.

στις θεματικές περιοχές «Νερό & Βιώσιμη Ανάπτυξη» και «Μείωση & χρηστή Διαχείριση των Απορριμμάτων», εκ του σύνεγγυς και από απόσταση», στην Έδεσσα το διάστημα από 16-12-2011 έως 17-12-2011 και στη συνέχεια 15ωρη από απόσταση σύγχρονη και ασύγχρονη τηλεκπαίδευση (σύμφωνα με την με αρ. πρ. 138694/Γ7/22-12-2011 απόφαση του ΥΠΔΜΒΘ).

Ιδιαιτερότητα παρουσιάζει ο τρόπος και το μέσο που χρησιμοποιήθηκε για την πραγματοποίηση του focus group. Πραγματοποιήθηκε μέσω chat[6] με αξιοποίηση της πλατφόρμας τηλεκπαίδευσης του ΚΠΕ Έδεσσας. Αυτό έγινε εφικτό εξαιτίας των προκαθορισμένων ερωτήσεων που υποβλήθηκαν στη διάρκειά του και της εξοικείωσης των συμμετεχόντων με το μέσο (chat με αξιοποίηση πλατφόρμας τηλεκπαίδευσης). Οι ερευνητές δεν θεωρούν απαραίτητη μια εκτενέστερη αναφορά στο focus group ως μέσο συλλογής δεδομένων μέσα από chat, αφού αυτό δεν καλύπτει μέρος της στοχοθεσίας της παρούσας εργασίας, ούτε ανταποκρίνεται σε ερευνητικές ανάγκες της. Πιστεύουν όμως πως αποτελεί μια ενδιαφέρουσα περιοχή προς επιστημονική διερεύνηση.

Τα σχόλια των εκπαιδευτικών που συμμετείχαν στο focus group μέσω chat, ομαδοποιήθηκαν ως θέσεις-απόψεις σε διερευνητικά ερωτήματα που τέθηκαν έμμεσα ή άμεσα στη συζήτηση και καταχωρήθηκαν ως ποσοτικές μεταβλητές στους πίνακες που ακολουθούν:

Ο εκπαιδευτικός Ζ8 τοποθετείται θετικά στη συμβολή των ΤΠΕ κατά την επιμόρφωση (διαδικαστικά και θεματικά) σε σχέση με το βαθμό κατάκτησης και την επάρκεια χρήσης εννοιών, μαθησιακών εργαλείων όπως η blended εκπαίδευση, project, ιστοεξερεύνηση και μικρομάθημα, αφού σχολιάζει ότι: «*Αυτό που δεν είχα ξεκαθαρίσει αρχικά ήταν οι διαφορές της ιστοεξερεύνησης και του μικρομαθήματος. Χάρη όμως στο φόρουμ και τις απαντήσεις των επιμορφωτών μου λύθηκαν οι απορίες.*».

Το ίδιο θετικά στέκουν και οι Ζ2, Ζ3, Ζ4, Ζ5 και Ζ10 μέσω των αντίστοιχων δηλώσεών τους: «*Εγώ μπορώ να πω ότι πειραματίστηκα αρκετά με το πρώτο αλλά ειδικά με αυτές τις δεξιότητες θέλει εξάσκηση και έτσι το δεύτερο το σχεδίασα πολύ πιο γρήγορα αφού ήξερα τι ήθελα να κάνω και πώς να το κάνω....*», «*Η ιστοεξερεύνηση είναι κάτι που με εντυπωσίασε και σίγουρα θα εντυπωσιάσει και τους μαθητές*», «*Παρόλες τις σχετικές δυσκολίες ήταν μια ΟΑΣΗ στο δύσκολο διάστημα που διανύουμε, μια ευκαιρία εξοικείωσης με την από απόσταση τηλεκπαίδευση*», «*Υπέροχη διαδικασία σε όλα της τα στάδια, οργάνωση, συνέπεια,ανθρώπινη επαφή. Το μοιράζομαι αυτό με τους φίλους μου....*» «*...Ανακαλύψαμε ότι αυτό που χρειαζόμαστε περισσότερο είναι η εξοικείωση με συγκεκριμένα λογισμικά για να παράξουμε πρωτότυπο έργο*»,.

Στη συζήτηση δεν συμμετείχαν 5 εκπαιδευτικοί.

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[6] Ο τρόπος αυτός αφενός διασφάλισε στον κάθε συμμετέχοντα τη δυνατότητα να εκφραστεί και συγχρόνως, υπερπηδώντας το εμπόδιο της απόστασης, έδωσε τη δυνατότητα της άμεσης και επακριβούς καταγραφής της άποψής του, δίχως να υπεισέρχεται ο κίνδυνος πιθανών ανακριβειών που θα προέκυπταν από την απομαγνητοφώνησή της (συνήθης τρόπος καταγραφής των Ομάδων Εργασίας, όπου παρουσιάζονται προβλήματα κακής ηχογράφησης). Ο γραπτός λόγος που διατυπώθηκε είναι ακριβής και στοχευμένος, δεν στερείται όμως των στοιχείων που χαρακτηρίζουν μια πρόσωπο με πρόσωπο και εκ του σύνεγγυς επικοινωνία, δηλαδή στοιχεία αμεσότητας και «ζωντανού» διαλόγου. Οι συμμετέχοντες είχαν τη δυνατότητα, αν το επιθυμούσαν, να διαβάζουν τις καταγραμμένες θέσεις και απόψεις τους καθώς και των υπολοίπων και να επανέρχεται στα ερωτήματα διορθωτικά, βελτιωτικά, συμπληρωματικά. Οι ιδιαίτερες συνθήκες επικοινωνίας (έλλειψη ήχου και εικόνας), εξ αιτίας της ιδιαιτερότητας του τρόπου και του εργαλείου μέσω του οποίου έγινε το focus group, αντιμετωπίστηκαν με τη σύσταση ενός πλαισίου/πρωτοκόλλου επικοινωνίας (Θεοδωρίδου, 2012) -που γνωστοποιήθηκε εξ αρχής στους συμμετέχοντες-, η τήρηση του οποίου διευκόλυνε τη διεξαγωγή της συζήτησης.

Πίνακας 1										
FOCUS GROUP/ Συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος, για το σχεδιασμό μαθησιακών δραστηριοτήτων ΕΡΩΤΗΣΗ 1										
E1. "ΟΡΙΣΑ τις έννοιες blended εκπαίδευση, project, ιστοεξερεύνηση και μικρομάθημα ως διαδικασίες μάθησης και ΣΧΕΔΙΑΣΑ μαθήματα με την αξιοποίησή τους, Αλήθειες και Ψέματα"										

ΕΚΠΑΙΔΕΥΤΙΚΟΙ	O1	O2	O3	O4	O5	06	O7	O8	O9	10	11
ΑΛΗΘΕΙΑ		1	1	1	1			1		1	
ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ											
ΨΕΜΑ											
ΔΕΝ ΑΠΑΝΤΗΣΑΝ	-					-	-		-		-

Τα σχόλια των εκπαιδευτικών που έδωσαν συνέντευξη, ομαδοποιήθηκαν ως θέσεις-απόψεις σε διερευνητικά ερωτήματα που τέθηκαν έμμεσα ή άμεσα στη συνέντευξη και καταχωρήθηκαν ως ποσοτικές μεταβλητές στους πίνακες που ακολουθούν:

Ο συνεντευξιαζόμενος 1 σχολίασε: «*Οι έννοιες ήταν κατανοητές, λίγο προβληματίστηκα στη διαφοροποίηση ιστοεξερεύνησης και μικρομαθήματος, αλλά θεωρώ ότι οι δύο έννοιες επικαλύπτονται, εξάλλου μία μορφή διδασκαλίας μπορεί να συνδυάζει διάφορες μεθόδους*». Η άποψή του καταγράφηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε1.

Ο συνεντευξιαζόμενος 2 σχολίασε: «*Έγινε κατανόηση των κύριων βασικών εννοιών όπως η από απόσταση εκπαίδευση με e-learning, τις ιστοεξερευνήσεις , τα μικρομαθήματα , την Περιβαλλοντική Εκπαίδευση. Υπήρχε δυσκολία... προφανώς λόγω έλλειψης χρόνου ή και εξοικείωσης με το περιβάλλον του υπολογιστή. Οι απαντήσεις των επιμορφωτών διευκόλυναν στην επίλυση αποριών και στην κατανόηση εννοιών*». Η άποψή του καταγράφηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε1.

Ο συνεντευξιαζόμενος 3 διατύπωσε τα εξής: «*Οι περισσότερες από τις παραπάνω έννοιες μου ήταν ήδη γνωστές. Το σεμινάριο στο ΚΠΕ Έδεσσας με βοήθησε όμως να τις εμπεδώσω καλύτερα. Η έννοια του μικρομαθήματος ήταν κάτι που δεν είχα εφαρμόσει πάλι στο παρελθόν και επειδή έχουν πολλά κοινά στοιχεία με τις ιστοεξερευνήσεις όταν έφυγα από το ΚΠΕ Έδεσσας δεν τα είχα ξεκαθαρίσει στο μυαλό μου. Όμως στην πορεία και με την καθοδήγηση των ανθρώπων του ΚΠΕ πιστεύω ότι κατανόησα σε βάθος όλες τις παραπάνω έννοιες*». Η άποψή του καταγράφηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε1.

Πίνακας 1α				
ΣΥΝΕΝΤΕΥΞΗ/ Συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος, για το σχεδιασμό μαθησιακών δραστηριοτήτων ΕΡΩΤΗΣΗ 1				
E1. "ΟΡΙΣΑ τις έννοιες blended εκπαίδευση, project, ιστοεξερεύνηση και μικρομάθημα ως διαδικασίες μάθησης και ΣΧΕΔΙΑΣΑ μαθήματα με την αξιοποίησή τους, Αλήθειες και Ψέματα"				
ΣΥΝΕΝΤΕΥΞΙΑΖΟΜΕΝΟΙ ΕΚΠΑΙΔΕΥΤΙΚΟΙ	**O1**	**O2**	**O3**	
ΑΛΗΘΕΙΑ	1	1	1	
ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ				
ΨΕΜΑ				
ΔΕΝ ΑΠΑΝΤΗΣΑΝ				

Ο εκπαιδευτικός Z8 παραδέχεται τη συμβολή των ΤΠΕ μέσα από τα εργαλεία του i-cre8 (forum συζητήσεων, παραδείγματα, ενημερωτικό υλικό), κατά την επιμόρφωση (διαχειριστικά, εργαλειακή χρήση), σε σχέση με τη βελτιστοποίηση της απόδοσης στο σχεδιασμό μαθησιακών

σχεδίων (ΜΣ), αφού σχολιάζει ότι: «...*Χάρη όμως στο φόρουμ και τις απαντήσεις των επιμορφωτών μου λύθηκαν οι απορίες. Ήταν πάρα πολύ καλό εργαλείο και πολύ πιο εύχρηστο κατά την άποψή μου!*». Συμπληρώνει όμως παρακάτω ότι «*Τα περισσότερα σχόλια είναι θετικά. Αλλά επειδή για την βελτίωση είναι απαραίτητα και τα αρνητικά σχόλια αυτό που θέλω να θέσω σαν κάτι που με δυσκόλεψε είναι ότι η πλατφόρμα είχε πολλές πληροφορίες που δεν σε αφορούσαν όλες γιατί ήταν για όλες τις τάξεις και αυτό την έκανε να με δυσκολεύει. Ειδικά τώρα που έχουμε πρόσβαση σε όλες τις εργασίες θεωρώ ότι δεν είναι καλά οργανωμένες ώστε να μην χάνουμε χρόνο στο ψάξιμο*». Καθώς ο συγκεκριμένος εκπαιδευτικός αμφιταλαντεύεται μεταξύ δύο θέσεων, καταχωρήθηκε η άποψή του ως αναποφάσιστου.

Οι εκπαιδευτικοί Ζ3 στέκουν με σκεπτικισμό, δηλώνοντας αντίστοιχα: «*Το υλικό ήταν αρκετά ικανοποιητικό και κατατοπιστικό.*», αλλά «*Το σύστημα είχε αρκετές ελλείψεις αλλά και αρκετά περιττά από προηγούμενο μάλλον πρόγραμμα*». Η άποψή τους καταχωρείται ως αναποφάσιστων.

Οι εκπαιδευτικοί Ζ2, Ζ4, Ζ5, Ζ10 δέχονται θετικά την Ε2, δηλώνοντας αντίστοιχα: «*συμφωνώ με την Ζ10...*», «*Υπέροχη διαδικασία σε όλα της τα στάδια, οργάνωση, συνέπεια, ανθρώπινη επαφή. Το μοιράζομαι αυτό με τους φίλους μου....Το υλικό της πλατφόρμας πλήρες! Άνοιξαν ΝΕΟΙ ορίζοντες στη δουλειά μου στο σχολείο..και ως εμψυχώτρια*», «*Διαφωνώ με το Ζ3. Το σύστημα προσπάθησε να δώσει στους επιμορφούμενους αρκετές πληροφορίες σφαιρικά. Ο καθένας στη συνέχεια είχε την δυνατότητα της επιλογής για χρήση*», «*Ναι. Η περιβαλλοντική εκπαίδευση κύριο στόχο έχει να αναπτύξει μια άλλη συμπεριφορά όλων μας απέναντι στα κοινωνικά, περιβαλλοντικά, πολιτικά προβλήματα (αυτό είναι το περιβάλλον μας): την ομαδοσυνεργατική! Μόνον έτσι, πιστεύω ότι μπορούμε ν' αλλάξουμε από την απομόνωση, τον ωχαδερφισμό . Παίρνουμε θέση......*».

Στη συζήτηση δεν συμμετείχαν 5 εκπαιδευτικοί.

Πίνακας 2											
FOCUS GROUP / Συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος, για το σχεδιασμό μαθησιακών δραστηριοτήτων ΕΡΩΤΗΣΗ 2											
Ε2. «ΥΠΟΣΤΗΡΙΧΘΗΚΑ ΕΠΑΡΚΩΣ από τα εργαλεία του i-cre8 (forum συζητήσεων, παραδείγματα, ενημερωτικό υλικό)ώστε να ΒΕΛΤΙΣΤΟΠΟΙΗΣΩ και να ΟΛΟΚΛΗΡΩΣΩ τα μαθησιακά σχέδια που δημιούργησα στο πλαίσιο του παρόντος σεμιναρίου, Αλήθειες και Ψέματα "											
ΕΚΠΑΙΔΕΥΤΙΚΟΙ	**Ο1**	**Ο2**	**Ο3**	**Ο4**	**Ο5**	**06**	**Ο7**	**Ο8**	**Ο9**	**10**	**11**
ΑΛΗΘΕΙΑ		1		1	1					1	
ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ			0					0			
ΨΕΜΑ											
ΔΕΝ ΑΠΑΝΤΗΣΑΝ	-					-	-		-		-

Ο συνεντευξιαζόμενος 1 διατύπωσε τα εξής: «*Η πλατφόρμα ήταν αρκετά εύχρηστη με κατανοητή δομή. Απλά ίσως για κάποιους θα βοηθούσε να αφιερώναμε στην Έδεσσα άλλη μία διδακτική ώρα για τη χρησιμοποίηση της*». Η άποψή του καταγράφηκε ως αναποφάσιστου σε σχέση με το διερευνητικό ερώτημα Ε2.

Ο συνεντευξιαζόμενος 2 διατύπωσε τα εξής: «*Η δομή της πλατφόρμας ίσως ήταν λίγο πολύπλοκη ωστόσο με λίγο περισσότερο ψάξιμο ήταν δυνατό να γίνει αφαίρεση περιττών στοιχείων και άριστη αξιοποίηση των χρήσιμων στοιχείων*» & «*Ναι, θεωρώ ότι μέσω του προγράμματος, καλλιεργήθηκαν πολύ καλά δεξιότητες σχεδιασμού εκπαιδευτικού υλικού όχι μόνο για το θέμα της ανακύκλωσης, αλλά και για άλλα θέματα, με τη μέθοδο της ιστοεξερεύνησης και του μικρομαθήματος, κλπ*». . Η άποψή του καταγράφηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε2.

Ο συνεντευξιαζόμενος 3 διατύπωσε τα εξής: «*Σε αυτή την δεξιότητα τα παραδείγματα της πλατφόρμας βοήθησαν σε πολύ μεγάλο βαθμό. Θεωρώ πως ήταν όπως έπρεπε. Ήταν απλά και δεν σε μπέρδευαν καθόλου. Μπορούσες να τα μελετήσεις για λίγο χρόνο και να καταλάβεις αμέσως το*

νόημά τους. Θεωρώ ότι έπαιξαν καθοριστικό ρόλο στο σχεδιασμό του εκπαιδευτικού υλικού μου». Η άποψή του καταγράφηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε2.

Πίνακας 2α **ΣΥΝΕΝΤΕΥΞΗ/ Συμβολή των ΤΠΕ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος, για το σχεδιασμό μαθησιακών δραστηριοτήτων ΕΡΩΤΗΣΗ 2**				
Ε2. «ΥΠΟΣΤΗΡΙΧΘΗΚΑ ΕΠΑΡΚΩΣ από τα εργαλεία του i-cre8 (forum συζητήσεων, παραδείγματα, ενημερωτικό υλικό)ώστε να ΒΕΛΤΙΣΤΟΠΟΙΗΣΩ και να ΟΛΟΚΛΗΡΩΣΩ τα μαθησιακά σχέδια που δημιούργησα στο πλαίσιο του παρόντος σεμιναρίου, Αλήθειες και Ψέματα ”				
ΣΥΝΕΝΤΕΥΞΙΑΖΟΜΕ ΝΟΙ ΕΚΠΑΙΔΕΥΤΙΚΟΙ	**Ο1**	**Ο2**	**Ο3**	
ΑΛΗΘΕΙΑ		1	1	
ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ	0			
ΨΕΜΑ				
ΔΕΝ ΑΠΑΝΤΗΣΑΝ				

Συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους, για το σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια

Το ερευνητικό ενδιαφέρον στο σημείο αυτό εστιάζεται γύρω από εκείνα τα δεδομένα της ερευνητικής διαδικασίας που αφορούσαν στο **διερευνητικό ερώτημα Δ.1.2**, δηλαδή στη συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους, για το σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια

Οι εκπαιδευτικοί Ζ2, Ζ3, Ζ4, Ζ8, Ζ10 δέχονται θετικά την Ε3, δηλώνοντας αντίστοιχα: «*Ένα θέμα που με προβλημάτισε, είναι κατά πόσον ένα περιβαλλοντικό πρόγραμμα θα πρέπει να περιλαμβάνει όλο το επιστημονικό υπόβαθρο του πεδίου, ή μέσα από δραστηριότητες και ομαδοσυνεργατική δουλειά θα καλλιεργήσει στους μαθητές την περιβαλλοντική ευαισθητοποίηση. Κατέληξα λοιπόν, ότι σίγουρα θα πρέπει να δίνουμε στους μαθητές το επιστημονικό πλαίσιο προκειμένου να κατανοούν τις ανθρώπινες ενέργειες και τις επιπτώσεις τους στο περιβάλλον, αλλά να στοχεύουμε περισσότερο στις δραστηριότητες και τη βιωματική μάθηση για να μην καταντήσει το πρόγραμμα απλά μία λύση για να γλιτώσουν οι μαθητές ώρες από άλλα μαθήματα.*», «*Μέσα από τη διαδικασία του μικρομαθήματος ή καθώς και των δραστηριοτήτων (επίσκεψη) επιτυγχάνεται η κατανόηση βασικών εννοιών*» και επίσης «*Σίγουρα το υλικό σας με καθοδήγησε. Ίσως χωρίς αυτό να μην μπορούσα να έχω αυτό το αποτέλεσμα.*», «*ναι*» «*Θεωρώ ότι είχα σαν πρώτο στόχο μέσα από όλο το πρόγραμμα να καλλιεργηθεί πολιτειότητα στον μαθητή και να γίνει ενεργό μέλος. Πιστεύω ότι σε ικανοποιητικό βαθμό το κατάφερα.*», «*αυτοαξιολογώντας τη δουλειά μου έχω την εντύπωση πως αυτό το σημείο θα μπορούσε να είναι η τελική δραστηριότητα του χαριστικού παζαριού στο σχολείο και κατά πόσο αυτό θα μπορούσε να εδραιωθεί σα θεσμός διαχρονικά.*» και επίσης «*ναι, ο μπούσουλας ήταν καθοριστικός γιατί θα μπορούσαμε να πλατειάσουμε απέραντα....*».

Ο εκπαιδευτικός Ζ5, αν και προηγουμένως σχολιάζει θετικά την όλη διαδικασία, καταλήγει στην εξής δήλωση «*Επιμένω σε μια επαναληπτική περιληπτική ημερίδα. Θα βοηθήσει τον καθένα μας να σταθούμε στα πόδια μας αυτόνομα και ολοκληρωμένα στην εκτέλεση κάποιου προγράμματος*». Εντέλει η άποψή του καταχωρείται ως αρνητική.

Πίνακας 3
FOCUS GROUP/ Συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους, για το σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια ΕΡΩΤΗΣΗ 3
Ε3. «ΥΠΟΣΤΗΡΙΧΘΗΚΑ ΕΠΑΡΚΩΣ στο πλαίσιο της επιμόρφωσης (ΚΠΕ, εισηγήσεις και πρακτικές για την ΕΑ, το δημοκρατικό/αποτελεσματικό/αειφορικό σχολείο, αναφορές στη μαθητική πολιτειότητα, αναφορές στις συνεργατικές μαθησιακές διαδικασίες, στη συστημική σκέψη, στην κριτική σκέψη, διαθεματικό υποστηρικτικό υλικό, παραδείγματα, ενημερωτικό υλικό) ώστε να ΒΕΛΤΙΣΤΟΠΟΙΗΣΩ και να ΟΛΟΚΛΗΡΩΣΩ τα μαθησιακά σχέδια που δημιούργησα στο πλαίσιο του παρόντος σεμιναρίου με αναφορά στην ΕΑ, Αλήθειες και Ψέματα»

ΕΚΠΑΙΔΕΥΤΙΚΟΙ	Ο1	Ο2	Ο3	Ο4	Ο5	06	Ο7	Ο8	Ο9	10	11
ΑΛΗΘΕΙΑ		1	1	1				1		1	
ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ											
ΨΕΜΑ					-1						
ΔΕΝ ΑΠΑΝΤΗΣΑΝ											

Συνεντευξιαζόμενος 1 δήλωσε: «*Ελπίζω το εκπαιδευτικό υλικό που δημιούργησα να χαρακτηρίζεται από τις παραπάνω έννοιες. Θεωρώ ότι επειδή ακριβώς υπάρχει το προσωπικό στοιχείο και δεδομένου ότι οι νέες τεχνολογίες είναι ένα πολύ δημιουργικό εργαλείο, κάθε εκπαιδευόμενος θα έχει δημιουργήσει ένα εξίσου ενδιαφέρον υλικό*» & «*Ο «περιβαλλοντικός αλφαβητισμός» καλλιεργεί δεξιότητες και γνώσεις για σφαιρική και ολιστική θεώρηση των πραγμάτων και έχει ως απώτερο σκοπό την απόκτηση προσωπικής και κοινωνικής ευθύνης. Έτσι τα περιβαλλοντικά προγράμματα εντάσσουν πιο ομαλά τους μαθητές στη σχολική κοινότητα*». Η συγκεκριμένη άποψη καταχωρήθηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε3.

Συνεντευξιαζόμενος 2 δήλωσε: «*Ναι, γιατί θεωρώ ότι αυτός είναι ο ρόλος του σχολείου. Άλλωστε έγιναν εισηγήσεις στο σεμινάριο και αυτό με έκανε να προσέξω ιδιαίτερα για να συμπεριλάβω και αυτές τις διαστάσεις (πολιτειότητα μαθητή, κ.ά.) στο υλικό που σχεδίασα*» & «*Ένα θέμα που με προβλημάτισε ... είναι κατά πόσον ένα περιβαλλοντικό πρόγραμμα θα πρέπει να περιλαμβάνει όλο το επιστημονικό υπόβαθρο του πεδίου, ή μέσα από δραστηριότητες και ομαδοσυνεργατική δουλειά θα καλλιεργήσει στους μαθητές την περιβαλλοντική ευαισθητοποίηση. Με βάση την άποψη συναδέλφου (focus group) θα πρέπει να δίνουμε στους μαθητές το επιστημονικό πλαίσιο προκειμένου να κατανοούν τις ανθρώπινες ενέργειες και τις επιπτώσεις τους στο περιβάλλον, αλλά να στοχεύουμε περισσότερο στις δραστηριότητες και τη βιωματική μάθηση για να μην καταντήσει το πρόγραμμα απλά μία λύση για να γλιτώσουν οι μαθητές ώρες από άλλα μαθήματα.*». Η συγκεκριμένη άποψη καταχωρήθηκε ως θετική σε σχέση με το διερευνητικό ερώτημα Ε3.

Συνεντευξιαζόμενος 3 δήλωσε: «*Θεωρώ ότι η κάθε δράση που συμβαίνει στο σχολείο θα πρέπει να καλλιεργεί πολιτειότητα στο μαθητή και να του δίνει ενεργό ρόλο στη σχολική κοινότητα. Έτσι λοιπόν και έχοντας πάντα στο νου μου το δάσκαλο ως απλό συντονιστή, θεωρώ ότι με το εκπαιδευτικό υλικό που σχεδίασα προσπαθώ να καλλιεργήσω πολιτειότητα στο μαθητή και να του δώσω ενεργό ρόλο στη σχολική κοινότητα*» & «*Το πρόγραμμα βοήθησε καθοριστικά στο να μπορώ να σχεδιάζω εκπαιδευτικό υλικό ... Βασικό ρόλο έπαιξαν τα παραδείγματα που όπως έχω προαναφέρει ήταν πολύ απλά, με διαθεματικό περιεχόμενο και αυτό σε βοηθούσε στην κατανόηση... Πιστεύω ότι στο εκπαιδευτικό υλικό που σχεδίασα έχω αξιοποιήσει προηγούμενες εμπειρίες και γνώσεις που είχα, οι οποίες προωθούν την κριτική σκέψη και την δημιουργικότητα*». Η συγκεκριμένη άποψη καταχωρήθηκε ως αναποφάσιστου σε σχέση με το διερευνητικό ερώτημα Ε3.

<table>
<tr><td colspan="5" align="center">**Πίνακας 3.α**
FOCUS GROUP/ Συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους, για το σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια ΕΡΩΤΗΣΗ 3</td></tr>
<tr><td colspan="5">Ε3. «ΥΠΟΣΤΗΡΙΧΘΗΚΑ ΕΠΑΡΚΩΣ στο πλαίσιο της επιμόρφωσης (ΚΠΕ, εισηγήσεις και πρακτικές για την ΕΑ, το δημοκρατικό/αποτελεσματικό/αειφορικό σχολείο, αναφορές στη μαθητική πολιτειότητα, αναφορές στις συνεργατικές μαθησιακές διαδικασίες, στη συστημική σκέψη, στην κριτική σκέψη, διαθεματικό υποστηρικτικό υλικό, παραδείγματα, ενημερωτικό υλικό) ώστε να ΒΕΛΤΙΣΤΟΠΟΙΗΣΩ και να ΟΛΟΚΛΗΡΩΣΩ τα μαθησιακά σχέδια που δημιούργησα στο πλαίσιο του παρόντος σεμιναρίου με αναφορά στην ΕΑ, Αλήθειες και Ψέματα»</td></tr>
<tr><td>**ΣΥΝΕΝΤΕΥΞΙΑΖΟΜΕΝΟΙ ΕΚΠΑΙΔΕΥΤΙΚΟΙ**</td><td>**Ο1**</td><td>**Ο2**</td><td>**Ο3**</td><td></td></tr>
<tr><td>ΑΛΗΘΕΙΑ</td><td>1</td><td>1</td><td></td><td></td></tr>
<tr><td>ΔΕΝ ΜΠΟΡΩ ΝΑ ΑΠΟΦΑΣΙΣΩ</td><td></td><td></td><td>0</td><td></td></tr>
<tr><td>ΨΕΜΑ</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ΔΕΝ ΑΠΑΝΤΗΣΑΝ</td><td></td><td></td><td></td><td></td></tr>
</table>

Συμπεράσματα

Η επιστημονική έρευνα ανέδειξε την παρουσία των ΤΠΕ στην εκπαίδευση, ως καθοριστικό παράγοντα διαφοροποίησης του έργου του εκπαιδευτικού, η αποτελεσματικότητα του οποίου είναι άμεσα συνυφασμένη με την ετοιμότητά του και την επάρκειά του για να τις εφαρμόσει αποτελεσματικά στην πράξη. Στην προσπάθεια των ερευνητών να διαπιστωθεί ο βαθμός επάρκειας των εκπαιδευτικών του δείγματος να σχεδιάσουν ΜΣ, τα οποία στη συνέχεια θα εφαρμόσουν στην πράξη, διερευνήθηκε πρώτον η κατανόηση και εξοικείωσή τους με βασικές έννοιες που συνδέονται με τις ΤΠΕ (εσωτερικά εργαλεία) και στη συνέχεια το αποτέλεσμα που επήλθε κατά την προσπάθεια αξιοποίησής τους. Συγκεκριμένα το 100 % όσων συμμετείχαν στο focus group –το ποσοστό αυτό αντιστοιχεί στο 55% του συνόλου του δείγματος-, συμφώνησαν στην συμβολή των ΤΠΕ για την καλλιέργεια εκείνων των δεξιοτήτων που τους επέτρεψαν να ολοκληρώσουν τα ΜΣ που δημιούργησαν στο πλαίσιο της επιμόρφωσης, μέσω και της κατανόησης και εξοικείωσή τους με βασικές έννοιες που συνδέονται με αυτές. Οι παραπάνω θέσεις συνάδουν και με τα αποτελέσματα των συνεντευξιαζόμενων, αφού και οι τρεις συμφώνησαν με τα ανωτέρω. Καταγράφηκε αποχή από τη συζήτηση σε ποσοστό 45%.

Σχετικά με τη συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους, για το σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια (διερευνητικό ερώτημα Δ.1.2), παρατίθενται τα ακόλουθα:

Το παιδαγωγικό πλαίσιο της ΕΑ καθορίζεται από τα εξής χαρακτηριστικά: καλλιέργεια αξιών, κριτική σκέψη, συνεργατική μάθηση, διαθεματικότητα, συστημική σκέψη, συμμετοχή σε δημοκρατικές διαδικασίες, ικανότητα δράσης (Δημητρίου, 2009). Αυτή καθεαυτή η επιμόρφωση λειτούργησε σύμφωνα με το προλεγόμενο παιδαγωγικό πλαίσιο (*σκοποθεσία/πρόγραμμα επιμόρφωσης*), αφού κάθε επιμορφούμενος εκπαιδευτικός διαδραμάτιζε ενεργητικό ρόλο στην εξέλιξη της εκπαίδευσής του, με εμπλοκή της κριτικής/συστημικής σκέψης του (σχεδιασμός πρωτότυπων ΜΣ), με ικανότητα δράσης (δημιουργικά εργαστήρια), με συμμετοχή σε δημοκρατικές διαδικασίες και συνεργατική μάθηση (focus group), καλλιέργεια αξιών (εισήγηση για την ΕΑ, με αναφορά στο κίνημα της μετανεωτερικότητας στην Εκπαίδευση, πρακτικές της επιμόρφωσης). Η διερεύνηση, λοιπόν, της συμβολής της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς του ερευνητικού δείγματος ως αποτέλεσμα της επιμόρφωσής τους για το σχεδιασμό μαθησιακών δραστηριοτήτων, ουσιαστικά συνίσταται α)στην ανίχνευση του βαθμού

κατανόησης των νεοεισαχθέντων εννοιών, ως αποτέλεσμα της επιμόρφωσης (ΚΠΕ, εισηγήσεις και πρακτικές για την ΕΑ, το δημοκρατικό/αποτελεσματικό/αειφορικό σχολείο, αναφορές στη μαθητική πολιτειότητα, αναφορές στις συνεργατικές μαθησιακές διαδικασίες, στη συστημική σκέψη, στην κριτική σκέψη, διαθεματικό υποστηρικτικό υλικό), και β)της αποτελεσματικότητας της επιμόρφωσης στο πλαίσιο της ΕΑ, μέσω του πλήθους των παραδοτέων ΜΣ από τους συμμετέχοντες στο ερευνητικό δείγμα.

Συγκεκριμένα για τις ανάγκες της έρευνας αντλήθηκαν δεδομένα από το focus group και τις συνεντεύξεις. Σύμφωνα με αυτά το 83 % όσων συμμετείχαν στο focus group –το ποσοστό αυτό αντιστοιχεί στο 45% του συνόλου του δείγματος-, συμφώνησαν στην συμβολή της ΕΑ για την καλλιέργεια εκείνων των δεξιοτήτων που τους επέτρεψαν να βελτιστοποιήσουν και να ολοκληρώσουν τα ΜΣ που δημιούργησαν στο πλαίσιο της επιμόρφωσης, εντάσσοντας στις μαθησιακές δραστηριότητες στοιχεία όπως η καλλιέργεια αξιών, η κριτική σκέψη, η συνεργατική μάθηση, η διαθεματικότητα, η συστημική σκέψη, η συμμετοχή σε δημοκρατικές διαδικασίες και η ικανότητα ενεργοποίησης και δράσης (μαθητική πολιτειότητα). Ένα ποσοστό της τάξης του 17% των συμμετεχόντων στο chat – αφορά στο 9% του δείγματος- διαφώνησε επί του θέματος. Οι παραπάνω θέσεις είναι συγγενικές με τα αποτελέσματα των συνεντευξιαζόμενων, οι δύο από τους οποίους συμφώνησαν, ενώ ο ένας παραμένει αναποφάσιστος. Καταγράφηκε αποχή από τη συζήτηση σε ποσοστό 45%. Το σύνολο του δείγματος παρέδωσε μετά την ολοκλήρωση της επιμόρφωσης πρωτότυπα μαθησιακά σχέδια που δημιούργησε στη διάρκειά της.

Άποψη των ερευνητών είναι ότι τα ανωτέρω αποτελέσματα προέκυψαν εξ αιτίας της αξιοποίησης, κατά τον εκπαιδευτικό σχεδιασμό μέσω ΤΠΕ (σκοποθεσία και περιεχόμενο επιμόρφωσης), και νέων σχεδιαστικών μοντέλων, τα οποία χρησιμοποιούν και ενσωματώνουν τις ΤΠΕ στην εκπαιδευτική διαδικασία. Οι υπάρχουσες μέθοδοι διδακτικού σχεδιασμού αποδεδειγμένα αδυνατούν να αναδείξουν τις δυνατότητες των ΤΠΕ. Οι βασικοί λόγοι στους οποίους συνίσταται η παραπάνω αδυναμία, σύμφωνα με τους Φεσάκη, Δημητρακοπούλου εντοπίζονται στην ανάγκη ανάπτυξης νέων μεθόδων, οι οποίες πέραν των άλλων θα πρέπει να είναι εφαρμόσιμες από το μέσο εκπαιδευτικό, καθώς αυτός θα αναλαμβάνει ενεργητικό ρόλο στο μαθησιακό σχεδιασμό που ενσωματώνει και αξιοποιεί εργαλεία και μέσα ΤΠΕ με τρόπο φυσικό και ολιστικό (Φεσάκης & Δημητρακοπούλου, 2009). Τελικά,

- ▪ Σε εφαρμογή των ανωτέρω θέσεων, μεταξύ των νέων σχεδιαστικών μοντέλων που αξιοποιήθηκαν κατά τη διάρκεια της επιμόρφωσης, συγκαταλέγονται σχεδιαστικά μοντέλα όπως είναι οι ιστοεξερευνήσεις (webquests), τα μικρομαθήματα, τα σχέδια εργασίας (projects). Τα μοντέλα αυτά εντέλει ενδείκνυνται να χρησιμοποιηθούν για το σχεδιασμό μαθησιακών δραστηριοτήτων που αναφέρονται στην ΕΑ.
- • Το υφιστάμενο θεσμικό πλαίσιο των ΣΔ και το παιδαγωγικό πλαίσιο λειτουργίας τους, δίνουν τη δυνατότητα εφαρμογής εκπαιδευτικών πρακτικών που διέπονται από τις αρχές και τις αξίες της μετανεωτερικότητας. Η αξιοποίηση αυτής της δυνατότητας στην σχολική ζωή προϋποθέτει, μεταξύ άλλων, την καλλιέργεια κατάλληλων δεξιοτήτων στους εκπαιδευτικούς, ώστε να ανταποκρίνονται στο νέο τους ρόλο. Η ανάγκη αυτή καλύφθηκε στη συγκεκριμένη επιμόρφωση μέσα από τη σκοποθεσία και το περιεχόμενό της, αλλά και από το γεγονός ότι το ισχύον θεσμικό πλαίσιο των ΣΔ, ευνοούσε[7], σχεδιάστηκε να ευνοεί[8] και ευνοεί την καλλιέργεια και ανάπτυξη αυτών των δεξιοτήτων.
- ▪ Στο πλαίσιο μιας μετανεωτερικής θεώρησης της συγκεκριμένης επιμόρφωσης, προσεγγίστηκε ο εκπαιδευτικός σαν αυθύπαρκτη οντότητα, αποδίδοντας σε αυτόν δυνάμεις και δυνατότητες που προέρχονται από την εμπειρία του, τη συναισθηματική και κοινωνική νοημοσύνη του (δημιουργία ΜΣ από τους επιμορφούμενους), σε μία προσπάθεια κατάληξης σε «μεθοδολογικό ατομισμό» (Αλεξίου Θ. 2002: 210 - 228) στο σχεδιασμό της εκπαιδευτικής πρακτικής.

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[7]ΥΠΕΠΘ.(2008).*ΣΧΕΔΙΑΣΜΟΣ ΚΑΙ ΥΛΟΠΟΙΗΣΗ ΠΡΟΓΡΑΜΜΑΤΩΝ ΣΧΟΛΙΚΩΝ ΔΡΑΣΤΗΡΙΟΤΗΤΩΝ.* Εγκύκλιος. /81687 / Γ7/9.07.2009. Αθήνα: ΥΠΕΠΘ.
ΥΠΕΠΘ. (2008). *Ανάπτυξη των Σχολικών Δραστηριοτήτων κατά το σχολικό έτος 2008-09.* Εγκύκλιος. /150401/Γ7/20-11-2008. Αθήνα: ΥΠΕΠΘ.
[8] Στυλιανίδης, Ε., (2011), *Όλα είναι θέμα Παιδείας.* σελ.349-384, Αθήνα: Μίνωας

- Οι συντελεστές της επιμόρφωσης (διοργανωτές και εκπαιδευτές) αναγνωρίζοντας τον πλούτο των εμπειριών που οι εκπαιδευτικοί κατείχαν μέσα από την τάξη, τους συμπεριφέρονταν ως ίσους όσον αφορά την εμπειρία και τη γνώση και τους επέτρεπαν να ακούγονταν ελεύθερα οι απόψεις τους (Lieb, 1991), οι οποίες συχνά ήταν αντιδιαμετρικά αντίθετες από αυτές των επιμορφωτών.
- Η κουλτούρα μίας μετανεωτερικής εκπαιδευτικής δομής, όπως είναι τα ΚΠΕ, επιτρέπει καινοτομίες αναφορικά με τρόπους αναδόμησης του αναλυτικού προγράμματος και του σχολικού περιβάλλοντος. Αυτό επιτυγχάνεται μέσα από την ανάδειξη του εκπαιδευτικού σε πρωταγωνιστή και δημιουργικό διαμορφωτή της σχολικής ζωής, κινητοποιώντας τον να συνειδητοποιήσει τη δική του συμβολή στο νέο ζητούμενο της σύγχρονης εποχής: *τη δημιουργία του μελλοντικού αυτόνομου κριτικού πολίτη* (Γιαβρίμης, Παπάνης κ.ά., 2010). Η επιμόρφωση λοιπόν κρίνεται ότι ενεργοποιεί, μέσα από τον προσανατολισμό της διδακτικής πράξης σε στόχους αναπτυξιακούς και μετασχηματιστικούς, διαδικασίες ευαισθητοποίησης σχετικά με τις νέες παιδαγωγικές αντιλήψεις.
- Οι ΤΠΕ συμβάλουν θετικά στην καλλιέργεια εκείνων των δεξιοτήτων που επιτρέπουν στους επιμορφούμενους να βελτιστοποιήσουν και να ολοκληρώσουν τα ΜΣ που δημιούργησαν στο πλαίσιο της επιμόρφωσης, μέσω εξωτερικών εργαλείων.
- Οι ΤΠΕ συμβάλουν θετικά στην καλλιέργεια εκείνων των δεξιοτήτων που τους επιτρέπουν να ολοκληρώσουν τα ΜΣ που δημιούργησαν στο πλαίσιο της επιμόρφωσης, μέσω και της κατανόησης και εξοικείωσή τους με βασικές έννοιες που συνδέονται με αυτές.
- αναφορικά με τις παραπάνω θέσεις του δείγματος, έδειξε ότι δεν επηρεάζονται και δεν συνδέονται με το φύλο, την ηλικία και τις βασικές σπουδές των εκπαιδευτικών.
- αναφορικά με το διερευνητικό υποερώτημα Δ.1.2, μέσα από βιβλιογραφική έρευνα, Focus Group & συνεντεύξεις με χρήση ΤΠΕ, όπου συμμετείχαν οι εκπαιδευτικοί του δείγματος, ανέδειξε τα εξής:
- Η Εκπαίδευση για την Αειφορία προσεγγίζει τη γνώση και τη μαθησιακή πράξη ιδωμένες από παρόμοια οπτική με αυτήν της μετανεωτερικής θεώρησης, καθώς αξιοποιεί την οικολογική νοημοσύνη η οποία παρέχει τη δυνατότητα να μάθουμε από την εμπειρία μας και να φερθούμε αποτελεσματικά απέναντι στο περιβάλλον μας (Goleman 2009). Μέσα από διαφορετικές ιδεολογικές διαδρομές αλλά καταλήγοντας στην ίδια θέση, ο μεταμοντερνισμός αμφισβητεί την κυριαρχία του επιστημονικού λόγου, αφού κατά τον Βέλτσο «η εποχή του μηδενισμού στην οποία ...εισερχόμαστε, προσφέρει την ευκαιρία μιας υπέρβασης, μιας κυριολεκτικής διάρρηξης των ορθολογικών δεσμών εντός των οποίων έχουν εγκλωβίσει οι σύγχρονες επιστήμες τα δημιουργικά-αισθητικά δυναμικά του κοινωνικού γλωσσικού παιγνίου». (1988, 1990). Συμπερασματικά μπορεί να ειπωθεί ότι στις μέρες μας ο αφηγηματικός λόγος (λόγος μη επιστημονικός), κατεξοχήν εμπειρικός, διεκδικεί και παίρνει ισότιμη θέση (με τον επιστημονικό) στην αναζήτηση της αλήθειας και της γνώσης.
- Η Εκπαίδευση για την Αειφορία (ΕΑ), ως πλαίσιο αναφοράς κατά τον εκπαιδευτικό σχεδιασμό που διέπεται από μετανεωτερικό πνεύμα, συμβάλει θετικά στο έργο των εκπαιδευτικών με την καλλιέργεια δεξιοτήτων στο σχεδιασμό μαθησιακών δραστηριοτήτων. Αυτό οφείλεται στο παιδαγωγικό πλαίσιο της ΕΑ που καθορίζεται από τα ακόλουθα χαρακτηριστικά: καλλιέργεια αξιών, κριτική σκέψη, συνεργατική μάθηση, διαθεματικότητα, συστημική σκέψη, συμμετοχή σε δημοκρατικές διαδικασίες, ικανότητα δράσης (Δημητρίου, 2009). Τα συγκεκριμένα χαρακτηριστικά αποτελούν κοινό τόπο και για τη λειτουργία του αειφορικού, δημοκρατικού και αποτελεσματικού σχολείου, στο περιβάλλον του οποίου, μεταξύ άλλων, μαθητές και εκπαιδευτικοί α)θα πρέπει να συμμετέχουν σ' έναν συνεργατικό σχεδιασμό και να οδηγούνται σε αποφάσεις που θα ανταποκρίνονται στα ενδιαφέροντα, τις επιδιώξεις και τα συμφέροντα και των δύο πλευρών, β) θα πρέπει να επικοινωνούν μεταξύ τους με μια διαπροσωπική επικοινωνία στηριγμένη στη συνεργασία, αναπτύσσοντας επομένως σχέσεις συνεργατικές και απορρίπτοντας τις ανταγωνιστικές, γ) μέσα από μία διαχείριση της πραγματικότητας που προσφέρει περισσότερες από μία εναλλακτικές λύσεις.

- Στη διάρκεια μιας επιμόρφωσης, όπου η παιδευτική διαδικασία έχει ως αντικείμενο εκπαίδευσης τον ίδιο τον εκπαιδευτικό, όταν αυτή λειτουργεί σύμφωνα με το προαναφερόμενο παιδαγωγικό πλαίσιο, οφείλει να διευκολύνει κάθε επιμορφούμενο να διαδραματίσει ενεργητικό ρόλο στην εξέλιξη της εκπαίδευσής του, με εμπλοκή της κριτικής/συστημικής σκέψης του (σχεδιασμός πρωτότυπων ΜΣ), με ικανότητα δράσης (δημιουργικά εργαστήρια), με συμμετοχή σε δημοκρατικές διαδικασίες και συνεργατική μάθηση (focus group), καλλιέργεια αξιών (εισήγηση για την ΕΑ, με αναφορά στο κίνημα της μετανεωτερικότητας στην Εκπαίδευση, πρακτικές της επιμόρφωσης).
- Η συμβολή της ΕΑ για την καλλιέργεια δεξιοτήτων σε εκπαιδευτικούς, ως αποτέλεσμα της επιμόρφωσής τους, στο σχεδιασμό μαθησιακών δραστηριοτήτων, ουσιαστικά συνίσταται α)στον προσδιορισμό αρχών και στην κατανόηση βασικών εννοιών που σχετίζονται με τον μετανεωτερικό εκπαιδευτικό σχεδιασμό στο πλαίσιο της ΕΑ (ΚΠΕ, εισηγήσεις και πρακτικές για την ΕΑ, το δημοκρατικό/αποτελεσματικό/αειφορικό σχολείο, αναφορές στη μαθητική πολιτειότητα, αναφορές στις συνεργατικές μαθησιακές διαδικασίες, στη συστημική σκέψη, στην κριτική σκέψη, διαθεματικό υποστηρικτικό υλικό), και β)στα παραδοτέα ΜΣ ως προϊόν της επιμόρφωσης, σε συνάφεια με το πλήθος τους (τουλάχιστον ένα από κάθε εμπλεκόμενο) και στο περιεχόμενό τους (οι μαθησιακές δραστηριότητες να χαρακτηρίζονται από την καλλιέργεια αξιών, κριτικής σκέψης, συνεργατικής μάθησης, διαθεματικότητας, συστημικής σκέψης, ώθησης για συμμετοχή σε δημοκρατικές διαδικασίες και δράση -μαθητική πολιτειότητα-).
– αναφορικά με τα προαναφερόμενα υποερωτήματα και μετά από συσχέτιση των συμπερασμάτων τους και βιβλιογραφική ανασκόπηση, απαντά στο διερευνητικό ερώτημα Δ.1, ως εξής:
▪ Αναγνωρίστηκε θετικά η συμβολή των ΤΠΕ και της Εκπαίδευσης για την Αειφορία (ΕΑ), κατά την εμπλοκή τους σε επιμορφωτικές παρεμβάσεις για εκπαιδευτικούς, επηρεάζοντας με μεταστροφή ή ακόμη και με ενίσχυση των παιδαγωγικών αντιλήψεων των επιμορφούμενων -με απόρριψη της παραδοσιακής και με προσέγγιση υπέρ της κονστρουκτιβιστικής θεώρησης της παιδαγωγικής πρακτικής που σχεδίασαν να ακολουθήσουν-. Στις μέρες μας ο αφηγηματικός λόγος (λόγος μη επιστημονικός), κατεξοχήν εμπειρικός, διεκδικεί και παίρνει ισότιμη θέση (με τον επιστημονικό) στην αναζήτηση της αλήθειας και της γνώσης. Η παρουσία των ΤΠΕ και το παιδαγωγικό πλαίσιο της ΕΑ, κάτω από το πρίσμα του μεταμοντερνισμού, επιτρέπει και διευκολύνει τη δημιουργία μιας λειτουργικής σχέσης που συνδέει την εσωτερική κουλτούρα του εκπαιδευτικού με την εξωτερική κουλτούρα των συντελεστών και λοιπών εμπλεκομένων σε παρεμβάσεις επιμορφωτικού χαρακτήρα, και η οποία οδηγεί σε ένα προϊόν καθόλα πρωτότυπο και συγχρόνως αξιοποιήσιμο προς όφελος της εκπαίδευσης. Η λογική της εποικοδομισμικής υπόθεσης (constructivism) για τη μάθηση σε σύγκλιση με την κατά τους Hollan, Hutchins & Kirsh (2000) θεωρία του «κατανεμημένου γιγνώσκειν» (distributed cognition), καθοδηγεί τον εκπαιδευτικό να κατασκευάζει τη δική του προσωπική γνώση, με την αλληλεπίδραση και διασύνδεσή του (interface) με κατασκευάσματα/μηχανές (ΤΠΕ), εσωτερικές (υποκειμενικές διεργασίες) και εξωτερικές αναπαραστάσεις. Οι συμβολικές αναπαραστάσεις αποτελούν μια μόνο κατηγορία αυτών των μορφών συντονισμού που μπορούν να αναπτυχθούν ανάμεσα στον άνθρωπο και τη μηχανή. Συμβολικές αναπαραστάσεις αποτελούν και οι παιδαγωγικές αντιλήψεις των εκπαιδευτικών.
▪ Η κατανόηση από τους εκπαιδευόμενους εννοιών, διαδικασιών, εκπαιδευτικών μεθόδων και εργαλείων, που σχετίζονται με τις ΤΠΕ μέσα από τη χρήση περιβάλλοντος κι εργαλείων ΤΠΕ, ως περιεχόμενο επιμόρφωσης, συνεισφέρει στην επίδραση των παιδαγωγικών τους αντιλήψεων. Αυτό το αποτέλεσμα ενισχύεται από το βαθμό χειραφέτησης που επιτυγχάνουν οι εκπαιδευτικοί στην προσπάθειά τους, μέσω και των ΤΠΕ, να αποκτήσουν δεξιότητες που τους επιτρέπουν να βελτιστοποιήσουν τις δυνατότητές τους για χάραξη προσωπικού εκπαιδευτικού σχεδιασμού στη σχολική τους ζωή. (σχεδιασμός ΜΣ μέσω εξωτερικών εργαλείων).

- Η χωροθέτηση της αειφορίας στον εννοιολογικό χάρτη ιδεών, περικλείει την έννοιά της μεταξύ των πόλων ενός τριγώνου που αντιπροσωπεύουν τον άνθρωπο, την κοινωνία και το περιβάλλον. Κάθε πλευρά αυτού του τριγώνου αντιστοιχεί στις μεταξύ τους σχέσεις, οι οποίες ανάλογα με τη βαρύτητα και τη δύναμη των δεσμών που αναπτύσσονται, προσεγγίζουν τη σημασία της, κατευθύνοντας κάθε ερμηνευτική προσπάθεια σε διαφορετικό συμπέρασμα. Η ΕΑ παρακολουθεί, ενίοτε ενισχύει και άλλοτε ακυρώνει όλες εκείνες τις δυνάμεις που αναπτύσσονται, πότε συγκρουσιακά και πότε συνεργατικά, μεταξύ των πόλων του κλειστού συστήματος «άνθρωπος, κοινωνία και περιβάλλον», σε μια αέναη προσπάθεια διατήρησής του, δηλαδή διατήρησης της πολυπόθητης αειφορίας (Θεοδωρίδου, 2012). Το παιδαγωγικό πλαίσιο της ΕΑ καθορίζεται από τα ίδια χαρακτηριστικά με αυτά που συγκροτούν ως δομικά στοιχεία την εποικοδομική προσέγγιση της γνώσης, σε συνδυασμό με την κονστρουκτιβιστική αντίληψη της παιδαγωγικής. Συνεπώς η συμβολή της ΕΑ στην καλλιέργεια δεξιοτήτων στους εκπαιδευτικούς, ως αποτέλεσμα της επιμόρφωσής τους στο σχεδιασμό μαθησιακών δραστηριοτήτων με πλαίσιο αναφοράς την ίδια, επιτυγχάνει ταυτόχρονα και την ενίσχυση των παιδαγωγικών αντιλήψεων τους υπέρ του κονστρουκτιβισμού.
- Η παρούσα εργασία παρουσιάζει περιορισμούς σε σχέση με το μέγεθος του ερευνητικού δείγματος. Εντούτοις τα συμπεράσματά της προσφέρονται για μελέτη και περαιτέρω αξιοποίηση από εκείνους που ασχολούνται με α)τις παιδαγωγικές αντιλήψεις και την παιδαγωγική κατάρτιση των εκπαιδευτικών, β)τον εκπαιδευτικό σχεδιασμό με αξιοποίηση νέων εκπαιδευτικών σχεδιαστικών μοντέλων με χρήση ΤΠΕ, γ)την ΕΑ, τις ΣΔ και τα ΚΠΕ -αντίστοιχα ως διαδικασία αγωγής, εκπαιδευτικών δραστηριοτήτων και παράδειγμα καλής πρακτικής εκπαιδευτικής δομής στο πλαίσιο του αειφορικού, αποτελεσματικού και δημοκρατικού σχολείου-, τις εκπαιδευτικές πρακτικές με θεωρητικό πλαίσιο τον εποικοδομισμό και τη μετανεωτερικότητα.

Προτάσεις

Με βάση τα ευρήματα και τα συμπεράσματα της παρούσας εργασίας κρίθηκε θετικά η συμβολή, μεταξύ άλλων, των ΤΠΕ και της Εκπαίδευσης για την Αειφορία (ΕΑ) αναφορικά με το ανωτέρω ζητούμενο. Άρα η ανάγκη για εκπαίδευση και συνεχή επιμόρφωση των εκπαιδευτικών, δεν πρέπει να περιορίζεται σε πεδία που σχετίζονται με τις επιστημονικές, τεχνολογικές και κοινωνικές εξελίξεις, αλλά είναι απαραίτητο να συμπεριλαμβάνει και θέματα ανάπτυξης πρωτοβουλιών επιστημονικού πειραματισμού και λειτουργίας με νέους ρόλους και πρότυπα διδασκαλίας. Η ανάγκη αυτή απορρέει μέσα από το ρόλο που διαδραματίζει ο εκπαιδευτικός ως ένας από τους βασικότερους κοινωνικοποιητικούς φορείς, αλλά και ως σημαντικότατος διαμεσολαβητής, τόσο για τη μάθηση και την ανάπτυξη των νέων, όσο και για τη διαμόρφωση του αυριανού δυναμικού μιας χώρας (Ράπτης & Ράπτη, 2001).

Η αποτελεσματικό δομή των ΚΠΕ προσφέρεται να αξιοποιηθεί με τρόπο καινοτόμο και δημιουργικό για την αλλαγή των παιδαγωγικών αντιλήψεων των εκπαιδευτικών, για τον ταχύ εκσυγχρονισμό του σύγχρονου σχολείου μέσα από την ενίσχυση του εκπαιδευτικού/επιμορφωτικού έργου τους (επιμορφώσεις στον εκπαιδευτικό σχεδιασμό με νέα εκπαιδευτικά σχεδιαστικά μοντέλα και χρήση ΤΠΕ στο πλαίσιο της ΕΑ, εκπαιδεύσεις/δικτυώσεις μαθητών και σχολείων της ημεδαπής και αλλοδαπής στο πλαίσιο της ΕΑ, λειτουργία κοινοτήτων μάθησης με χρήση ΤΠΕ στο πλαίσιο της ΕΑ κ. ά.).

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Το Wiki, Εκπαιδευτικό Εργαλείο στην Περιβαλλοντική Εκπαίδευση

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Περίληψη

Η εργασία αναφέρεται στην εφαρμογή των wikis στην εκπαιδευτική διαδικασία, ως εργαλείο που υποστηρίζει τη συνεργασία, την οικοδόμηση της γνώσης και τη διερευνητική μάθηση, ενώ είναι κατάλληλο για την αξιολόγηση των ομαδοκεντρικών εργασιών. Εξετάζονται τρεις μελέτες αξιοποίησης των wikis στην περιβαλλοντική εκπαίδευση, όπου μαθητές από διαφορετικά Σχολεία, από Κρήτη και Μακεδονία, συνεργάζονται και διερευνούν και σε έναν κοινό ιστότοπο. Οι 3 μαθησιακές κοινότητες που δημιουργήθηκαν διαφέρουν μεταξύ τους ως προς το βαθμό δόμησης, ξεκινώντας από ελεύθερη μορφή διερευνητικής μάθησης, έως την πλήρως δομημένη με τους μαθητές να έχουν συγκεκριμένα ερωτήματα και τα βήματα για τη διερεύνηση να είναι σαφή. Αν και η τελική εργασία είναι αποτέλεσμα συλλογικής προσπάθειας, στην πλατφόρμα εργασίας είναι διακριτή η συνεισφορά κάθε ομάδας και κάθε μαθητή στην ομάδα. Τα αποτελέσματα της αξιολόγησης είναι ιδιαίτερα ενθαρρυντικά και δείχνουν αυξημένο ενδιαφέρον και ενεργό εμπλοκή όλων των μαθητών που συμμετείχαν στη διδακτική αυτή παρέμβαση.

Λέξεις κλειδιά : Wikis, Μαθησιακές κοινότητες, Περιβαλλοντική Εκπαίδευση

Abstract

This study investigates wikis, as a powerful educational tool for supporting the collaboration, the construction of knowledge and the inquiring learning. In addition, wiki is the appropriate tool for accessing the collaborative projects. Three case studies of implementation of wikis in environmental education projects are examined. Students from different parts of Greece (Macedonia and Crete), were working together in the same web space, on a common project. The knowledge communities are differentiated in the way in which they were constructed, from a free – unstructured one to a well-structured. In the latter, the students followed specific instructions, how to work in their subject. Although, the final product was the result of a collaborative work, the contribution of each team and each student within the team is recorded in the web platform. The outcomes of this work offer promising evidence for enhanced interest and active involvement of all the students, who took part in the project.

Key-words: Wikis, Knowledge communities, Environmental Education

Εισαγωγή

Οι μαθησιακές κοινότητες στην εκπαίδευση αναφέρονται ως περιβάλλοντα στα οποία μπορούν οι μαθητές να συνδεθούν εκούσια, για να μοιραστούν κάποιες κοινές αξίες και ιδανικά και να αλληλεπιδρούν στη μαθησιακή διαδικασία (Barab & Duffy, 2000). Βασίζονται σε αρχές κοινής συμμετοχής, ενώ ταυτόχρονα μπορούν να προκαλούν τις παραδοσιακές μορφές σχέσεων δασκάλου-μαθητή, δεδομένου ότι οι εκπαιδευτικοί δεν είναι πλέον οι φορείς της γνώσης, αλλά συνεργάτες σε δράσεις που σκοπό έχουν την οικοδόμηση της γνώσης (Pringle, 2002). Με την ένταξη των Τεχνολογιών Πληροφορίας και Επικοινωνιών (ΤΠΕ) στην εκπαίδευση αυξάνεται το ενδιαφέρον για δραστηριότητες που υποστηρίζουν τη συνεργασία μαθητών και βασίζονται στην εποικοδόμηση της γνώσης. Τα νέα υπολογιστικά περιβάλλοντα επιτρέπουν, εκτός των άλλων, και αλληλεπίδραση από απόσταση μέσα από το διαδίκτυο, δίνοντας τη δυνατότητα για συνεργατική μάθηση (computer-supported collaborative learning: CSCL) και συνεργατικές δράσεις (computer-supported collaborative working: CSCW) ανάμεσα σε εκπαιδευόμενους με διαφορετικές εμπειρίες και βιώματα (Stahl, 2006).

Σε αυτή την κατεύθυνση, σημαντική είναι η συμβολή του Web 2.0, που προσφέρει ποικιλία εργαλείων που εμπλουτίζουν την εκπαιδευτική διαδικασία (Alexander, 2006). Ο όρος Web 2.0 συνδέεται με ένα σύνολο από αλληλεπιδραστικές τεχνολογίες και υπηρεσίες στον παγκόσμιο ιστό (Richardson, 2006) και με διαμορφωμένη χρήση της πληροφορίας (Tredinnick, 2006). Ιδιαίτερο χαρακτηριστικό του Web 2.0 είναι τα λεγόμενα «κοινωνικά λογισμικά» (Kolbitsch & Maurer, 2006), τα οποία διευκολύνουν την ανθρώπινη επικοινωνία, την αλληλεπίδραση και τη συνεργασία σε μεγάλες κοινωνικές ομάδες (Ward, 2006). Τα κυριότερα εργαλεία του Web 2.0 είναι τα blogs και τα wikis. Ενώ όμως τα blogs χρησιμεύουν κυρίως ως αποθετήριο και πηγή άντλησης πληροφοριών, τα wikis δημιουργούν το κατάλληλο περιβάλλον για συνεργατική μάθηση και οικοδόμηση της γνώσης (Yukawa, 2006).

Στην εργασία αυτή παρουσιάζονται τα wikis, ως τεχνολογία του Web 2.0 που υποστηρίζει τη διερευνητική μάθηση και τη συνεργασία και γίνεται αναφορά σε μελέτες σχετικές τη χρήση τους στην εκπαιδευτική διαδικασία. Στην αρχή παρουσιάζονται οι βασικές αρχές που καθιστούν τα wikis χρήσιμα εργαλεία στην εκπαίδευση και ιδιαίτερα στις διερευνητικές εργασίες, ενώ στη συνέχεια εξετάζονται 3 παραδείγματα εφαρμογής των wiki στην περιβαλλοντική εκπαίδευση, με τις μαθησιακές κοινότητες να αποτελούνται από μαθητές από διαφορετικά Σχολεία από Κρήτη και Κεντρική Μακεδονία. Παρουσιάζεται το εργαλείο που χρησιμοποιήθηκε, τα κριτήρια με τα οποία αυτό επιλέχθηκε και οι δυνατότητες που προσφέρει στους χρήστες του. Κατόπιν, αναλύονται η διαδικασία οργάνωσης της μαθησιακής κοινότητας και οι στόχοι που τέθηκαν, αναφέρονται οι παράγοντες που επηρέασαν την όλη διαδικασία στα τρία περιβαλλοντικά σενάρια που εξετάζονται και στο τέλος γίνεται συζήτηση για την αξιολόγηση της εκπαιδευτικής πρακτικής και παρατίθενται τα συμπεράσματα που προέκυψαν καθώς και οι προτάσεις για περαιτέρω διερεύνηση.

Τα Wikis στην εκπαίδευση

Τα wikis είναι ιστοσελίδες που μπορούν να δημιουργηθούν πολύ εύκολα από ομάδες ατόμων και περιλαμβάνουν κείμενα, συνδέσμους, χρήση πολυμέσων, χώρο για σχόλια και ελεύθερο διάλογο και οτιδήποτε μπορεί να συνδεθεί με το προς μελέτη θέμα. Επιτρέπουν στους χρήστες, όχι μόνο να έχουν πρόσβαση στο περιεχόμενό τους, αλλά και να μπορούν να το τροποποιούν διαδικτυακά (Leuf & Cunningham, 2001). Τα wikis διατίθενται στον παγκόσμιο ιστό, η λειτουργία τους δεν απαιτεί επιπλέον λογισμικά και η χρήση τους δεν προϋποθέτει ιδιαίτερες γνώσεις πληροφορικής (Désilets et al., 2005). Επιτρέπουν πάσης φύσης διαμορφώσεις σε γραπτό κείμενο (προσθήκες, διαγραφές, τροποποιήσεις), καθώς και δημιουργία υπερσυνδέσμων που να παραπέμπει σε άλλο περιεχόμενο, σε οποιοδήποτε σημείο του αρχικού (Raitman et al., 2005). Με αυτό τον τρόπο, πολλά άτομα μπορούν να δημιουργούν και να επεξεργάζονται ένα περιεχόμενο, πάνω σε κάποιο συγκεκριμένο θέμα (Yukawa, 2006). Παράδειγμα συνεργατικών δράσεων σε wiki είναι η γνωστή

διαδικτυακή εγκυκλοπαίδεια Wikipedia, όπου χρήστες από όλο τον πλανήτη έχουν δημιουργήσει από κοινού τη μεγαλύτερη στον κόσμο εγκυκλοπαίδεια (Lih, 2004).

Η χρήση των wikis ως εκπαιδευτικά εργαλεία που προωθούν την επικοινωνία και την οικοδόμηση της γνώσης κερδίζει τα τελευταία χρόνια όλο και περισσότερο έδαφος, τόσο στην τριτοβάθμια όσο και στην δευτεροβάθμια εκπαίδευση, ενώ συχνά το wiki αναφέρεται ως η πιο συνεργατική μέθοδος μάθησης που μπορεί να υπάρξει με την προϋπόθεση ότι θα χρησιμοποιηθεί με παιδαγωγικά σωστό τρόπο (Reinhold, 2006). Τα wikis στηρίζονται στις αρχές του κοινωνικού εποικοδομισμού (Κόμης, 2004), σύμφωνα με τις οποίες το κοινωνικό περιβάλλον δεν διευκολύνει απλώς τη μάθηση, αλλά είναι εκείνο που τη δημιουργεί. Επιπλέον, τα wikis εκφράζουν μία μαθητοκεντρική διαχείριση της γνώσης, όπου οι εκπαιδευόμενοι συμμετέχουν ενεργά και αναλαμβάνουν οι ίδιοι την ευθύνη για τη διαδικασία της μάθησης, ενώ μετατοπίζει τη μαθησιακή διαδικασία από τη δασκαλο-μαθητική επικοινωνία στη δια-μαθητική συνεργασία, με τον εκπαιδευτικό να καθοδηγεί και να στηρίζει αυτή τη συνεργασία.

Η περιβαλλοντική εκπαίδευση και η εκπαίδευση για την αειφόρο ανάπτυξη προωθούν μία νέα εκπαιδευτική κουλτούρα που ενθαρρύνει την πρωτοβουλία, την επιλογή, τον πειραματισμό και την ατομική και ομαδική ευθύνη, ενώ στηρίζονται στις παιδαγωγικές αρχές α) της Διερευνητικής Προσέγγισης στη Μάθηση, β) της Διεπιστημονικής Συνεργασίας, γ) της Διαφοροποιημένης Προσέγγισης στη Μάθηση και δ) της Ομαδικής Συνεργασίας των Μαθητών. Οι αρχές αυτές είναι συμβατές με τη βασική «παιδαγωγική φιλοσοφία» των wikis και εφαρμόζονται και στις μελέτες περίπτωσης των μαθησιακών κοινοτήτων που περιγράφονται στη συνέχεια.

Δημιουργία μαθησιακής κοινότητας

Επιλέξαμε για την κατασκευή των μαθησιακών κοινοτήτων να χρησιμοποιήσουμε το λογισμικό pbworks, επειδή α) διατίθεται δωρεάν στο διαδίκτυο για εκπαιδευτικούς σκοπούς, β) είναι ιδιαίτερα απλό στη χρήση, γ) επιτρέπει τη συμμετοχική κατασκευή και δ) προσφέρει ένα απολύτως ασφαλές και ελεγχόμενο περιβάλλον κοινωνικής δικτύωσης αφού απαιτεί από τους χρήστες να έχουν κωδικό πρόσβασης και έτσι οι μαθητές προστατεύονται και οι δραστηριότητες τους δεν είναι προσβάσιμες από άλλους. Επιπλέον, το λογισμικό αφήνει χώρο για ανταλλαγή απόψεων και σχολιασμό, ενώ οι παρουσιάσεις των δυο σχολείων διαφοροποιούνται μέσα στον ιστοχώρο και είναι διακριτή η συμβολή του κάθε σχολείου και του κάθε μαθητή. Τέλος, το λογισμικό καταγράφει όλες τις παρεμβάσεις που έκανε ο κάθε μαθητής καθώς και κάθε αλλαγή που γίνεται, ενώ οποιαδήποτε στιγμή η σελίδα μπορεί να έρθει σε προηγούμενη κατάσταση.

Η μαθησιακή κοινότητα κτίστηκε με βάση τις αρχές του κοινωνικού εποικοδομισμού, όπου οι μαθητές λειτουργώντας μέσα σε ένα κοινωνικό πλαίσιο επιλέγουν το πολυμεσικό περιεχόμενο και τα δεδομένα γύρω τους, έτσι ώστε να δημιουργήσουν νέο περιεχόμενο και να αναπτύξουν τις γνώσεις και τις δεξιότητές τους. Σκοπός της παρέμβασης είναι το να μπορέσουν οι μαθητές να βρουν τις στρατηγικές μάθησης από μόνοι τους και σύμφωνα με τις ανάγκες τους, να αυτορυθμίζουν δηλαδή οι ίδιοι τη διαδικασία μάθησης. Η περιβαλλοντική εκπαίδευση και η εκπαίδευση για την αειφόρο ανάπτυξη προσφέρονται ιδιαίτερα για αυτό το σκοπό διότι χαρακτηρίζονται από τη διαθεματικότητα, ενώ ξεφεύγουν από την πίεση που υπάρχει στην κάλυψη της ύλης, όπως αυτή προβλέπεται στα αναλυτικά προγράμματα σπουδών. Επιπλέον, στην περιβαλλοντική εκπαίδευση αυτό που επιδιώκεται και αξιολογείται είναι η δημιουργία συλλογικών προσπαθειών και δράσεων και αυτό είναι ακριβώς ένα από τα χαρακτηριστικά της εφαρμογής των wiki στην εκπαιδευτική διαδικασία (Mader, 2006). Στη βιβλιογραφία επισημαίνεται το γεγονός ότι η εφαρμογή των wikis στην εκπαίδευση είναι επιτυχημένη, μόνο στις περιπτώσεις που απαιτείται από τους μαθητές να συνεργαστούν (Choy & Ng, 2007).

Πριν την έναρξη της κάθε δραστηριότητας, και αφού βρέθηκε το συνεργαζόμενο Σχολείο διευθετήθηκαν κάποια πρακτικά ζητήματα, όπως η ενημέρωση και εξασφάλιση έγκρισης των γονέων, η εξασφάλιση της απαιτούμενης υλικοτεχνικής υποδομής για τους μαθητές που δεν είχαν ηλεκτρονικούς υπολογιστές στο σπίτι, η εύρεση ωρών εκτός ωρολογίου προγράμματος κ.λ.π. Και στις τρεις περιπτώσεις ο αριθμός των μαθητών που απαρτίζουν την μαθησιακή κοινότητα είναι περίπου 20. Επιλέχθηκε οι μαθητές να είναι από διαφορετικές περιοχές, καθόσον κατά την

αλληλεπίδραση μαθητών με διαφορετικές εμπειρίες, συμπεριφορές και βιώματα δημιουργείται ένα πλούσιο κοινωνικο-γνωστικό περιβάλλον που λειτουργεί καταλυτικά στην ανακάλυψη και διαμοίραση της γνώσης. Οι μαθητές μπορούσαν να εργαστούν είτε στο σπίτι τους, είτε στο Σχολείο. Οι επιβλέποντες καθηγητές σχολιάζουν και βοηθούν τους μαθητές τους από κοντά στο Σχολείο αλλά και από απόσταση, στην ιστοσελίδα, δεδομένου ότι κάθε σελίδα του wiki παρέχει τη δυνατότητα σχολιασμού και αλληλεπίδρασης. Με αυτή την έννοια οι δραστηριότητες στις οποίες αναφερόμαστε εμπεριέχουν και στοιχεία εξ αποστάσεως εκπαίδευσης.

Στην πρώτη φάση της παρέμβασης οι μαθητές των δύο σχολείων ενημερώνονται στο Σχολείο για τη δραστηριότητα και για τις βασικές αρχές λειτουργίας του wiki. Τους ανακοινώνονται οι κανόνες που πρέπει να τηρούνται, τα χρονοδιαγράμματα και οι προσδοκίες των καθηγητριών τους από τη δραστηριότητα. Τους δόθηκε υποστηρικτικό υλικό για τη χρήση του εργαλείου, η διεύθυνση του δικτυακού τόπου, καθώς και το όνομα χρήστη και ο κωδικός πρόσβασης. Σε κάθε μαθητή δόθηκαν πλήρη δικαιώματα, στο να δημιουργούν περιεχόμενο, να κατασκευάζουν νέες σελίδες και να παρεμβαίνουν στο περιεχόμενο των συμμαθητών τους. Έτσι, συνεργατικά μπορούσαν να ολοκληρώσουν την εργασία τους. Οι πρώτες δύο εβδομάδες αφιερώθηκαν στο να εξοικειωθούν οι μαθητές με το εργαλείο και να γνωριστούν μεταξύ τους. Είναι σημαντικό στη φάση αυτή να δημιουργηθεί ένα καλό κλίμα ανάμεσα στους συμμαθητές από τα δύο σχολεία και να αναπτυχθούν σχέσεις εμπιστοσύνης. Χρησιμοποιούσαν περισσότερο το χώρο για σχολιασμό και ανταλλαγή απόψεων και συζήτησαν ελεύθερα για τα Σχολεία τους και τους τόπους τους.

Οι 3 εφαρμογές ανάπτυξης wiki για την περιβαλλοντική εκπαίδευση που περιγράφονται στη συνέχεια, πραγματοποιήθηκαν κατά τα Σχολικά έτη 2010-2011 και 2011-2012. Μεταξύ τους παρουσιάζουν διαφοροποιήσεις ως προς τον τρόπο με τον οποίο δομήθηκε η μαθησιακή κοινότητα και ως προς το βαθμό ελέγχου και καθοδήγησης της διερευνητικής μάθησης. Κάθε παρέμβαση διήρκεσε περίπου τρεις μήνες.

1η Μελέτη Περίπτωσης – μελέτη του φαινομένου της κλιματικής αλλαγής

Η πρώτη περίπτωση αναφέρεται σε μία ελεύθερη επικοινωνία όπου οι μαθητές δύο Σχολείων (Γυμνάσιο Γαζίου και 1ο Γυμνάσιο Γιαννιτσών) ανταλλάσουν περιεχόμενο και απόψεις πάνω στο θέμα της κλιματικής αλλαγής (Γκινούδη et al., 2011 ; Γκινούδη et al., 2012). Οι στόχοι που τέθηκαν ήταν αρκετά γενικοί και σχετίζονται περισσότερο με επικοινωνιακές και διερευνητικές δεξιότητες, καθώς και με δεξιότητες επίλυσης προβλημάτων που πρέπει να αποκτήσουν οι μαθητές στο Σχολείο. Το θέμα της κλιματικής αλλαγής α) αναφέρεται σε πρακτικά ζητήματα και άρα προκαλεί το ενδιαφέρον των μαθητών και προσφέρεται για εποικοδόμηση των γνώσεων, β) επιτρέπει τη διαθεματική προσέγγιση και γ) μπορεί να διερευνηθεί εύκολα, δεδομένου ότι υπάρχει μεγάλη ποσότητα σχετικού υλικού κατάλληλου για παιδιά διαθέσιμη στη βιβλιογραφία και στο διαδίκτυο.

Η Εικόνα 1 δείχνει την αρχική σελίδα του wiki, όπως αυτή διαμορφώθηκε από τους μαθητές των δύο Σχολείων. Οι καθηγήτριες δεν έβαλαν κανένα περιορισμό ως προς τη δόμηση του περιεχομένου, θέλοντας με αυτό τον τρόπο να παρατηρήσουν τις ανάγκες και την ανταπόκριση των μαθητών τους. Αυτό είχε ως αποτέλεσμα οι μαθητές να νιώσουν ελεύθεροι στο να εκφράσουν τις απόψεις τους και να διατυπώσουν τις υποθέσεις τους. Τους κατεύθυναν όμως να εμπλακούν με διάφορες γνωστικές περιοχές από τα μαθήματα των φυσικών επιστημών που σχετίζονται με το φαινόμενο της κλιματικής αλλαγής. Η συλλογή του περιεχομένου, κάλυψε διάφορες πτυχές της κλιματικής αλλαγής και αφορούσε κυρίως βίντεο, φωτογραφίες, διαγράμματα και συνδέσεις σε ιστοσελίδες επιστημονικών ινστιτούτων, περιβαλλοντικών οργανώσεων κ.λ.π. Οι μαθητές βρήκαν το επιπλέον περιεχόμενο κυρίως από το διαδίκτυο, αλλά η δόμηση του υλικού στο wiki οδήγησε σε νέο δυναμικό περιεχόμενο που έχει δυνατότητα διαμόρφωσης και εμπλουτισμού. Από τα αναλυτικά προγράμματα σπουδών του Γυμνασίου, οι μαθητές ασχολήθηκαν ενότητες όπως α) το φαινόμενο της τήξης, το φάσμα της ηλεκτρομαγνητικής ακτινοβολίας, οι μετατροπές ενέργειας και οι εναλλακτικές μορφές ενέργειας από το μάθημα της Φυσικής, β) οι υδρογονάνθρακες, η σύσταση της ατμόσφαιρας, τα αέρια του θερμοκηπίου και η ατμοσφαιρική ρύπανση από το μάθημα της Χημείας, γ) η διαταραχή και η υποβάθμιση των οικοσυστημάτων, η μείωση της

βιοποικιλότητας και οι επιπτώσεις της ρύπανσης στην υγεία του ανθρώπου από το μάθημα της Βιολογίας και δ) το κλίμα και η επίδραση του στις ανθρώπινες δραστηριότητες, οι υδάτινοι πόροι, οι υδροφόροι ορίζοντες, τα υδρογραφικά δίκτυα, το έδαφος, τα φαινόμενα ερημοποίησης, τα πλημμυρικά φαινόμενα και η απώλεια χερσαίων εδαφών από το μάθημα της Γεωγραφίας και Γεωλογίας. Οι μαθητές όμως επεκτάθηκαν και σε επιπτώσεις της κλιματικής αλλαγής όπως είναι μείωση του πόσιμου νερού και των καλλιεργήσιμων εκτάσεων, οι διαμάχες, οι πόλεμοι και η αύξηση των οικονομικών μεταναστών που αυτά συνεπάγονται, η φτώχεια και οι κοινωνικές ανισότητες και η εμφάνιση έντονων οικονομικών προβλημάτων σε παγκόσμια κλίμακα. Τα θέματα αυτά που συμπεριλαμβάνονται σε κάποιες από τις δραστηριότητες των μαθητών στο wiki, σχετίζονται με ενότητες που διδάσκονται σε άλλα μαθήματα, όπως αυτά της νεοελληνικής γλώσσας, της ιστορίας και της κοινωνικής και πολιτικής αγωγής.
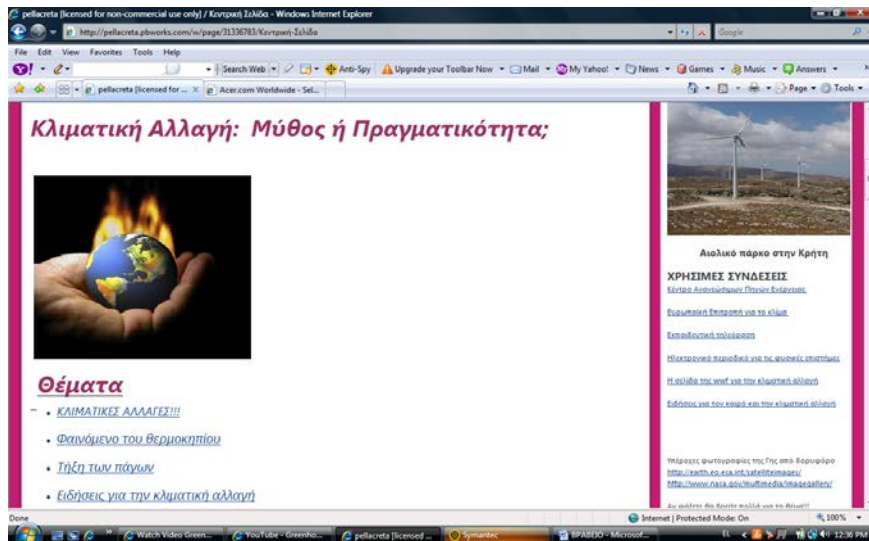
Εικόνα 1: Αρχική σελίδα του wiki για την κλιματική αλλαγή.

Οι μαθητές επισκέφθηκαν και έκαναν αναφορές με υπερσυνδέσμους σε ιστοσελίδες επιστημονικών ινστιτούτων, περιβαλλοντικών οργανώσεων, κέντρων ανανεώσιμων πηγών ενέργειας και μέσων μαζικής ενημέρωσης. Εντυπωσιάστηκαν από το γεγονός ότι μπορούσαν να έχουν άμεση πρόσβαση σε αρχεία της NASA ή της ESA και να συγκρίνουν θερμοκρασίες του πλανήτη από δορυφορικές φωτογραφίες. Στο θέμα της κλιματικής αλλαγής οι απόψεις των επιστημόνων διχάζονται. Οι μαθητές προσπάθησαν να παρακολουθήσουν αυτό τον προβληματισμό και να τον μοιραστούν με τους συμμαθητές τους σε μία εποικοδομητική συζήτηση. Σε αυτή την περίπτωση, ο χώρος για ελεύθερη συζήτηση και σχολιασμό χρησιμοποιήθηκε για παρουσίαση διαφορετικών ιδεών. Αξίζει να σημειωθεί, ότι σημαντικότατη παρουσία στον ιστότοπο είχαν και οι μαθητές που εμφανίζουν χαμηλές επιδόσεις στη συμβατική τάξη, ενώ το γεγονός ότι οι μαθητές που συμμετέχουν ανήκουν σε διαφορετικά σχολεία δημιούργησε ένα κλίμα ευγενούς άμιλλας.

Η ενεργός συμμετοχή των μαθητών, η επικοινωνία των δύο Σχολείων, η διαμόρφωση θετικών στάσεων για το περιβάλλον και η συνολική προσπάθεια της ομάδας είναι τα στοιχεία που αξιολογήθηκαν από την παρέμβαση. Αντίθετα, δεν δόθηκε ιδιαίτερη έμφαση στο αν οι μαθητές κατανόησαν όλα τα επιμέρους θέματα και δεν αξιολογήθηκε η καλή οργάνωση του υλικού που δημιουργήθηκε, καθώς και ο καταμερισμός της εργασίας ανάμεσα στις ομάδες.

2η Μελέτη Περίπτωσης – παρουσιάζοντας το φυσικό περιβάλλον του τόπου μας

Η δεύτερη περίπτωση αναφέρεται σε ένα ημιδομημένο wiki, όπου οι μαθητές δύο Σχολείων (Γυμνάσιο Γαζίου και 2ο Γυμνάσιο Λαγκαδά) καλούνται να παρουσιάσουν το φυσικό περιβάλλον

του τόπους τους. Εδώ, η συνεισφορά του κάθε Σχολείου είναι διακριτή, από την αρχική σελίδα του wiki (Εικόνα 2). Οι μαθητές τώρα εργάστηκαν σε ομάδες, για να αναπτύξουν μία πτυχή του τόπου τους που τον κάνει να διαφέρει από τον άλλο τόπο. Τα θέματα τα επέλεξαν οι μαθητές κάθε ομάδας σε συνεργασία με τις καθηγήτριές τους. Από τις ομάδες του Λαγκαδά παρουσιάστηκαν κυρίως οι λίμνες, τα ποτάμια, οι βιότοποι και οι ιαματικές πηγές ενώ τα αντίστοιχα θέματα από τις ομάδες της Κρήτης αφορούσαν τους ορεινούς όγκους, τα φαράγγια και τα γεωλογικά παράδοξα της περιοχής. Το wiki αυτό, το οποίο περιελάμβανε και βιωματικές δράσεις, εξελίχθηκε σε μία πηγή πληροφοριών για την τοπική γεωγραφία, που μπορεί να εμπλουτίζεται συνεχώς με νέες ιδέες και δραστηριότητες από τους ίδιους τους μαθητές, αλλά και από μαθητές επομένων τάξεων, ενισχύοντας με αυτό τον τρόπο την οικοδόμηση νέας γνώσης. Ο ρόλος των καθηγητριών σε αυτό το wiki ήταν πιο ενεργός. Υπήρξε αλληλεπίδραση, και κατά τη διαδικασία σύνταξης των εργασιών γινόταν ανατροφοδότηση, έτσι ώστε τα όποια λάθη να διορθώνονται έγκαιρα. Οι ομάδες ξεκίνησαν να παρουσιάζουν την εργασία τους με βάση αυτά που ήξεραν από την εμπειρία τους. Σταδιακά όμως άρχισαν να αναζητούν επιπλέον υλικό σε βιβλιοθήκες και ιστοχώρους. Διαπίστωσαν ότι στον τόπο τους δραστηριοποιούνται και φορείς οι οποίοι θα μπορούσαν να παρέχουν χρήσιμες πληροφορίες. Έτσι, οι μαθητές του Λαγκαδά επικοινώνησαν με το φορέα Διαχείρισης Λιμνών Κορώνειας - Βόλβης, ο οποίος τους έδωσε πληροφοριακό υλικό για τις λίμνες. Το υλικό αυτό, αποσπάσματα του οποίου αξιολογήθηκαν και αναρτήθηκαν στις σελίδες των μαθητών, σχετίζεται α) με τη βιοποικιλότητα στις λίμνες και τις ανθρώπινες δραστηριότητες που συντελούν στη συρρίκνωσή της και β) με την υποβάθμιση του φυσικού περιβάλλοντος στην περιοχή των λιμνών. Οι μαθητές της Κρήτης αντίστοιχα, ήρθαν σε επαφή με τους ειδικούς από το Μουσείο Φυσικής Ιστορίας Κρήτης και ενημερώθηκαν σχετικά με τον ορεινό όγκο του Ψηλορείτη, τα απειλούμενα είδη εκεί καθώς και με δράσεις που θα μπορούσαν να αποτρέψουν περαιτέρω υποβάθμιση.
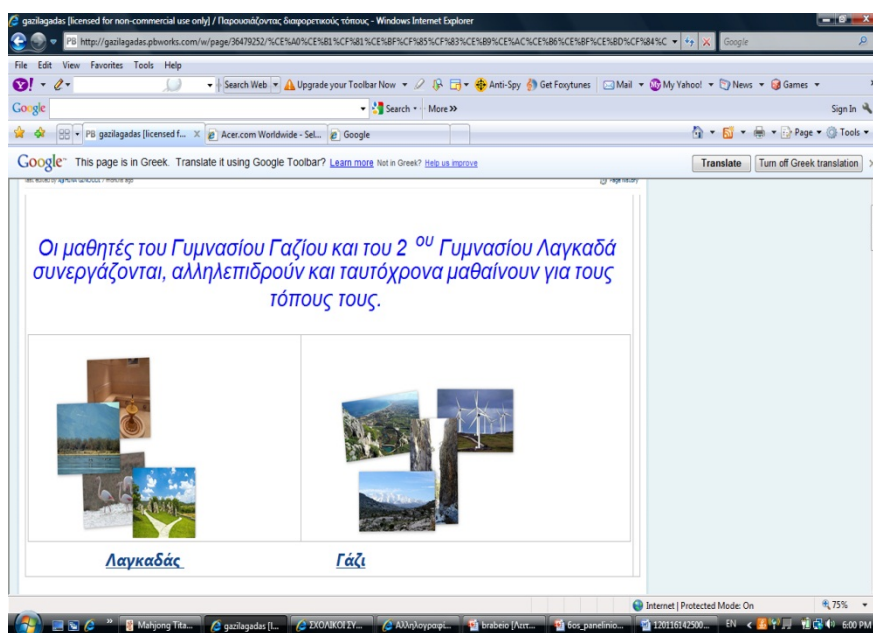
Εικόνα 2: Αρχική σελίδα του wiki «παρουσιάζοντας τους τόπους μας».

 Η δράση συνδυάστηκε και με βιωματικές δραστηριότητες στην περιοχή. Οι μαθητές του Λαγκαδά επισκέφθηκαν τις λίμνες, περπάτησαν στο όρος Βερτίσκος, πήραν συνέντευξη από τους υπεύθυνους στα Ιαματικά λουτρά του Λαγκαδά και άντλησαν πληροφορίες από το ΚΠΕ Βερτίσκου. Αντίθετα οι μαθητές από το Γάζι, έκαναν πεζοπορία στο δάσος του Ρούβα, περπάτησαν στην Κέρη και στο φαράγγι του Αλμυρού, συμμετείχαν σε βιωματικές δραστηριότητες του Πεζοπορικού Ομίλου Ηρακλείου και του ΚΠΕ Ανωγείων και κατέγραψαν θέσεις και διαδρομές που τις απεικόνισαν στο Google Map.

Κάποιες ομάδες μαθητών προσπάθησαν να συνδέσουν τα χαρακτηριστικά του φυσικού περιβάλλοντος με τις αναπτυξιακές δραστηριότητες του τόπου τους. Έτσι, οι μαθητές από το Γάζι συμπεριέλαβαν στις σελίδες τους τις αγροτικές και κτηνοτροφικές δραστηριότητες στη περιοχή του Ψηλορείτη και προβληματίστηκαν για τις δράσεις που θα μπορούσαν να αναδείξουν νέα πρότυπα ανάπτυξης στην περιοχή, συμπεριλαμβανομένων και των ανανεώσιμων πηγών ενέργειας. Αντίστοιχα οι μαθητές του Λαγκαδά, σε συνεργασία με την τοπική αυτοδιοίκηση, διερεύνησαν τη δυνατότητα περαιτέρω ανάπτυξης του ιαματικού τουρισμού στη δική τους περιοχή.

Το ευρύτερο περιβάλλον της περιοχής Γαζίου και Λαγκαδά έχουν σημαντικά γεωλογικά μνημεία. Το Βουλισμένο Αλώνι και η λίμνη του Αλμυρού στο Γάζι, οι θερμές πηγές του Λαγκαδά και οι Νυμφόπετρες είναι παραδείγματα για την εκπαίδευση στη γεωλογική ιστορία του τόπου. Τα μνημεία αυτά προβλήθηκαν ιδιαίτερα από τους μαθητές οι οποίοι αναφέρθηκαν και σε σχετικές παραδόσεις που αποτελούν μέρος της πολιτιστικής κληρονομιάς του τόπου τους.

Στο ημιδομημένο αυτό wiki, οι καθηγήτριες διαπραγματεύθηκαν από την αρχή με τους μαθητές τα αντικείμενα μελέτης κάθε ομάδας. Επιπλέον, οι μαθητές κτίζουν τώρα το περιεχόμενο, όχι μόνο από πηγές του διαδικτύου, αλλά και από δικές τους δράσεις και βιώματα. Εδώ, αξιολογήθηκαν εκτός των άλλων, οι διαδικασίες που ακολουθήθηκαν για την οικοδόμηση της γνώσης, η χρήση των επιμέρους εργαλείων, η ποιότητα της ιστοσελίδας της κάθε ομάδας, η συνολική παρουσίαση, αλλά και η δυναμική του wiki, που δε σταματάει με το πέρας της σχολικής χρονιάς.

3ᵗʰ Μελέτη Περίπτωσης – προβάλλοντας τα ιστορικά μνημεία του τόπου μας

Στην τρίτη περίπτωση περίπτωσης, μαθητές από την Γ΄ τάξη του Γυμνασίου Γαζίου και από την Α΄ τάξη του Πρότυπου Πειραματικού ΓΕΛ του Πανεπιστημίου Μακεδονίας από τη Θεσσαλονίκη κλήθηκαν να αναπτύξουν μία συλλογική εργασία για τα ιστορικά μνημεία του τόπου τους και να την παρουσιάσουν στο διαδίκτυο. Επιλέχθηκε αυτή τη φορά το wiki να είναι αυστηρά δομημένο, έτσι ώστε το θέμα να χωρίζεται σε υποθέματα, με κάθε υπόθεμα να αντιστοιχεί σε διαφορετική σελίδα στο wiki. Η δόμηση της εργασίας και η κατανομή σε ομάδες έγινε από την αρχή από τις καθηγήτριες, οι οποίες επέλεξαν τα προς μελέτη αντικείμενα, ενώ οι ομάδες επέλεξαν από τη λίστα, σύμφωνα με τα προσωπικά τους ενδιαφέροντα. Οι μαθητές ξεκίνησαν τώρα στη δική τους σελίδα, στην οποία συνέταξαν το περιεχόμενο, επιλέγοντας οι ίδιοι τον τρόπο παρουσίασης. Ένα παράδειγμα σελίδας μαθητών φαίνεται στην Εικόνα 3.

Παράλληλα με την κατασκευή της σελίδας τους, οι μαθητές πρότειναν και πραγματοποίησαν επισκέψεις σε αρχαιολογικούς χώρους, μνημεία και μουσεία, ενώ διερεύνησαν τη εξέλιξη της ιστορίας του τόπου τους διαχρονικά. Μέσα από τη μελέτη τους, οι μαθητές διερεύνησαν και τα πολυπολιτισμικά στοιχεία του τόπου τους, ενώ συνέδεσαν τα ιστορικά γεγονότα με τα ιδιαίτερα γεωγραφικά χαρακτηριστικά και προσπάθησαν να κατανοήσουν γιατί κάποια ιστορικά γεγονότα συνέβησαν στο συγκεκριμένο τόπο. Έτσι, εκτός από την απλή διερεύνηση και συνεργασία, οι μαθητές καλούνται και εδώ να συνθέσουν πληροφορίες και γνώσεις, έτσι ώστε να πετύχουν την καλύτερη δυνατή ατομική και ομαδική παρουσίαση. Και σε αυτή την περίπτωση, το γεγονός ότι οι μαθητές που συνεργάζονται στην ομαδική αυτή παρουσίαση προέρχονται από διαφορετικά Σχολεία δημιουργεί ένα θετικό κλίμα άμιλλας και το κάθε «Σχολείο» προσπαθεί να προβάλλει την ιστορία και τα ιστορικά μνημεία του τόπου του με τον καλύτερο τρόπο. Πέρα από τις επιμέρους εκπαιδευτικές επισκέψεις των μαθητών στα ιστορικά μνημεία της περιοχής τους, οι μαθητές από την Κρήτη είχαν την ευκαιρία να επισκεφθούν τη Θεσσαλονίκη και να γνωρίσουν από κοντά τους συμμαθητές τους, οι οποίοι τους υποδέχθηκαν με ένα ξεχωριστό τρόπο και τους ξενάγησαν στη πόλη, την οποία είχαν ήδη γνωρίσει μέσα από τις σελίδες του wiki.
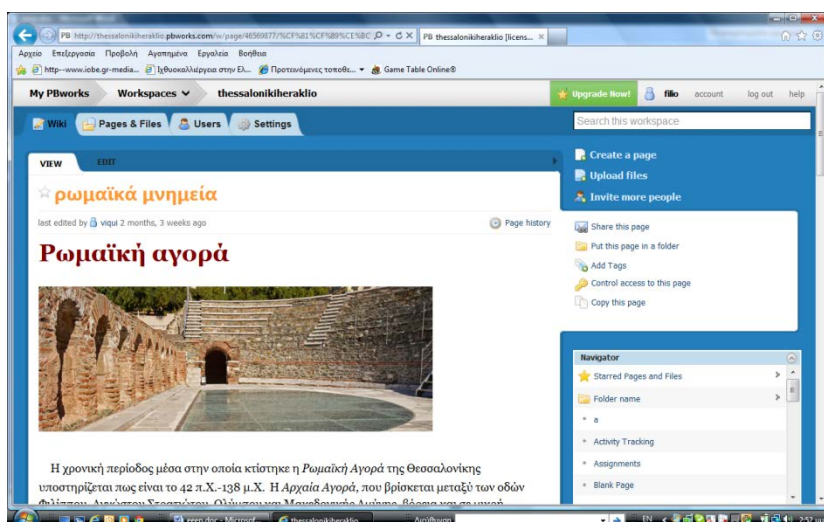
Εικόνα 3: Παράδειγμα από μία σελίδα του wiki, όπου οι μαθητές παρουσιάζουν τη Ρωμαϊκή Αγορά της Θεσσαλονίκης.

Σε αυτό τον τρόπο δόμησης του wiki, εκτός από τους γενικότερους στόχους τέθηκαν και σαφείς μαθησιακοί στόχοι οι οποίοι μπόρεσαν να αξιολογηθούν και με τις παραδοσιακές τεχνικές αξιολόγησης. Το δομημένο wiki, σύμφωνα με τη βιβλιογραφία, συνδέεται με καλύτερη επίτευξη μαθησιακών στόχων (Slotta & Peters, 2008). Έτσι, η διδακτική αυτή πρόταση, εκτός από διερευνητική εργασία στα πλαίσια της περιβαλλοντικής εκπαίδευσης, θα μπορούσε να αποτελέσει και εναλλακτική πρόταση για τη διδασκαλία του μαθήματος της ιστορίας και της τοπικής ιστορίας, δεδομένου ότι οι μαθητές αναφέρουν δυσκολίες στα μαθήματα αυτά, που σχετίζονται με την απομνημόνευση και την ερμηνεία.

Αξιολόγηση της πρακτικής

Στην περίπτωση ομαδοσυνεργατικών ερευνητικών εργασιών, το θέμα της αξιολόγησης είναι εξαιρετικά δύσκολο και απασχολεί έντονα την παιδαγωγική έρευνα (Nordberg, 2008). Το μεγαλύτερο πρόβλημα που επισημαίνεται, είναι να αντιμετωπιστεί και να αξιολογηθεί η συνεισφορά του κάθε μέλους της ομάδας στην κοινή εργασία, έτσι ώστε να πριμοδοτούνται περισσότερο οι μαθητές που εργάστηκαν καλύτερα. Επιπλέον, είναι γενικά παραδεκτό, ότι η διαμορφωτική αξιολόγηση είναι παιδαγωγικά πιο χρήσιμη πρακτική, καθόσον υπάρχει συνεχής ανατροφοδότηση και γίνονται βελτιωτικές κινήσεις, όταν αυτό κρίνεται απαραίτητο. Η αυτοαξιολόγηση τέλος, από τα ίδια τα μέλη της ομάδας, των διαδικασιών και της ποιότητας του τελικού αποτελέσματος κρίνεται από τους ερευνητές ότι συμβάλλει στην ανάπτυξη συνεργατικών δεξιοτήτων και συλλογικής συνείδησης (Ματσαγγούρας, 2000).

Η τεχνολογία wiki προσφέρεται ιδιαίτερα για αξιολόγηση της ομαδοκεντρικής συνεργασίας καθόσον στην πλατφόρμα εργασίας είναι διακριτή η συμβολή της κάθε ομάδας, αλλά και του κάθε ατόμου στην ομάδα. Καταγράφονταν και αξιολογούνταν η συμμετοχή των μαθητών, η έκφραση διαφορετικών απόψεων, η συχνότητα των διευκρινιστικών ερωτήσεων, το καλό κλίμα, ο χρόνος που αφιερωνόταν σε συζητήσεις, και η συνεργασία, τόσο μέσα στην ομάδα, όσο και ανάμεσα στις ομάδες. Επιπλέον, καταγράφονταν στοιχεία, όπως οι αντιδράσεις των μαθητών, η τήρηση του χρονοδιαγράμματος, προβλήματα σε υλικοτεχνική υποδομή κ.λ.π. Αξιολογήθηκαν επίσης οι δεξιότητες και στάσεις που απέκτησαν οι μαθητές που συμμετείχαν σε αυτές τις κοινότητες της διαδικτυακής μάθησης, καθώς και η όλη διαδικασία και οι εμπειρίες που αποκόμισαν οι μαθητές, αλλά και οι καθηγητές οι οποίοι ανέπτυξαν τις δεξιότητές τους στις νέες τεχνολογίες και αναπτύχθηκαν επαγγελματικά.

Τα αποτελέσματα έδειξαν ότι οι μαθητές ήταν ενθουσιασμένοι με τη χρήση του νέου μαθησιακού περιβάλλοντος και εξέφρασαν την επιθυμία τους να χρησιμοποιούν παρεμφερή διαδικτυακά

εργαλεία και στα πλαίσια των άλλων μαθημάτων τους. Δεν αντιμετώπισαν κανένα πρόβλημα στην εξοικείωσή τους με το λογισμικό, ενώ ανάρτησαν μεγάλο αριθμό από βίντεο, εικόνες, γραφικά και άλλα πολυμέσα στον ιστότοπο. Εντυπωσιάστηκαν από το γεγονός ότι μπορούσαν να έχουν άμεση πρόσβαση σε τόσα αρχεία, φωτογραφίες, video. Αξίζει να σημειωθεί το γεγονός ότι η συμμετοχή όλων των μαθητών, ακόμα και των αποκαλούμενων «αδύνατων» στη συμβατική τάξη, ήταν ιδιαίτερα αυξημένη. Επιπλέον, το γεγονός ότι οι μαθητές που συμμετείχαν ανήκαν σε διαφορετικά σχολεία, συνέβαλλε στη δημιουργία κλίματος αλληλεπίδρασης και ευγενούς άμιλλας. Από τις παρεμβάσεις, τις προτάσεις και τη δόμηση του περιεχομένου στο wiki και τις παρατηρήσεις που έκαναν για τη δουλειά τους, διαφαίνεται πρόοδος των μαθητών στη σύνθεση γνώσεων και στην ανάπτυξη κριτικής σκέψης και αναστοχασμού.

Η κριτική που ασκείται σε ομαδικές εργασίες με τη χρήση των νέων τεχνολογιών είναι ότι ο καθηγητής δεν μπορεί να είναι πάντα σίγουρος ότι επιτεύχθηκαν όλοι οι μαθησιακοί στόχοι και ότι όλοι οι μαθητές θα δείξουν το απαιτούμενο ενδιαφέρον για να τους κατακτήσουν, παρά την ιδιαίτερη εξοικείωση τους με τη χρήση των πολυμέσων (Cuban, 2001). Όμως, λόγω ευχέρειας χρόνου στη διαδικτυακή μάθηση, η ικανοποίηση που προέρχεται από την κατανόηση των θεμάτων είναι πιθανόν να συμβάλλει στην αύξηση της αυτενέργειας. Επιπλέον, η όλη φιλοσοφία των περιβαλλοντικών δράσεων, αποδίδει μεγάλη σημασία, τόσο στο περιεχόμενο της μάθησης, όσο και στις γνωστικές διαδικασίες πρόσληψης και επεξεργασίας της γνώσης, καθώς και στις κοινωνικές δεξιότητες. Η μαθησιακή κοινότητα wiki προσφέρει επίσης επιπλέον δυνατότητες για δημιουργικότητα και προσωπική ανάπτυξη, ενώ όπως αναφέρθηκε και προηγούμενα, η ίδια η δομή του wiki επιτρέπει την αξιολόγηση της ατομικής συνεισφοράς κάθε μαθητή. Ακόμα, ο κατάλληλος σχεδιασμός της διδακτικής παρέμβασης δεν αποκλείει και συμπληρωματική εφαρμογή των παραδοσιακών μορφών αξιολόγησης.

Τα πρώτα αποτελέσματα από τις τρεις μελέτες περίπτωσης που παρουσιάστηκαν, δείχνουν ότι υπήρξε πρόοδος των μαθητών που συμμετείχαν στην ομαδοσυνεργατική αυτή δραστηριότητα και στα άλλα μαθήματα του αναλυτικού προγράμματος, καθώς και καλύτερες επιδόσεις στις τελικές εξετάσεις. Η μελέτη όμως αυτής της συσχέτισης είναι σε εξέλιξη και αποτελεί αντικείμενο επόμενης εργασίας.

Συμπεράσματα

Τα wikis είναι ένα σημαντικό εκπαιδευτικό εργαλείο, που υποστηρίζει τη συνεργασία μαθητών, τη διερευνητική μάθηση και την οικοδόμηση της γνώσης. Στις τρεις μελέτες περίπτωσης που εξετάσαμε, είδαμε τα wikis να χρησιμοποιούνται ως χώρος που κατατίθενται ελεύθερα ιδέες και υλικό, ως προσωπικός χώρος που ανανεώνεται συνεχώς και εμπλουτίζεται με θέματα και δραστηριότητες και ως δομημένος χώρος άντλησης στοιχείων και πληροφοριών πάνω σε ένα συγκεκριμένο θέμα. Η αποτελεσματικότητα των wiki στην περιβαλλοντική εκπαίδευση εξαρτάται από τον τρόπο με τον οποίο αυτά σχεδιάζονται. Είναι σημαντικό να παράγεται δυναμικό περιεχόμενο, το οποίο να μπορεί να επαναχρησιμοποιείται από τη μαθητική κοινότητα. Στις παραπάνω παρεμβάσεις, έγινε προσπάθεια να συνεργαστούν μαθητές από γεωγραφικά απομακρυσμένες περιοχές και να συμβάλλουν σε ένα κοινά αξιοποιήσιμο αποτέλεσμα, όπου η επιτυχία της προσπάθειας οφείλεται τόσο στην ατομική, όσο και στην ομαδική συνεισφορά. Τα αποτελέσματα της αξιολόγησης δείχνουν α) ιδιαίτερα αυξημένο το ενδιαφέρον των μαθητών τόσο σχετικά με την ίδια τη φύση της δραστηριότητας, που ξεφεύγει από τη συμβατική διδασκαλία, όσο και με τη συνεργασία τους με μαθητές άλλων Σχολείων και β) ικανοποιητικό βαθμό εμπλοκής όλων των μαθητών στην επικοινωνία με τους συμμαθητές τους και στην παραγωγή υλικού. Το μη δομημένο wiki, επιτρέπει στους μαθητές την ελεύθερη διατύπωση απόψεων, ενώ το απόλυτα δομημένο σχετίζεται με καλύτερα μαθησιακά αποτελέσματα. Ο βαθμός δόμησης επομένως, επιλέγεται ανάλογα με τους στόχους που τίθενται από τους επιβλέποντες την περιβαλλοντική δραστηριότητα καθηγητές. Και οι τρεις όμως παραπάνω εναλλακτικές προτάσεις είναι απόλυτα συμβατές με το πνεύμα, τους σκοπούς και το πρόγραμμα σπουδών για το επιστημονικό πεδίο «Περιβάλλον και Αειφόρος Ανάπτυξη», όπως αυτή αναλύεται και οικοδομείται σε ερευνητικά σχέδια εργασίας στα νέα πιλοτικά προγράμματα σπουδών (Υπουργείο Παιδείας, 2011), αλλά και στα project στο Λύκειο.

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Οι Web 2.0 Τεχνολογίες στην Εκπαίδευση. Ο Ρόλος τους στη Μάθηση

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Περίληψη

Στο άρθρο αυτό παρουσιάζεται η σημασία των νέων Web2.0 τεχνολογιών στην εκπαίδευση και συγκεκριμένα των ιστολογίων ως συμπλήρωμα στη διδασκαλία. Το ιστολόγιο(blog) σύμφωνα με το Richardson(2006) είναι το πιο εύκολο προσαρμόσιμο αλλά και δημοφιλές ανάμεσα στις Web 2.0 τεχνολογίες. Τα τρία βασικά του χαρακτηριστικά είναι η προώθ
ηση της συνεργασίας, της δέσμευσης και το ότι αποτελεί κίνητρο για συμμετοχή. Αυτά είναι και τα χαρακτηριστικά που προσπάθησα να αποδείξω. Γίνεται περιγραφή δέκα ιστολογίων και αναφορά στις συνεντεύξεις από τέσσερις εκπαιδευτικούς που τα χρησιμοποίησαν στην εκπαίδευση τους. Αυτή η έρευνα είναι για να δείξει με ποιο τρόπο οι εκπαιδευτικοί τα χρησιμοποιούν στη διδασκαλία τους και για ποιο λόγο αλλά και για το πώς οι μαθητές ανταποκρίνονται σε αυτά.

Abstract

Modern and synchronous means are being now used in teaching and learning. Web 2.0 applications is a relatively new phenomenon in teaching and learning and one of the most usable application of web 2.O technologies is blogs.This research is about how teachers uses the blog and why, meaning the pedagogies behind the decision to incorporate them and how students respond to them. The blogs will be described regarding to the themes that are most known about, such as collaboration, engagement, participation. The ways of how teachers use the blogs will be described as well.

Εισαγωγή

Στη Γενική Συνέλευση των Ηνωμένων Εθνών, το Δεκέμβριο του 2002 αποφασίστηκε ότι το έτος 2005 μέχρι 2014 θα αποτελεί τη δεκαετία για τη βιώσιμη και αειφόρο ανάπτυξη και όρισε την Unesco ως τον οργανισμό που έχει την ευθύνη για την προώθηση της. Τη δεκαετία αυτή η εκπαίδευση για τη βιώσιμη και αειφόρο ανάπτυξη θα μπορεί να συμβάλει στο να μπορούν οι πολίτες να αντιμετωπίσουν τις προκλήσεις του παρόντος, του μέλλοντος και οι ηγέτες θα μπορούν να πάρουν τις σχετικές αποφάσεις για ένα βιώσιμο κόσμο. Μία από τις πρακτικές που προτείνει η Unesco είναι η εκπαίδευση μέσω των νέων τεχνολογιών. (Unesco 2005)

Αειφόρος Ανάπτυξη

Οι πηγές του φυσικού κόσμου μας έχουν βοηθήσει να δημιουργήσουμε ένα πλούτο που αν χρησιμοποιηθεί σωστά, θα βοηθήσει ώστε να μπορούμε να απολαύσουμε ένα καλό επίπεδο ζωής. Δεν πρέπει όμως να χρησιμοποιήσουμε αυτές τις πηγές με τέτοιο τρόπο που να εμποδίζει την ευχέρεια των μελλοντικών γενεών να δημιουργήσουν και οι ίδιοι ένα καλό επίπεδο ζωής. Δεν πρέπει να κυνηγήσουμε τον πλούτο που έχει ως αποτέλεσμα την καταστροφή του φυσικού μας περιβάλλοντος. (Scott&Gough:2003). "Βιώσιμη και αειφόρος ανάπτυξη είναι η διαδικασία κατά την οποία η εκμετάλλευση, ο προσανατολισμός της τεχνολογικής ανάπτυξης και θεσμικών αλλαγών που πραγματοποιούνται είναι σύμφωνα με το μέλλον όπως και το παρόν". (The Brundtlant Commission, WCED, 1987).

Εκπαίδευση

Ζούμε σε μία κοινωνία όπου η τεχνολογία επηρεάζει όλους τους τομείς της ζωής μας και αποτελεί αναπόσπαστο κομμάτι της καθημερινότητάς μας. Σε έναν από τους τομείς που παίζει σημαντικό ρόλο είναι η εκπαίδευση. Ο εκπαιδευτικός με τη χρήση της τεχνολογίας προκαλεί το μαθητή να επιδείξει ενδιαφέρον στη μάθηση, να απορροφά τις πληροφορίες που του μεταδίδονται και να τις μετουσιώνει σε γνώση.

Η ενσωμάτωση όμως της τεχνολογίας "δεν είναι πανάκεια, ούτε a priori αυξάνει την αποτελεσματικότητα και ποιότητα". (Κουτσελίνη 2010). Γίνεται απαραίτητη μόνο όταν ενισχύει τα μαθησιακά αποτελέσματα. Το ζητούμενο είναι η μεγιστοποίηση της μάθησης των μαθητών για αυτό είναι απαραίτητη και η αξιολόγηση τους από τους παιδαγωγούς για να θεωρείται δείκτης εκσυγχρονισμού. Η ενσωμάτωση της τεχνολογίας στην εκπαίδευση πρέπει να θεμελιώνεται σε παιδαγωγικά χαρακτηριστικά. (Κουτσελίνη 2010). Η ενσωμάτωση των νέων τεχνολογιών στην διδασκαλία απαιτεί από τους εκπαιδευτικούς να μάθουν μία διαφορετική προσέγγιση όσον αφορά τη διδασκαλία και τη μάθηση και την ανάπτυξη νέων ψηφιακών υλικών και δραστηριοτήτων στο διαδίκτυο πριν από την έναρξη των μαθημάτων. Και η Laurillard(2010) τονίζει τη σημασία της εξέτασης, του επανασχεδιασμού και της απανεξέτασης στις καινούριες μεθοδολογίες που προτείνονται. Για να γίνει αυτό αποτελεσματικό πρέπει να προέρχεται από τους παιδαγωγούς και όχι από εταιρείες λογισμικού. Πρέπει να γίνει από αυτούς που θέλουν το μαθητή να μάθει και θα ερευνήσουν κάθε μέθοδο που μπορεί να τους βοηθήσει.

Οι παιδαγωγικές μεθόδοι που σχετίζονται με τον κοινωνικό εποικοδομητισμό έγιναν μία κοινή επιδίωξη από παιδαγωγούς που επιθυμούν να καινοτομούν και να σχεδιάσουν πιο μαθητοκεντρικά περιβάλλοντα μάθησης.(Laurillard 2010). Αυτά τα περιβάλλοντα είναι που προτείνει και η κ. Κουτσελίνη σε αντίθεση με τα χρηστοκεντρικά που δεν έχουν παιδαγωγική ή μαθησιακή αξία. Η βαθιά εμπλοκή με τις νέες τεχνολογίες αφορά περισσότερο ψηλότερες δεξιότητες σκέψης, ενοποιητικές ικανότητες αλλά και ικανότητες αναστοχασμού. (Μακράκης 2010). Τώρα οι μαθητές είναι σε θέση να βρουν το δρόμο τους γύρω από μια συζήτηση στο διαδίκτυο, είναι σε θέση να ανταλλάσουν ιδέες και σχέδια και να διαπραγματευτούν μία κοινή λύση σε ένα πρόβλημα. Αυτό εξαρτάται από τον εκπαιδευτικό, ο οποίος δεν προσανατολίζεται μόνο στον κοινωνικό εποικοδομητισμό ως μέθοδο διδασκαλίας αλλά καταλαβαίνει επίσης πως πρέπει να εκμεταλλευτεί τις ψηφιακές τεχνολογίες. Οι αρχές της καλής διδασκαλίας εφαρμόζονται και στην επαγγελματική εξέλιξη του εκπαιδευτικού όπως και στη μάθηση του μαθητή. Συγκεκριμένα, ισχύουν οι παιδαγωγικές του κοινωνικού εποικοδομητισμού, της κοινωνικής μάθησης, της συνεργατικής μάθησης. (Laurillard 2010).

Σύμφωνα με τον Lev Vygotsky ο εκπαιδευτικός του εποικοδομητισμού δημιουργεί ένα πεδίο γνώσης στο οποίο οι μαθητές δεσμεύονται σε ενδιαφέρουσες δραστηριότητες οι οποίες παροτρύνουν και διευκολύνουν τη μάθηση. Ο εκπαιδευτικός μπορεί να τους καθοδηγεί όταν αντιμετωπίζουν διάφορα προβλήματα, μπορεί να τους παροτρύνει να δουλεύουν σε ομάδες, να τους ενθαρρύνει και συμβουλεύει. Οι τέσσερις αρχές σε μία τέτοια τάξη είναι:

-Η μάθηση και η ανάπτυξη είναι μία κοινωνική και ομαδική δραστηριότητα.

-Η ζώνη της επικείμενης ανάπτυξης μπορεί να υπηρετεί σαν οδηγός διδακτέας ύλης και μαθημάτων προγραμματισμού.

-Η μάθηση στο σχολείο πρέπει να γίνεται σε ένα σημαντικό πλαίσιο. Η τεχνολογία μπορεί να βοηθήσει με διάφορους τρόπους.

-Συσχετισμοί εξωσχολικών δραστηριοτήτων με τις δραστηριότητες του σχολείου.

Σημαντικό για την εκπαίδευση αλλά και τη διαδικασία της μάθησης είναι ο μαθητής να νιώθει τη δέσμευση με το αντικείμενο, να συνεργάζεται με τους συμμαθητές του για να βρει τη λύση στο πρόβλημα αλλά και το κίνητρο που του δίνεται. Αυτά τα σημεία χαρακτηρίζουν και το ιστολόγιο.

Για την πτυχιακή μου εργασία ως μέρος της απόκτησης του μεταπτυχιακο τίτλου με θέμα 'Digital technologies, Communication and Education' στο The Manchester University επέλεξα να ερευνήσω τις Web 2.0 technologies. Blogs in teaching and learning. Παρόλο που δεν έχει άμεση σχέση με την αειφόρο ανάπτυξη η έρευνα μου δείχνει ακριβώς πώς οι νέες τεχνολογίες και

εφαρμογές υποστηρίζουν την εκπαίδευση και ποια είναι τα αποτελέσματα σε μαθητές και καθηγητές. Τα ερωτήματα που ήθελα να απαντήσω ήταν με ποιο τρόπο και για ποιο λόγο οι καθηγητές χρησιμοποιούν τα ιστολόγια στην εκπαίδευση αλλά και το πώς οι μαθητές αντιδρούν σε αυτά. Ποια δηλαδή είναι η επίδραση στους μαθητές.

Web 2.0 Technologies

Οι Web 2.0 τεχνολογίες στη διδασκαλία και τη μάθηση αποτέλεσε ένα θέμα το οποίο οι ερευνητές βρίσκουν ενδιαφέρον. Αυτό το φαινόμενο "κρατάει σημαντικές αλλαγές για τους εκπαιδευτικούς αλλά και τους μαθητές". (Will Richardson 2006). Τα ιστολόγια γίνονται όλο και πιο δημοφιλή στην επιλογή των εκπαιδευτικών, όπως λένε οι ερευνητές και οι συγγραφείς. (Richardson 2006, Imperatore 2009, Downes 2004, Churchill 2009). Πίσω από αυτό το γεγονός πρέπει να υπάρχει μία λογική εξήγηση.
Ο Tim Berners - Lee ισχυρίστηκε " το αρχικό πράγμα που ήθελα να κάνω ήταν να δημιουργήσω ένα συλλογικό μέσο, ένα μέρος στο οποίο όλοι θα μπορούμε να συναντιόμαστε, να διαβάζουμε και να γράφουμε". (Carvin 2005). Ο Richardson (2006) υποστηρίζει ότι το Read/ Write Web "αλλάζει τη σχέση μας με την τεχνολογία και ξαναγράφει τα παλιά παραδείγματα με το πώς λειτουργούν τα πράγματα¨. "Μπορούμε όλοι να είμαστε δημιουργοί περιεχομένου και πληροφοριών και "μπορούμε να μάθουμε πολλά για τον εαυτό μας και για τον κόσμο" στην πορεία.
Ο Tim O' Reilly παίρνει αυτό το όραμα και το πάει ένα βήμα παραπέρα και μας συστήνει το Web 2.0. Σύμφωνα με το Grossman (2006) το νέο δίκτυο είναι ένα διαφορετικό πράγμα. Είναι ένα εργαλείο το οποίο φέρνει κοντά τις μικρές συνεισφορές εκατομμυρίων ανθρώπων και τις κάνει σημαντικές. Είναι ένα θέμα κοινότητας και συνεργασίας σε μία κλίμακα που δεν έχουμε δει ποτέ. Ειναι για τους πολλούς να αποσπούν δύναμη από τους λίγους και να βοηθούν ο ένας τον άλλο χωρίς αντάλλαγμα και αυτό δεν θα αλλάξει μόνο τον κόσμο αλλά θα αλλάξει και τον τρόπο με τον οποίο ο κόσμος αλλάζει. Είναι μία επανάσταση. Οι πιο γνωστές Web 2.0 τεχνολογίες είναι τα Wikis, το Rich Site Summary (RSS), τα Aggretators και οι Online photo galleries. (Richardson 2006). Οι μαθητές θα μπορούν να διαπραγματεύονται νοήματα και σχέσεις ανάμεσα στους κοινωνικούς χώρους των Web 2.0 τεχνολογιών ή δίκτυα, να ανταλλάζουν περιεχόμενο, να δημιουργούν νέο περιεχόμενο και να συνεργάζονται με διάφορους τρόπους. (Duffy 2008). Ο Richardson (2006) πιστεύει ότι αν οι εκπαιδευτικοί συστήσουν τις νέες τεχνολογίες στους μαθητές με ένα αποτελεσματικό τρόπο και τα ενσωματώσουν ανάλογα με τις ανάγκες τους θα τους φέρει μόνο πλεονεκτήματα όπως "θα αναπτύξει τα μάθηση και θα τους προετοιμάσει καλύτερα για τον μετά την εκπαίδευση κόσμο".

Ιστολόγια (Blogs)

Η έρευνα μου βασίστηκε στα ιστολόγια που σύμφωνα με το Richardson είναι το πιο εύκολο προσαρμόσιμο και δημοφιλές ανάμεσα σε όλες τις Web 2.0 τεχνολογίες. Το ιστολόγιο είναι μία ιστοσελίδα η οποία δημιουργείται εύκολα, είναι εύκολα προσβάσιμη και επιτρέπει στον συγγραφέα ή στους συγγραφείς να δημοσιεύουν στο διαδίκτυο από οποιαδήποτε σύνδεση στο διαδίκτυο. Στην απλούστερη του μορφή είναι μία ιστοσελίδα με χρονολογική σειρά από αναφορές, που παρουσιάζονται χρονολογικά αντίστροφα. (Richardson 2006). Τα κυριότερα χαρακτηριστικά των ιστολογίων είναι η συνεργασία, η δέσμευση και η συμμετοχή. Οι μαθητές έχουν την ευκαιρία να συμβάλουν στη διαδικασία της δημιουργίας περιεχομένου και να μην είναι απλά παθητικοί αναγνώστες. Η Imperatore (2009) υποστηρίζει ότι τα Wikis επικεντρώνονται περισσότερο στη συνεργασία ενώ τα ιστολόγια ενθαρρύνουν τη δέσμευση. Οι αναγνώστες μπορούν να σχολιάζουν κάθε ανάρτηση, ενθαρρύνοντας την απάντηση του κοινού και τη δέσμευση. Επίσης, οι μαθητές μαθαίνουν να διαβάζουν πιο κριτικά και αναλυτικά καθώς επίσης και να γράφουν πιο καθαρά και σαφές. Επίσης, σημαντικό ρόλο παίζει και η ιδέα ότι γράφει σε ένα πιθανό κοινό το οποίο αποτελεί ένα ισχυρό κίνητρο και μία σημαντική αλλαγή για τον τρόπο

με τον οποίο σκεφτόμαστε για τις αναθέσεις εργασιών και τη δουλειά που ζητούμε από τους μαθητές. (Richardson 2006). Η Aguilar (2009) συμφωνεί λέγοντας ότι οι μαθητές και ιδιαίτερα οι έφηβοι χρειάζονται κίνητρο να γράψουν και ένα "αυθεντικό σκοπό" και για αυτό το ιστολόγιο "είναι ένας τρόπος να δεις την εργασία σου σε έντυπη μορφή και να έχεις ένα πραγματικό αυθεντικό σκοπό". Το ιστολόγιο είναι ένα εποικοδομητικό εργαλείο γνώσης για μάθηση το οποίο υποστηρίζει διάφορους τρόπους μάθησης. Βοηθά τους μαθητές που είναι ντροπαλοί να εκφράσουν τις σκέψεις τους. Όλοι έχουν τις ίδιες ευκαιρίες να ακουστούν. Υπάρχει ισότητα ανάμεσα στο μαθητή που μιλά στην τάξη με το μαθητή που είναι ντροπαλός και έχουν τον ίδιο χώρο να πουν την άποψη τους. Πολλοί καθηγητές το χρησιμοποιούν ως προσωπικό ημερολόγιο αναστοχασμού και άλλοι για σκοπούς επικοινωνίας. Αυτές οι προσεγγίσεις μπορούν να πάρουν διάφορες μορφές και το ιστολόγιο προσφέρει στον εκπαιδευτικό διάφορους τρόπους που μπορούν να τον οδηγήσουν στα αποτελέσματα που επιθυμεί.

Μετά από μελέτη διαφόρων ερευνητών για τα ιστολόγια φάνηκε ότι μπορούν να προσφέρουν πλεονεκτήματα στη διδασκαλία και στη μάθηση εφόσον σχεδιάζονται προσεκτικά από τους εκπαιδευτικούς. Ο κοινός στόχος ανάμεσα σε όλους τους εκπαιδευτικούς ήταν να προωθήσουν τη δέσμευση και τη συνεργασία ανάμεσα στους μαθητές. Οι πιο κοινές χρήσεις είναι η ο αναστοχασμός των εμπειριών τους, απαντήσεις ερωτήσεων, ανάθεση εργασιών και οι μαθητές απαντούν στο προσωπικό τους ιστολόγιο, δίνουν παραδείγματα και επεξηγήσεις, αναθέτουν εργασίες.

Οι εκπαιδευτικοί όμως που χρησιμοποιούν την τεχνολογία στην τάξη τους έχουν να κάνουν και με το θέμα της ασφάλειας και την προστασία της ιδιωτικής ζωής. Το πιο γνωστό είναι ο διαδικτυακός εκφοβισμός. Οι μαθητές μπορούν να εκθέτουν φωτογραφίες που μπορεί να ενοχλήσουν και να ασκούν κακή κριτική στους δασκάλους ή το σχολείο τους. (Sharples et all 2009). Επίσης, οι γονείς είναι καλό να ενημερώνονται για τους σκοπούς και τις προσδοκίες όσον αφορά τη χρήση. Πριν την απόφαση ενσωμάτωσης τους πρέπει να λαμβάνονται τα απαραίτητα μέτρα ασφαλείας. "Όπως με οποιαδήποτε τεχνολογία, πρέπει να χρησιμοποιείται για να διευκολύνει κάτι που θα έκανες ή που θα ήθελες να κάνεις έτσι κι αλλιώς. Χρησιμοποιώντας την τεχνολογία για χάρη της τεχνολογίας ή για καινοτομία δεν είναι η καλύτερη πρακτική". (Weiler 2004).

Για την έρευνα μου χρησιμοποίησα δύο μεθόδους. Ανάλυση περιεχομένου σε δέκα διαφορετικά ιστολόγια τα οποία ήταν διαθέσιμα στο διαδίκτυο με ανοιχτή πρόσβαση αλλά και διεξαγωγή συνεντεύξεων σε τέσσερις από τους εκπαιδευτικούς(καθηγητές σε τέσσερα διαφορετικά σχολεία Μέσης Εκπαίδευσης στην Αγγλία) που είχαν ενσωματώσει τα τέσσερα ιστολόγια στη διδασκαλία τους για να δούμε το λόγο που οι καθηγητές επέλεξαν να τα χρησιμοποιήσουν. Τα κυριότερα χαρακτηριστικά των ιστολογίων είναι η συνεργασία, η δέσμευση και η συμμετοχή. Αυτά τα τρία χαρακτηριστικά προσπάθησα να τεκμηριώσω.

Όσον αφορά τα αποτελέσματα της έρευνας, τα συμπεράσματα από την ανάλυση των ιστολογίων ενισχύουν τα συμπεράσματα από τη θεματική ανάλυση των συνεντεύξεων και δείχνουν ακριβώς σε ποιο βαθμό οι καθηγητές χρησιμοποιούν τα ιστολόγια αλλά και πώς οι μαθητές τα δέχονται. Άλλωστε η χρησιμότητα της τεχνολογίας φαίνεται από το μαθησιακά αποτελέσματα.

Ευρήματα

1ο ιστολόγιο

Το πρώτο blog που έχω μελετήσει αφορά το μάθημα της Αγγλικής Λογοτεχνίας. Σκοπός του η καθημερινή μελέτη και η παράδοση εργασιών. Ο καθηγητής το χρησιμοποιούσε για "ενίσχυση του διαβάσματος, των εργασιών και των συζητήσεων που έκαναν στην τάξη". Επίσης, μέσω του ιστολογίου συστήνει στους μαθητές τις εφαρμογές Wikis και Google docs. Οι μαθητές ακουλουθούν τις οδηγίες του, γράφουν αρκετά και φαίνεται να επιτυγχάνεται η δέσμευση που είναι ένα από τα πιο βασικά χαρακτηριστικά των ιστολογίων. Όσον αφορά την ασφάλεια, ο καθηγητής τους ζητά να διαβάσουν την πολιτική του σχολείου για την χρήση των υπολογιστών και ότι πρέπει να συμμορφώνονται με αυτή. Επίσης έχει οδηγίες για να χρησιμοποιούν την κατάλληλη γλώσσα, να είναι ευγενικοί και να μην αποκαλύπτουν προσωπικές λεπτομέρειες.

2ο ιστολόγιο

Αφορά την Αμερικανική λογοτεχνία. Ο καθηγητής προωθεί τη συνεργασία ανάμεσα στους μαθητές δίνοντας τους σαφείς οδηγίες "να είσαι σίγουρος ότι σχολιάζεις σε μία τουλάχιστον παρατήρηση του προηγούμενου μαθητή στη δική σου παρατήρηση". Το χρησιμοποιεί κυρίως για ανάθεση εργασιών. Οι ερωτήσεις είναι υποχρεωτικές. Επίσης τους δίνει χρήσιμες ιστοσελίδες για βοήθεια. Οι μαθητές συμμετέχουν σχεδόν όλοι και συνεργάζονται χωρίς να συζητάνε άσχετα πράγματα και γράφουν αρκετά σχόλια. Σε κάποια από τα σχόλια βλέπουμε την ένδειξη 'comment deleted' άρα υποθέτουμε ότι ο διαχειριστής το έσβησε εξαιτίας ακατάλληλου περιεχομένου.

3ο ιστολόγιο

Αφορά τη λογοτεχνία. Το μεγαλύτερο μέρος του ιστολογίου το αποτελούν τα 'scribe posts', τα οποία περιλαμβάνουν τι έγινε στην τάξη με λεπτομέρειες. Επίσης, υπάρχει η περίληψη του υλικού που είχαν διδαχτεί τη συγκεκριμένη μέρα και τα σημαντικά σημεία καθώς και τις ασκήσεις που πρέπει να κάνουν στο σπίτι. Κάποια από τα 'scribe posts' έχουν γραφτεί από μαθητές. Αυτό δίνει την ευκαιρία στον κάθε μαθητή να νιώσει και ο ίδιος συγγραφέας. Με αυτό τον τρόπο προωθείται η δέσμευση αλλά και το κίνητρο να συμμετέχουν. Υπάρχει και μία λίστα με τους μαθητές που συμβάλουν και κάποιοι έχουν και τα δικά τους προσωπικά ιστολόγια. Οι αναρτήσεις του καθηγητή αφορούν και πράγματα που δεν έχουν σχέση με το μάθημα. Ο καθηγητής τους βάζει να κάνουν ασκήσεις για να προωθήσει τη συνεργασία και τους βάζει να σχολιάζουν την εμπειρία τους σχετικά με κάθε εργασία. Θεωρεί σημαντικό δηλαδή τον αναστοχασμό μετά από κάθε εμπειρία. Οι μαθητές συνεργάζονται, και οδηγούνται στην απάντηση της ερώτησης ή στη λύση της άσκησης. Ο καθηγητής επίσης επεμβαίνει με περαιτέρω ερωτήσεις για να ενθαρρύνει τη συνεργασία αλλά και την κριτική τους σκέψη.

4ο ιστολόγιο

Αφορά την αγγλική γλώσσα. Ο καθηγητής το χρησιμοποιεί περισσότερο για εργασίες στις οποίες τους δίνει την απαραίτητη βοήθεια εξηγώντας τους τι ακριβώς πρέπει να κάνουν αλλά και δίνοντας τους χρήσιμες ιστοσελίδες. Επίσης τους κάνει γενικές ερωτήσεις για να τους προβληματίσει για διάφορα θέματα, όπως ο ρατσισμός, τα ναρκωτικά, το περιβάλλον. Επιπλέον, τους ζητά να σχολιάσουν το θέμα που είχαν συζητήσει στην τάξη. Συμπεριλαμβάνει και μία ενότητα όπου ο καθηγητής κάνει συγκεκριμένες ερωτήσεις που αφορούν την επικαιρότητα και ζητά από τους μαθητές να σχολιάσουν. Ακόμα ζητά τη γνώμη τους για κάποια προγράμματα που χρησιμοποιεί. Οι μαθητές λένε τη γνώμη τους και για το ιστολόγιο. "Μου άρεσαν πολύ κάποια από τα αιτήματα σας και εισηγήσεις όσον αφορά το ιστολόγιο". Ο φιλικός τόνος είναι έκδηλος σε αυτό το ιστολόγιο. Οι μαθητές φαίνονται ευχαριστημένοι και αφήνουν πολύ θετικά σχόλια "Πιστεύω ότι αυτό το ιστολόγιο είναι καταπληκτική ιδέα. Καθηγητές σαν εσένα θα φωτίσουν το μονοπάτι προς το μέλλον". "Μου αρέσει ο σχολιασμός". Ο καθηγητής ευχαριστεί τους γονείς που πιστεύουν σε αυτο το νέο τρόπο διδασκαλίας αλλά και το σχολείο που προωθεί και παροτρύνει την ένταξη της τεχνολογίας στα σχολεία. Αυτό δείχνει ότι έχει την υποστήριξη και από τους γονείς αλλά και από το σχολείο. Επίσης χρησιμοποιούν και Wikispace.

5ο ιστολόγιο

Είναι για μάθημα ιστορίας. Δεν υπάρχουν πολλές αναρτήσεις. Ο καθηγητής το χρησιμοποιεί κυρίως για να αναθέτει εργασίες. Συστήνει το θέμα και τους βάζει φωτογραφίες ή χάρτες που έχουν σχέση με την ερώτηση. Δίνει σημειώσεις και χρήσιμες ιστοσελίδες στους μαθητές για να έχουν την ευκαιρία να κάνουν περισσότερη έρευνα για ένα θέμα. Επίσης βάζει podcasts σχετικά με το μάθημα της ημέρας.

6ο ιστολόγιο

Αφορά τάξη αμερικανικής λογοτεχνίας. Ο καθηγητής το χρησιμοποιεί ως ανάθεση εργασιών τις οποίες οι μαθητές πρέπει να αναρτίζουν στο ιστολόγιο. Τους δίνει χρήσιμες ιστοσελίδες και εικόνες. Ο καθηγητής τους ζητά να συνεργαστούν για να απαντήσουν "σας παρακαλώ διαβάστε και σχολιάστε τις απαντήσεις των άλλων συμμαθητών τους". Οι μαθητές γράφουν αρκετά σχόλια

σε κάθε απάντηση.

7ο ιστολόγιο
Αφορά τάξη ξένων μοντέρνων γλωσσών. Υπάρχουν αναρτήσεις από YouTube βίντεο τα οποία έχουν να κάνουν με το μάθημα αλλά δεν έχουν άμεση σχέση. Υπάρχουν αναρτήσεις με πληροφορίες όσον αφορά τις εξετάσεις, υλικό για επανάληψη και θέματα τα οποία πρόκειται να καλύψουν. Επιπλέον, τους προσθέτει το Voki (χαρακτήρας που μιλά) με τη συμβουλή του καθηγητή για επανάληψη. Επίσης βάζει χρήσιμες ιστοσελίδες που αφορούν τις ξένες γλώσσες. "Αναρτώ το πρόγραμμα μου. Έτσι όταν κάποιοι μαθητές λείπουν, μπορούν να κάνουν την εργασία τους από το σπίτι. Ξέρουν τι έχουν χάσει. Τους δίνω τα νέα του μαθήματος. Το χρησιμοποιώ περισσότερο για να ενημερώνω με πληροφορίες προς το παρόν". Επίσης έχει δημιουργήσει ακόμη ένα ιστολόγιο για να κάνουν εργασίες με τη χρήση του Voki. Οι μαθητές γράφουν ένα κομμάτι από τη δουλειά τους χωρίς να ντρέπονται αφού δεν είναι η φωνή τους. Είναι ανώνυμο και το χρησιμοποιεί για αξιολόγηση από τους υπόλοιπους μαθητές.

8ο ιστολόγιο
Αφορά γλώσσες. Η κύρια χρήση είναι για ανακοινώσεις. Επίσης υπάρχουν και κάποια βίντεο από το Youtube από ταξίδια του καθηγητή. Ο καθηγητής χρησιμοποιεί το Voki για να αναθέσει εργασίες στους μαθητές.

9ο ιστολόγιο
Αφορά ICT και επιχειρηματικές σπουδές. Το χρησιμοποιεί για να θέτει ερωτήσεις και οι μαθητές πρέπει να αφήνουν τα σχόλια τους στο ιστολόγιο. Όπως έχει πει "οι μαθητές είναι πιο πρόθυμοι να ολοκληρώσουν μία εργασία χρησιμοποιώντας το ιστολόγιο σε σύγκριση με το να συμπληρώνουν φύλλο εργασίας. Ο καθηγητής είναι υπεύθυνος να εγκρίνει τα σχόλια πριν τα αφήσει να δημοσιευτούν.

10ο ιστολόγιο
Είναι για μάθημα ιστορίας. Το χρησιμοποιεί κυρίως για να δημοσιεύει βίντεο που αφορούν την ιστορία και υλικό για επανάληψη στο οποίο συμπεριλαμβάνει σημειώσεις και παρουσιάσεις. Επίσης βάζει φωτογραφίες από ταξίδια που έχει κάνει με τους μαθητές.

Παρατηρήσεις – Αποτελέσματα

Από τις συνεντεύξεις βρίσκουμε το λόγο που οι καθηγητές αποφάσισαν να τα εντάξουν στην εκπαίδευση. Όσον αφορά τον παιδαγωγικό ρόλο κάποιοι καθηγητές τα χρησιμοποιούν για προώθηση της προσωπικής μάθησης. Ο μαθητής έχει την επιλογή να διαλέξει τι επιθυμεί να μάθει έχοντας όλες τις πληροφορίες μπροστά του. Αυτό ενισχύει την κριτική σκέψη. Άλλοι για ανατροφοδότηση, δέσμευση, κίνητρο, αναστοχασμό αλλά και για να συμπληρώνουν τις εργασίες της τάξης. Ο Richardson(2006) αναφέρει ότι τα ιστολόγια είναι ένα εποικοδομητικό εργαλείο γνώσης. Για να επιτευχθεί αυτό ένα σημαντικός παράγοντας είναι η συνεργασία. Οι καθηγητές θέλουν τη συνεργασία ανάμεσα στους μαθητές για αυτό άλλωστε και την προωθούν με συγκεκριμένες οδηγίες.
Επιπρόσθετα, γιατί είναι ένας πιο ευχάριστος τρόπος για να κάνουν τις εργασίες τους. Το κίνητρο και η ευχαρίστηση πάνε μαζί αφού όταν τους αρέσει να κάνουν κάτι τους παρακινεί να μη σταματήσουν. Στους μαθητές αρέσει το γεγονός ότι μπορούν να επικοινωνήσουν με τους καθηγητές τους έξω από τα πλαίσια του σχολείου. Τα πλεονεκτήματα που έχει ο καθηγητής είναι ότι μπορεί να είναι σίγουρος για το υλικό που έχει καλύψει, μπορεί να ελέγχει ότι οι εργασίες έχουν συμπληρωθεί αλλά και το ότι είναι ένας εύκολος τρόπος να δώσει οδηγίες για εργασίες. Τα πλεονεκτήματα του μαθητή είναι ότι αποτελεί κάτι που έτσι κι αλλιώς το χρησιμοποιεί, τον παρακινεί να διαβάσει αλλά και του αρέσει να το χρησιμοποιεί. Επιπλέον, κτίζει στη σχέση μεταξύ των ανθρώπων εφόσον ανά πάσα στιγμή μπορούν να επικοινωνήσουν με τους καθηγητές τους. Δεν αγχώνονται αν χάσουν κάποιο μάθημα αφού μπορούν να βρουν το υλικό αναρτισμένο

στο ιστολόγιο.

Οι καθηγητές συμφωνούν ότι είναι ένας καλός τρόπος για να είναι σίγουροι για τη δουλειά τους και για την ύλη που έχουν καλύψει. Επίσης, προσφέρει διαφάνεια στη δουλειά τους και "αν οι γονείς των μαθητών ξέρουν τι πρόκειται να διδάξω μπορούν να βοηθήσουν καλύτερα τα παιδιά στο σπίτι". Είναι και "ένας εύκολος τρόπος να ελέγξουν τις εργασίες¨.

Σχετικά με τη συμμετοχή των μαθητών οι καθηγητές έχουν δηλώσει ότι έχει αυξηθεί το κίνητρο και ότι οι μαθητές είναι πιο πρόθυμοι να εκπληρώσουν μία εργασία παρά όταν έπρεπε να την παραδώσουν στην τάξη. Επίσης, οι ντροπαλοί μαθητές έχουν την ευκαιρία να συμμετέχουν στο ιστολόγιο. Αυτοί οι μαθητές εκφράζονται στο ιστολόγιο αφού νιώθουν ασφάλεια επειδή βρίσκονται πίσω από την οθόνη. Συμφωνούν όλοι ότι η εμπειρία τους έχει συναντήσει τις προσδοκίες τους. Η δέσμευση και το κίνητρο είναι κάτι που οι περισσότεροι καθηγητές επιθυμούν να επιτύχουν. "Οι μαθητές νιώθουν δεσμευμένοι τώρα. Με βοηθούν να το λειτουργώ". "Τους αρέσει να το χρησιμοποιούν". Σημαντικό ρόλο παίζει και η υποχρεωτική εργασία για τη δέσμευση(Churchill 2009). Στο τελευταίο ιστολόγιο η συμμετοχή είναι μικρή γιατί οι εργασίες δεν είναι υποχρεωτικές. Με μια προσεκτική ματιά μπορείς να καταλάβεις τον τόνο που έχει το καθένα. Κάποια είναι πιο 'φιλικά', με μια πιο χαρούμενη νότα και άλλα πιο 'σοβαρά' με ερωτήσεις και εργασίες. Μερικοί καθηγητές ζητούν και τη γνώμη των μαθητών τους για να γίνει καλύτερο το ιστολόγιο. Ένας καθηγητής μάλιστα έδωσε ερωτηματολόγιο στους μαθητές για το τι επιθυμούν να βλέπουν στο ιστολόγιο. Ο λόγος που επέλεξαν το ιστολόγιο και όχι κάτι άλλο "είναι πιο προσωπικό στο καθηγητή, είναι κάτι μεταξύ του μαθητή και εμένα", "είναι δωρεάν, προσβάσιμο και άμεσο". Σε όλα τα ιστολόγια έχει δοθεί έμφαση στην ασφάλεια χρήσης τους. Για παράδειγμα τα σχόλια περνούν πρώτα από τον έλεγχο των καθηγητών και μετά αναρτίζονται. Σίγουρα υπάρχουν και κάποια προβλήματα. Για παράδειγμα ένα μικρό ποσοστό μαθητών μπορεί να μην έχει υπολογιστή. Αυτοί έχουν την ευκαιρία να χρησιμοποιούν υπολογιστή στο σχολείο. Επίσης υπάρχει και το θέμα της κλοπής κειμένων από το διαδίκτυο και της παρουσίασης τους ως δικά τους. Σε αυτό το θέμα οι καθηγητές πρέπει να δίνουν ιδιαίτερη προσοχή.

Οι Lujan - Moran (2006:255) αναφέρει δύο χρήσεις των ιστολογίων. Μία από την άποψη του εκπαιδευτικού και μία από του μαθητή. Από την άποψη του εκπαιδευτικού είναι όταν οι καθηγητές μοιράζονται τη γνώση, παρέχουν οδηγίες στους μαθητές, δημοσιεύουν ιστοσελίδες και βλέπουν τις εργασίες των μαθητών. Από την άποψη των μαθητών είναι όταν χρησιμοποιείται ως εργαλείο για ομαδική εργασία, για να μοιραστούν σχετικές πηγές και να δημοσιεύσουν εργασίες και ασκήσεις. Τα περισσότερα από τα ιστολόγια, αν όχι όλα, υπηρετούν και τα δύο, ακόμα και αν οι μαθητές δεν τα χρησιμοποιούν όπως θα έπρεπε.

Συμπεράσματα

Η έρευνα αυτή έγινε με σκοπό να ανακαλύψουμε το λόγο για τον οποίο οι καθηγητές επιλέγουν τα ιστολόγια ως συμπλήρωμα της διδασκαλίας τους. Η συνεργασία, η δέσμευση και η συμμετοχή είναι τα τρία διαδεδομένα χαρακτηριστικά τους που μπορούν να επιτευχθούν αν ο καθηγητής τα χρησιμοποιεί με το σωστό τρόπο. Ο εκπαιδευτικός πρέπει να έχει συνέχεια στο μυαλό τον τρόπο βελτίωσης της διαδικασίας της μάθησης και ότι η τεχνολογία είναι το μέσο για διδασκαλία και τη μάθηση εφόσον ο ίδιος τους τη συστήνει με αποτελεσματικό τρόπο.

Οι Web 2.0 τεχνολογίες μπορούν να αποτελέσουν και το μέσο για τη βιώσιμη και αειφόρο εκπαίδευση εφόσον έχουμε αποδείξει ότι συνεισφέρουν στη μάθηση. "Οι νέοι υπολογίζουν σε τέτοιες ευέλικτες δομές στα σχολεία και εκτιμούν τις ευκαιρίες που τους προσφέρονται να μάθουν με διαφορετικούς τρόπους και σε διαφορετικά περιβάλλοντα". (Φλογαΐτη και Λιαράκου 2009:109). Γενικά καταλήγουμε ότι πράγματι οι νέες τεχνολογίες βοηθούν στην εκπαίδευση και αποτελούν ένα μέσο για ενίσχυση του ρόλου του εκπαιδευτικού που περνά τις πληροφορίες όσο και του μαθητή που τις λαμβάνει.

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Η Χρήση των Ιστοεξερευνήσεων (WebQuests) ως Εκπαιδευτικά Εργαλεία για την Περιβαλλοντική Εκπαίδευση

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Περίληψη

Η παρούσα μελέτη προσεγγίζει το θέμα της αξιοποίησης των Τεχνολογιών Πληροφορικής και Επικοινωνιών (ΤΠΕ) ως εκπαιδευτικών εργαλείων για την υλοποίηση προγραμμάτων Περιβαλλοντικής Εκπαίδευσης.

Καθώς ο ρόλος των ΤΠΕ στην εκπαιδευτική διαδικασία έχει εξελιχθεί, το παραδοσιακό μοντέλο όπου ο ηλεκτρονικός υπολογιστής αποτελούσε ένα είδος «διδακτικής μηχανής» (Computer as a tutor) αντικαταστάθηκε από την σύγχρονη προσέγγιση του υπολογιστή ως διαμεσολαβητή της συνεργατικής μάθησης (Collaborative Learning). Σε αυτό το πλαίσιο λειτουργεί το μοντέλο των ιστοεξερευνήσεων (WebQuests) που παρουσιάζονται στην εργασία. Το χαρακτηριστικό των ιστοεξερευνήσεων είναι ότι αποτελούν μια στοχευόμενη αναζήτηση η οποία μέσα από δραστηριότητες επίλυσης προβλημάτων, διερεύνησης πηγών και διαχείρισής πληροφοριών, προτρέπει τους μαθητές στην αναζήτηση και οικοδόμηση της γνώσης. Οι παραπάνω δραστηριότητες ταυτίζονται με τις δραστηριότητες που θα πρέπει να υιοθετούν τα περιβαλλοντικά προγράμματα, προκειμένου να καλλιεργήσουν τον «περιβαλλοντικό αλφαβητισμό» (environmental literacy).

Η παρούσα μελέτη παρουσιάζει την χρήση μίας ιστοεξερεύνησης με θέμα τα απορρίμματα στη θάλασσα, η οποία σχεδιάστηκε στο πλαίσιο του προγράμματος Τηλεκπαίδευσης με τίτλο "Επιμόρφωση από ρήματα και από απόσταση" Οραματίζομαι, Σχεδιάζω και Δημιουργώ εκπαιδευτικό υλικό για τη διαχείριση απορριμμάτων. Το πρόγραμμα οργανώθηκε και υλοποιήθηκε από το ΚΠΕ Έδεσσας με στόχο τη Δημιουργία εκπαιδευτικού υλικού για τη μείωση, την ανακύκλωση και την επαναχρησιμοποίηση των απορριμμάτων (Θεοδωρίδου κ.ά. 2010).

Λέξεις κλειδιά: Ιστοεξερευνήσεις, WebQuests, Περιβαλλοντικά Προγράμματα, Περιβαλλοντικός Αλφαβητισμός.

Abstract

This survey describes the use of Information and Communication Technologies (ICT) as an educational tool for the carrying out of Environmental Education Projects.

As the role of ICT in the educational process has evolved, the traditional model, where the computer constituted a form of "instructive machine" (Computer as a tutor,) was replaced by the modern approach according to which the computer is a mediator for Collaborative Learning. This is the frame where the model of WebQuests functions. The main characteristic of WebQuests is that they constitute a targeted search which prompts students to seek and obtain knowledge, through activities such as problem solving, investigation of sources and information management. The above activities are related to the activities that the Environmental Projects should adopt in order to cultivate "environmental literacy".

The present study discuses the use of WebQuests on the subject of sea waste, which was carried out as part of a distance learning program entitled " I envision, I draw and I create educational material for the management of litter."

The program was organized and evaluated by the Centre of Environmental Education of Edessa aiming at the creation of educational material for the reduction, the recycling and the re-use of litter (Theodoridou et al,2010).

Εισαγωγή

Η ενσωμάτωση των Τεχνολογιών της Πληροφορίας και της Επικοινωνίας (ΤΠΕ) στην εκπαιδευτική διαδικασία θεωρείται πλέον αναγκαία, δεδομένου ότι τα αναλυτικά προγράμματα θα πρέπει να συμβαδίζουν και να αντικατοπτρίζουν το σύγχρονο τρόπο ζωής. Με τη ευρεία εξάπλωση του διαδικτύου η γνώση και η πληροφορία έχουν ξεφύγει πια από τον περιορισμένο χώρο του σχολείου και της βιβλιοθήκης, ενώ ταυτόχρονα ο κάθε χρήστης του κυβερνοχώρου μπορεί να εναλλάσσει ρόλους πομπού και δέκτη πληροφοριών. Αποτέλεσμα αυτής της υπερπροσφοράς των πληροφοριών είναι η γνωστική υπερφόρτωση των μαθητών, που εκφράζεται από αίσθηση ανικανοποίητου, αποστροφή από το διάβασμα και, τέλος, έλλειψη ενδιαφέροντος (Χαλκίδης, Μανδρίκας, Τζήκου, Ευθυβούλου,Νομικού,2009).

Για τους παραπάνω λόγους οι εκπαιδευτικοί έρχονται αντιμέτωποι με μία καινούργια πρόκληση: να μπορέσουν να μετατρέψουν τη ψηφιακή πληροφορία σε ανθρώπινη γνώση προκειμένου να κερδίσουν την προσοχή του μαθητή και παράλληλα να προσφέρουν αυτή τη νέα γνώση μέσω της χρησιμοποίησης των Τεχνολογιών Πληροφορικής και Επικοινωνιών.

Προς αυτή την κατεύθυνση έχει σχεδιαστεί μία μέθοδος εκπαιδευτικής αξιοποίησης του διαδικτύου, που ονομάζεται ιστοεξερεύνηση (WebQuest). Σύμφωνα με τον εισηγητή του όρου καθηγητή του πανεπιστημίου του San Diego Bernie Dodge ιστοεξερεύνηση είναι «*η εκπαιδευτική δραστηριότητα που εντάσσεται στο Αναλυτικό Πρόγραμμα κατά την οποία οι περισσότερες ή και όλες οι πληροφορίες που απαιτούνται για την επίλυση ενός προβλήματος ή για τη σύνθεση μίας γνωστικής ενότητας, προέρχονται από πηγές του διαδικτύου*» (Dodge 1995).

Το θεωρητικό υπόβαθρο των ιστοεξερευνήσεων

Το υπό εξέταση μοντέλο των ιστοεξερευνήσεων βασίζεται στη προσέγγιση του υπολογιστή ως διαμεσολαβητή της συνεργατικής μάθησης (Collaborative Learning).Με βάση τη συγκεκριμένη προσέγγιση, η χρήση του ηλεκτρονικού υπολογιστή σε καμία περίπτωση δεν αντικαθιστά την ανθρώπινη ευφυΐα, αλλά υποστηρίζει τις ανθρώπινες πρακτικές μέσα από τις οποίες οικοδομείται η γνώση (Κουλαϊδης 2007).

Οι θεωρίες τις συνεργατικής μάθησης προέρχονται από τις προσεγγίσεις του Δομισμού (constructivism). Οι Δομιστές προσπαθούν να δημιουργήσουν περιβάλλοντα στα οποία οι μαθητές μπορούν οι ίδιοι να συμμετέχουν ενεργά στο να δομήσουν τις γνώσεις τους και όχι απλά να αφεθούν στους εκπαιδευτικούς να τους ερμηνεύουν τις γνώσεις άλλων (Jonassen 2000). Χαρακτηριστικό της θεώρησης αυτής είναι ότι η μάθηση δεν αποτελεί απομνημόνευση εννοιών και κανόνων αλλά μία ενεργή ατομική διαδικασία διερεύνησης, ανακάλυψης, έρευνας, επίλυσης προβλήματος.

Τα χαρακτηριστικά μιας ιστοεξερεύνησης (WebQuest)

Η ιστοεξερεύνηση είναι μία δραστηριότητα κατευθυνόμενης διερεύνησης (Ματσαγγούρας, 2001), όπου με βασικό εργαλείο το διαδίκτυο ο εκπαιδευτικός ενεργοποιεί τους μαθητές σε μία διαδικασία προβληματισμού, έρευνας, ανάλυσης, σύγκρισης και, τέλος, δημιουργίας γνώσης. Προκειμένου να στηθεί και να εφαρμοστεί μία ιστοεξερεύνηση, δεν απαιτείται καμία ιδιαίτερη γνώση από τους μαθητές, ούτε η εγκατάσταση συγκεκριμένου λογισμικού, καθώς η πρόσβαση γίνεται από έναν απλό φυλλομετρητή ιστού (browser), όπως ο Internet Explorer, Mozilla, Opera κλπ.Ο εκπαιδευτικός διαχειρίζεται θέματα όπως η επιλογή του σεναρίου, η αξιολόγηση και επιλογή των κατάλληλων πηγών από το διαδίκτυο και η καθοδήγηση των μαθητών καθ' όλη τη

διάρκεια της δραστηριότητας. Οι ρόλοι του στη συγκεκριμένη δραστηριότητα είναι αυτοί του συντονιστή στα πλαίσια της επικοινωνιακής διδασκαλίας, βοηθού στις αναζητήσεις και δυσκολίες των παιδιών και συνεργάτη στη γενικότερη προσπάθεια τους να αυτονομηθούν (Χρυσαφίδης 1994).

Πέρα από το βασικό στοιχείο της χρήσης διαδικτυακών πηγών, η ιστοεξερεύνηση σε όλα τα στάδιά της μπορεί να περιλαμβάνει ομαδοσυνεργατικές δραστηριότητες, όπως οι ομαδικές εργασίες, τα projects, τα παιχνίδια ρόλων, οι συνεντεύξεις, οι επισκέψεις πεδίου, οι μελέτες περιπτώσεων και γενικότερα μεθόδους και εργαλεία βιωματικής μάθησης.

Οι ιστοεξερευνήσεις, ανάλογα με το εύρος και τη χρονική διάρκεια ολοκλήρωσης τους, χωρίζονται σε δύο κατηγορίες, σύντομης διάρκειας και μακράς διάρκειας. Οι σύντομης διάρκειας φέρονται καταλληλότερες για την ανάπτυξη της γνώσης, ενώ οι μεγάλης διάρκειας για τη βελτίωση των γνωστικών σχημάτων και κατανόησης.(Φεσάκης Δημητρακοπούλου 2009).

Ιστοεξερευνήσεις και Περιβαλλοντική Εκπαίδευση
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Προκειμένου να εξετάσουμε τη χρηστικότητα των ιστοεξερευνήσεων στα προγράμματα Περιβαλλοντικής Εκπαίδευσης, θα πρέπει να μελετήσουμε τους σκοπούς και στόχους με βάση τους οποίους σχεδιάζονται τα συγκεκριμένα προγράμματα. Ο γενικός σκοπός των περιβαλλοντικών προγραμμάτων είναι ο «περιβαλλοντικός αλφαβητισμός» (environmental literacy). Ο «περιβαλλοντικός αλφαβητισμός περιλαμβάνει» την απόκτηση και την καλλιέργεια όλων εκείνων των γνώσεων, δεξιοτήτων και ικανοτήτων που χρειάζονται οι μαθητές προκειμένου να συνειδητοποιήσουν τα αποτελέσματα των δράσεων του καθενός και να αναγνωρίσουν πως η ομαδική δράση μπορεί να φέρει αποτελέσματα στα περιβαλλοντικά ζητήματα. Οι περιβαλλοντικά εγγράμματοι μαθητές πρέπει να κατέχουν τη γνώση, τα εργαλεία και τις ικανότητες προκειμένου να αντιμετωπίσουν κατάλληλα τα περιβαλλοντικά ζητήματα και να αναγάγουν το περιβάλλον σε σημαντικό παράγοντα της καθημερινής ζωής τους (Makin, 2005).

Ο «περιβαλλοντικός αλφαβητισμός» σαν έννοια περιλαμβάνει τόσο γνωστικούς όσο και συναισθηματικούς και ψυχοκινητικούς στόχους. Οι δραστηριότητες που απαιτούνται για την επίτευξη των παραπάνω στόχων έχουν σίγουρα ομαδοσυνεργατικό και βιωματικό χαρακτήρα, καθώς η γνώση στηρίζεται στην εμπειρία και τη αναζήτηση της λύσης. Μπορούμε έτσι εύκολα να παρατηρήσουμε ότι το πλαίσιο της μεθοδολογίας των ιστοεξερευνήσεων μπορεί να υιοθετηθεί προκειμένου να σχεδιαστούν προγράμματα για την περιβαλλοντική εκπαίδευση.

Παρουσίαση της ιστοεξερεύνησης

Η συγκεκριμένη ιστοεξερεύνηση διαπραγματεύεται το θέμα των απορριμμάτων στις θάλασσες και τις ακτές. Οι δραστηριότητες που αναπτύχθηκαν καλύπτουν το γνωστικό, συναισθηματικό και το ψυχοκινητικό πεδίο, τόσο για τους «αναγκαίους» όσο και για τους «αναπτυσσόμενους» αντικειμενικούς στόχους που θέτει ο εκπαιδευτικός με τελικό σκοπό τον «περιβαλλοντικό αλφαβητισμό», δηλαδή την απόκτηση προσωπικής και κοινωνικής ευθύνης.

Συγκεκριμένα, μέσα από τους γνωστικούς αντικειμενικούς στόχους, επιδιώκεται οι μαθητές:

- Να βιώσουν και να αναγνωρίσουν το πρόβλημα που δημιουργείται από την υπερκατανάλωση, την ταυτόχρονη εξάντληση και καταστροφή των φυσικών πόρων.
- Να ενημερωθούν για τα περιβαλλοντικά ζητήματα του πλανήτη και να αναγνωρίσουν την αλληλοσυσχέτιση τους.
- Να αναγνωρίσουν την έννοια της αειφορίας και να την ενσωματώσουν στην θεώρησή τους για τα περιβαλλοντικά ζητήματα.
- Να συνθέσουν τον ορισμό των απορριμμάτων.
- Να κατονομάσουν ποιές είναι οι ανθρώπινες δραστηριότητες που ρυπαίνουν τις ακτές και τις θάλασσες και να προτείνουν δράσεις που μπορούν να γίνουν ατομικά ή συλλογικά για την προστασία της θαλάσσιας ρύπανσης.

- Να αναφέρουν τη σχέση αλληλεπίδρασης του τουρισμού με το φυσικό περιβάλλον και να εξηγούν πώς μπορεί να υπάρξει οικονομική ανάπτυξη με ταυτόχρονη διατήρηση και προστασία της περιβαλλοντικής ποιότητας.
- Να είναι σε θέση να συνθέτουν τον ορισμό του εναλλακτικού τουρισμού και να κατονομάζουν τις μορφές που έχει ο ελληνικός εναλλακτικός τουρισμός.
- Να έρθουν σε επαφή με την επιστημονική έρευνα
- Οι δραστηριότητες του συναισθηματικού επιπέδου έχουν σχεδιαστεί ώστε οι μαθητές:
- Να αναπτύξουν συνεργατικό πνεύμα, ικανότητα παρατήρησης και οργάνωσης.
- Να προβληματιστούν και να φανταστούν πώς μπορούν οι μη αειφορικές δράσεις στο περιβάλλον να επιφέρουν μη αναστρέψιμα αποτελέσματα
- Να αναπτύξουν το αίσθημα της προσωπικής και κοινωνικής ευθύνης σε θέματα προστασίας του περιβάλλοντος, να είναι πρόθυμοι να συμμετέχουν σε δράσεις και να αναλαμβάνουν πρωτοβουλίες με στόχο τη προστασία και βελτίωση της ποιότητας του περιβάλλοντος σε τοπικό και εθνικό επίπεδο
- Τέλος με βάση τους ψυχοκινητικούς στόχους, επιδιώκεται οι μαθητές:
- Να δημιουργήσουν φωτογραφικό υλικό το οποίο θα επεξεργαστούν με τη βοήθεια προγράμματος σε Η/Υ και να το αναρτήσουν στον internet.
- Να είναι ικανοί να προβούν σε καταγραφή δεδομένων (data), μετρήσεις, υπολογισμούς, αναλύσεις μέσω λογιστικών φύλλων Excel.
- Να αναπτύξουν δεξιότητες χρήσης πολυμέσων (Power Point, Movie Maker).
- Να οργανώσουν ομάδες για την συγκέντρωση, καταγραφή και παρακολούθηση των μετρήσεων των απορριμμάτων που βρίσκονται στις ακτές.
- Να δημιουργήσουν σενάριο το οποίο στη συνέχεια θα παρουσιάσουν.

Δομικά στοιχεία της ιστοεξερεύνησης

Προκειμένου η ιστοεξερεύνηση να ανταποκρίνεται στον τύπο της ανακαλυπτικής μάθησης, περιλαμβάνει τα παρακάτω στάδια (Θεοδωρίδου κ.ά. 2010), τα οποία περιγράφονται με σαφήνεια στο υποστηρικτικό υλικό του προγράμματος τηλεκπαίδευσης που σχεδιάστηκε από την Παιδαγωγική Ομάδα του ΚΠΕ Έδεσσας:

Εισαγωγή

Στο αρχικό αυτό στάδιο, οι μαθητές έρχονται σε πρώτη επαφή με το υπό συζήτηση θέμα. Έναυσμα για τον προβληματισμό αποτελεί μία φωτογραφία που προτρέπει τους αναγνώστες να αναρωτηθούν κατά πόσο θεωρούμε τη θάλασσα ως «το απέραντο γαλάζιο» που μπορούμε να ρίχνουμε ό,τι θέλουμε χωρίς συνέπειες.
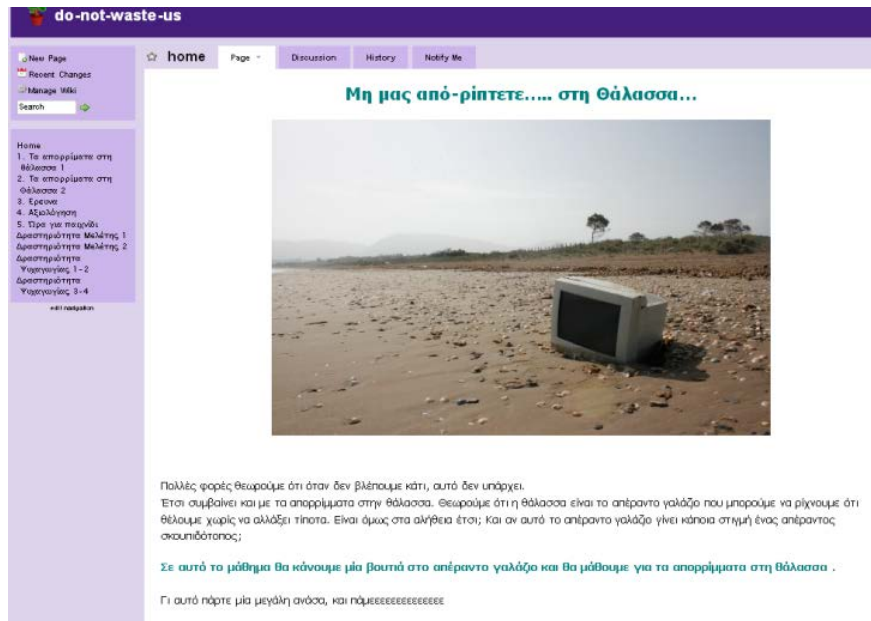
Σχήμα 1: Εισαγωγή. Η αρχική σελίδα της ιστοεξερεύνησης.

Σκοπός – Αποστολή

Στο στάδιο αυτό περιγράφεται το πρόβλημα το οποίο πρέπει να επιλυθεί. Για το υπό εξέταση θέμα, προτείνεται η επίσκεψη στην ιστοσελίδα του Δικτύου- Μεσόγειος Sos, προκειμένου οι μαθητές να διαβάσουν ένα άρθρο σχετικά με τα απορρίμματα στη θάλασσα και τις ακτές και να απαντήσουν σε ένα ερωτηματολόγιο, χρησιμοποιώντας διαγράμματα, πίνακες και ερωτήσεις ανάπτυξης. Σε δεύτερο επίπεδο, προτείνονται εξωτερικοί σύνδεσμοι (link) με την αντίστοιχη ορολογία για το περιβάλλον και περισσότερες πληροφορίες πάνω στο θέμα της θαλάσσιας ρύπανσης, που έχουν μορφή αρχείων βίντεο, παρουσίασης Power Point, προβολής μέσω του προγράμματος Adobe Reader. Το συγκεκριμένο στάδιο μπορεί να εφαρμοστεί τόσο σε ατομικό επίπεδο όσο και σε συλλογικό.

Διαδικασία

Το στάδιο αυτό είναι διακριτό και αναφέρει καταρχήν τον σκοπό και έπειτα τον τρόπο με τον οποίο θα γίνει η έρευνα. Ο σκοπός της συγκεκριμένης έρευνας είναι να γίνει διερεύνηση σχετικά με τον αριθμό, τον όγκο, την σύσταση και λοιπές πληροφορίες για τα απορρίμματα που βρίσκονται στις παράκτιες περιοχές, να προσδιοριστούν οι πηγές των απορριμμάτων και τέλος να προταθούν τρόποι μείωσης – αντιμετώπισης του φαινομένου. Η διεξαγωγή της έρευνας απαιτεί ομαδική εργασία και έτσι προτείνεται να χωριστούν οι μαθητές σε δύο ομάδες, τη φωτογραφική και τη δημοσιογραφική ομάδα με τις ακόλουθες αρμοδιότητες:

- Φωτογραφική ομάδα: Αναλαμβάνει τη συγκέντρωση φωτογραφικού υλικού από την έρευνα πεδίου (Φωτογραφίες από απορρίμματα, κάδους, ανθρωπογενείς δραστηριότητες στην περιοχή (πχ τουριστικές μονάδες, οικισμοί, εργοστάσια κλπ). Επιπλέον, θα δημιουργηθεί παρουσίαση σε μορφή Power Point.
- Δημοσιογραφική ομάδα: Αναλαμβάνει τη συγκέντρωση των πρωτογενών δεδομένων (data). Συμπληρώνει το φύλλο καταγραφής απορριμμάτων, αναλύει και παρουσιάζει τα συμπεράσματα της έρευνας (Τι είδους απορρίμματα υπάρχουν, από ποιες ανθρώπινες δραστηριότητες προκύπτουν, συνάφεια απορριμμάτων με τις ανθρωπογενείς δραστηριότητες κλπ).

Τα στάδια πραγματοποίησης της έρευνας είναι τα ακόλουθα:

- Ερεύνα πεδίου: Στην έρευνα πεδίου οι δύο ομάδες συγκεντρώνουν το υλικό από την επιτόπια έρευνα στην ακτή.

- Επεξεργασία στοιχείων: Οι δύο ομάδες επεξεργάζονται τα στοιχεία που έχουν συλλέξει. Η φωτογραφική ομάδα ομαδοποιεί το φωτογραφικό υλικό. Η δημοσιογραφική ομάδα αναλύει τα δεδομένα από τα φύλλα καταγραφής απορριμμάτων σε λογιστικό φύλλο Excel, ώστε να γίνει η ομαδοποίηση και στατιστική τους επεξεργασία.
- Καταγραφή των συμπερασμάτων και προτάσεων για την αντιμετώπιση του προβλήματος.
- Παρουσίαση της έρευνας σε μορφή Power Point με την χρησιμοποίηση του φωτογραφικού υλικού, των στατιστικών συμπερασμάτων και των τρόπων αντιμετώπισης του προβλήματος.

Πηγές/Υλικό
Πολύ σημαντικό είναι το κομμάτι της παραπομπής στις πηγές, από τις όποιες θα αντλήσουν οι μαθητές υλικό για την έρευνα τους. Ο εκπαιδευτικός θα πρέπει από πριν να έχει επιλέξει και αξιολογήσει το υλικό, ώστε να ανταποκρίνεται στις ερωτήσεις που θέλει να θέσει. Για τη συγκεκριμένη ιστοεξερεύνηση πηγές αποτελούν ιστοσελίδες διαφόρων Κρατικών Οργανισμών, Μη Κυβερνητικών Οργανώσεων και επιστημονικών άρθρων.

Αξιολόγηση.
Ένα από τα χαρακτηριστικά των ιστοεξερευνήσεων είναι ότι οι μαθητές δεν περιορίζονται στη αναζήτηση της πληροφορίας, αλλά συνεχίζουν σε μεταγνωστικό επίπεδο με την αξιολόγηση των στόχων της δραστηριότητας και μέσω της ανατροφοδότησης που λαμβάνουν. Η αξιολόγηση γίνεται με ρουμπρίκες επίδοσης όπου ο μαθητής αξιολογεί τη προσπάθειά του σε σχέση με τους στόχους της ενέργειας, τη συμμετοχή του στην ομάδα, την τελική παρουσίαση, το βαθμό κάλυψης του υπό εξέταση θέματος κ.α.

Συμπεράσματα
Το τελευταίο στάδιο της ιστοεξερεύνησης είναι η εξαγωγή συμπερασμάτων από όλη την ομάδα σχετικά με την έρευνα, τις δραστηριότητες που υλοποιήθηκαν, τα οφέλη που προέκυψαν και τις ενδεχόμενες μελλοντικές δράσεις.

Επιπλέον στοιχεία
Πέρα από τα παραπάνω βασικά στάδια που θα πρέπει να υπάρχουν σε κάθε ιστοεξερεύνηση, ο εκπαιδευτικός μπορεί να εμπλουτίσει το έργο του με περαιτέρω στοιχεία και δραστηριότητες. Στην προκειμένη περίπτωση, υπάρχουν 5 επιπλέον δραστηριότητες, τις οποίες μπορούν να υλοποιήσουν είτε μετά την ολοκλήρωση του τελικού σταδίου της έρευνας, είτε παράλληλα με τη διεξαγωγή της.
Η πρώτη δραστηριότητα με τίτλο «ώρα για παιχνίδι» αφορά κάποια διαδικτυακά παιχνίδια, τα οποία έχουν να κάνουν με το περιβάλλον και συγκεκριμένα με τη ρύπανση των θαλασσών και ακτών. Οι εκπαιδευτικοί που ασχολούνται με τα Περιβαλλοντικά Προγράμματα δεν θα πρέπει να ξεχνάνε ότι επειδή ακριβώς η συμμετοχή των μαθητών είναι εθελοντική, ο σχεδιασμός των προγραμμάτων θα πρέπει να ξεφεύγει από τα δεδομένα πλαίσια των αναλυτικών προγραμμάτων και να προάγει με τη δημιουργική και ψυχαγωγική καλλιέργεια των μαθητών. Στο πλαίσιο αυτό κινούνται και οι επόμενες δύο δραστηριότητες ψυχαγωγίας.
Στην πρώτη από αυτές, οι μαθητές καλούνται να συμπληρώσουν σε ένα συγκεκριμένο χρονικό διάστημα ένα σταυρόλεξο με περιβαλλοντική ορολογία. Επιπλέον, καλούνται να αναπτύξουν τη φαντασία και τη δημιουργικότητα τους μέσα από comics. Για το σκοπό αυτό έχουν επιλεγεί διάφορα αποσπάσματα από γνωστά comics, τα οποία απεικονίζουν θαλάσσια τοπία. Οι μαθητές καλούνται να φανταστούν τι θα μπορούσαν να συζητάνε οι ήρωες σε σχέση με τα απορρίμματα στη θάλασσα και να το αποτυπώσουν στο χαρτί.

Σχήμα 2: Η δραστηριότητα ψυχαγωγίας.

Δύο ακόμη δραστηριότητες που αναπτύσσονται στην ιστοεξερεύνηση είναι δραστηριότητες μελέτης. Οι δραστηριότητες αυτές είναι διαθεματικές και οι μαθητές έχουν την ευκαιρία να έρθουν αντιμέτωποι με πραγματικά προβλήματα και μέσω των γνώσεων τους, να διαμορφώσουν άποψη και προτάσεις για την επίλυσή τους.

Στην πρώτη δραστηριότητα μελέτης οι μαθητές καλούνται να ασχοληθούν με ένα επιστημονικό άρθρο σχετικά με την ποιότητα του περιβάλλοντος σε συνάρτηση με την ανάπτυξη του ελληνικού τουρισμού. Οι μαθητές καλούνται να απαντήσουν σε ερωτήσεις σε σχέση με το κείμενο, ενώ σε ένα χάρτη ενός αγροτικού τοπίου τους ζητείται να αποτυπώσουν τις ανθρωπογενείς δραστηριότητες και τις συνέπειες αυτών στο περιβάλλον.

Η επόμενη δραστηριότητα μελέτης μπορεί να υλοποιηθεί σε συνδυασμό ή και ανεξάρτητα από την προηγούμενη. Το θέμα της είναι ο τουρισμός και η οικονομική ανάπτυξη, με έμφαση στον εναλλακτικό τουρισμό. Η παρουσίαση της δραστηριότητας γίνεται με την προβολή ενός βίντεο από την εκπομπή της ΕΡΤ «Μένουμε Ελλάδα». Καθώς η προβολή ενός αρχείου βίντεο ή ταινίας δεν θα πρέπει ποτέ να θεωρηθεί «αυτοσκοπός» ούτε να γίνεται για να περάσει η ώρα (Whitehead - Μακρίδου 1995),ο εκπαιδευτικός θα πρέπει να αφιερώσει κάποιο χρόνο προκειμένου να διευκρινίσει τις ερωτήσεις που θα πρέπει να απαντήσουν οι μαθητές και να τους ενθαρρύνει να είναι παρατηρητικοί και να κρατάνε σημειώσεις κατά την διάρκεια της προβολής της ταινίας. Με αυτόν τον τρόπο, επίσης, καλλιεργείται και ο «οπτικός αλφαβητισμός» (visual literacy) «ως ένα είδος μόρφωσης που καλλιεργεί τις δεξιότητες κατανόησης, κριτικής ανάγνωσης και παραγωγής των εικόνων του σύγχρονου οπτικού πολιτισμού» (Μπέλλου, 2003)

Συμπεράσματα

Από το Φεβρουάριο του 1995 που σχεδιάστηκε, το μοντέλο της ιστοεξερεύνησης κερδίζει ολοένα και αυξανόμενη απήχηση και πλέον πάνω από δέκα χιλιάδες εκπαιδευτικοί το έχουν ενσωματώσει στις διδακτικές τους μεθόδους. Καθώς οι δραστηριότητες που υλοποιούνται στα πλαίσια μίας ιστοεξερεύνησης έχουν ομαδοσυνεργατικό και βιωματικό χαρακτήρα, προτείνεται η υιοθέτησή τους ως εργαλείων υλοποίησης προγραμμάτων περιβαλλοντικής εκπαίδευσης, με τελικό στόχο την καλλιέργεια του «περιβαλλοντικού αλφαβητισμού». Η συγκεκριμένη ιστοεξερεύνηση σχεδιάστηκε τον Μάιο του 2010 στο πλαίσιο του προγράμματος τηλεκπαίδευσης που υλοποιήθηκε από το ΚΠΕ Έδεσσας και αναμένεται να υλοποιηθεί το επόμενο χρονικό διάστημα σε πρόγραμμα Περιβαλλοντικής Εκπαίδευσης.

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Ο Ρόλος της Διεύθυνσης Σχολικής Μονάδας στη Βιώσιμη Εισαγωγή και Εφαρμογή των Τ.Π.Ε ως Καινοτομιών

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Περίληψη

Οι ΤΠΕ κατέχουν σημαντική θέση στην καρδιά του ήθους της σύγχρονης σχολικής καινοτομίας. Στην περίπτωση των σχολικών οργανισμών, η εμπνευσμένη σχολική διοίκηση αναδεικνύεται σε σημαντικό παράγοντα στη βιώσιμη εφαρμογή και διάχυση των καινοτομιών. Η σχολική ηγεσία μπορεί να διαμορφώσει δραστικά το σύγχρονο σχολικό ήθος λειτουργώντας ως μοχλός ή καταλύτης για την αποτελεσματική εισαγωγή και την επιτυχημένη αειφόρο διαχείριση της καινοτομίας. Η μελέτη περίπτωσης που παρουσιάζεται στην παρούσα εργασία εστιάζεται στη διοίκηση ενός δημόσιου Δημοτικού σχολείου που βρίσκεται σε μια κοινωνικά και οικονομικά δύσκολη αστική περιοχή στο κέντρο της Αθήνας. Στόχος της έρευνας είναι να αποτυπώσει και να αναδείξει το ενδιαφέρον σχετικά με τον κρίσιμο διοικητικό και οργανωτικό ρόλο της σχολικής διοίκησης στην προώθηση και αειφόρο διάχυση της καινοτομίας μέσω των ΤΠΕ στη σχολική οργάνωση. Τα αποτελέσματα της παρούσης έρευνας μπορούν να αποτελέσουν κίνητρο για επιπλέον έρευνα και να ανακινήσουν το ενδιαφέρον σχετικά με τον επιδραστικό ρόλο της σχολικής διοίκησης στη διαμόρφωση ενός καινοτόμου σχολικού ήθους σε δύσκολους καιρούς.

Λέξεις-κλειδιά: Διευθυντής, Καινοτομία, Τ.Π.Ε, Μελέτη Περίπτωσης, Δημοτικό σχολείο.

Abstract

Information and Communication Technologies hold a dominant position at the core of modern school innovativeness. In the case of educational organizations, school administration and inspired leadership emerge as a key factor in the sustainable implementation and diffusion of innovations. Educational leadership can radically shape modern school ethos serving as a lever or catalyst for the effective introduction and successful management of sustainable innovation. The case study research presented in this paper focuses on the administration of a public elementary school situated in a Greek socially and financially challenged urban area in the center of Athens. Its aim is to reflect and evoke awareness for the crucial educational and organizational role of school administration in promoting and diffusing innovation through ICT practices in a school organization. Findings of this research can be a motive for further study and raise awareness concerning the influential role of school management in shaping an innovative school ethos in ominous times.

Keywords: School Head, Innovation, ICT, Case Study, Greek Elementary school.

Εισαγωγή

Η διοίκηση της σχολικής μονάδας είναι μία από τις σημαντικότερες λειτουργίες του σχολικού οργανισμού και αποσκοπεί στην πραγματοποίηση των στόχων που επιδιώκονται από αυτόν. Επηρεάζει καθοριστικά την εκπαιδευτική αποτελεσματικότητα του σχολικού οργανισμού αλλά και διαμορφώνει καθοριστικά τις πρακτικές και τη φιλοσοφία του (Σαΐτης, 2008).
Βασικός σκοπός της σχολικής διοίκησης πρέπει να είναι η αναζήτηση και υιοθέτηση νέων, καινοτόμων, σύγχρονων και αποδοτικών μεθόδων, που σχετίζονται με την ποιοτική αναβάθμιση

της εκπαιδευτικής διαδικασίας αλλά και του διοικητικού, γραφειοκρατικού έργου της. Οι Τεχνολογίες της Πληροφορίας και των Επικοινωνιών (Τ.Π.Ε), αποτελούν αλλά και θεωρούνται σήμερα κορυφαίο και σύγχρονο μέσο για την επίτευξη των στόχων της σχολικής διοίκησης τόσο στην εκπαιδευτική διαδικασία, όσο και στη διεκπεραίωση των διοικητικών διεργασιών (Τζιμογιάννης & Κόμης, 2004).

Τα σύγχρονα σχολεία της πρωτοβάθμιας εκπαίδευσης παρουσιάζονται να αξιοποιούν λοιπόν, όλο και περισσότερο τις Νέες Τεχνολογίες, στην καθημερινή πραγματικότητα, αξιοποιώντας τα σύγχρονα τεχνολογικά επιτεύγματα τόσο στη διδακτική πράξη όσο και στις διοικητικές εργασίες. Όμως, η ενσωμάτωση των Τ.Π.Ε στη διοικητική πράξη, δεν είναι ενιαία και κοινή σε όλα τα σχολεία της πρωτοβάθμιας εκπαίδευσης, καθώς παρατηρείται έλλειψη στην τεχνολογική υποδομή και στην επιμόρφωση των διοικητικών στελεχών. Διάφορες μελέτες αξιολόγησης της χρήσης των Τ.Π.Ε δείχνουν πως στη μεγάλη τους πλειονότητα τα ελληνικά σχολεία δεν έχουν ακόμη προσκομίσει τα αναμενόμενα οφέλη από τις Τ.Π.Ε (Κυνηγός κ. ά., 2002).

Η Θεωρία της «διάχυσης» της καινοτομίας του Rogers

Ως «καινοτομία» ορίζεται από τον Rogers «κάθε ιδέα, πρακτική ή αντικείμενο, το οποίο γίνεται αντιληπτό ως καινούργιο από κάποιο άτομο ή κάποια ομάδα που το υιοθετεί» (Rogers, 2003: 93). Ως «διάχυση» ορίζεται «η διαδικασία κατά την οποία μια καινοτομία διαδίδεται μέσω ορισμένων καναλιών, με την πάροδο του χρόνου, ανάμεσα στα μέλη ενός κοινωνικού συστήματος» (Rogers, 2003: 93-95). Τέσσερις βασικές παράμετροι συνθέτουν το φαινόμενο των καινοτομιών κατά Rogers: (α) η ίδια η καινοτομία, (β) τα κανάλια διάδοσής της, πώς δηλαδή οι σχετικές πληροφορίες περνούν από το ένα άτομο στο άλλο (communication), (γ) ο παράγων «χρόνος» και (δ) η «φύση» της κοινωνίας, στην οποία εισάγεται η καινοτομία.

Σχετικά με το «χρόνο» της διαδικασίας υιοθέτησης μιας καινοτομίας (adoption process) ο Rogers (2003) διακρίνει πέντε στάδια: (α) πρώτη γνώση της καινοτομίας, (β) διαμόρφωση στάσης απέναντί της μέσω της αναζήτησης σχετικής πληροφόρησης, (γ) απόφαση υιοθέτησης ή απόρριψής της, (δ) εφαρμογή της καινοτομίας. Σημαντικό στοιχείο του σταδίου αυτού είναι η «επαν-επινόηση» (re-invention), που ορίζεται ως «ο βαθμός στον οποίο μια καινοτομία μεταβάλλεται ή τροποποιείται από τον χρήστη κατά τη διαδικασία της υιοθέτησής της και της εφαρμογής της» και τέλος η (ε) επιβεβαίωση της ειλημμένης απόφασης ή υπαναχώρηση (δες σχήμα 2). Ανάλογα με το ρυθμό υιοθέτησης μιας καινοτομίας κατηγοριοποιεί το σώμα των αποδεκτών της σε (α) νεωτεριστές (innovators), (β)πρώιμους αποδέκτες (early adopters), (γ) πρώιμη πλειοψηφία (early majority), (δ) ύστερη πλειοψηφία (late majority) και (ε) βραδυπορούντες (laggards) (Δες σχήμα 2).

Ως προς τον παράγοντα «φύση» της κοινωνίας όπου διαχέεται η καινοτομία, ιδιαίτερη έμφαση δίνεται στο ρόλο της υπάρχουσας κοινωνικής δομής, τυπικής με τις ιεραρχίες της και άτυπης με τη λειτουργία των διαπροσωπικών σχέσεων. «Φορείς αλλαγής» (change agents) και «διαμορφωτές της κοινής γνώμης» (opinion leaders) είναι όροι που αποδίδονται σε στελέχη των οποίων ο ρόλος είναι κομβικός στο σύστημα του «δικτύου επικοινωνιών» (communicational network: άτομα που συνδέονται μεταξύ τους με ροή πληροφοριών που βασίζεται σε συγκεκριμένα πρότυπα), στο οποίο στηρίζεται η διαδικασία διάχυσης της καινοτομίας. Πολύ σημαντικός για τη διάχυση της καινοτομίας είναι ο ρόλος του ευρύτερου πολιτισμικού πλαισίου(context).
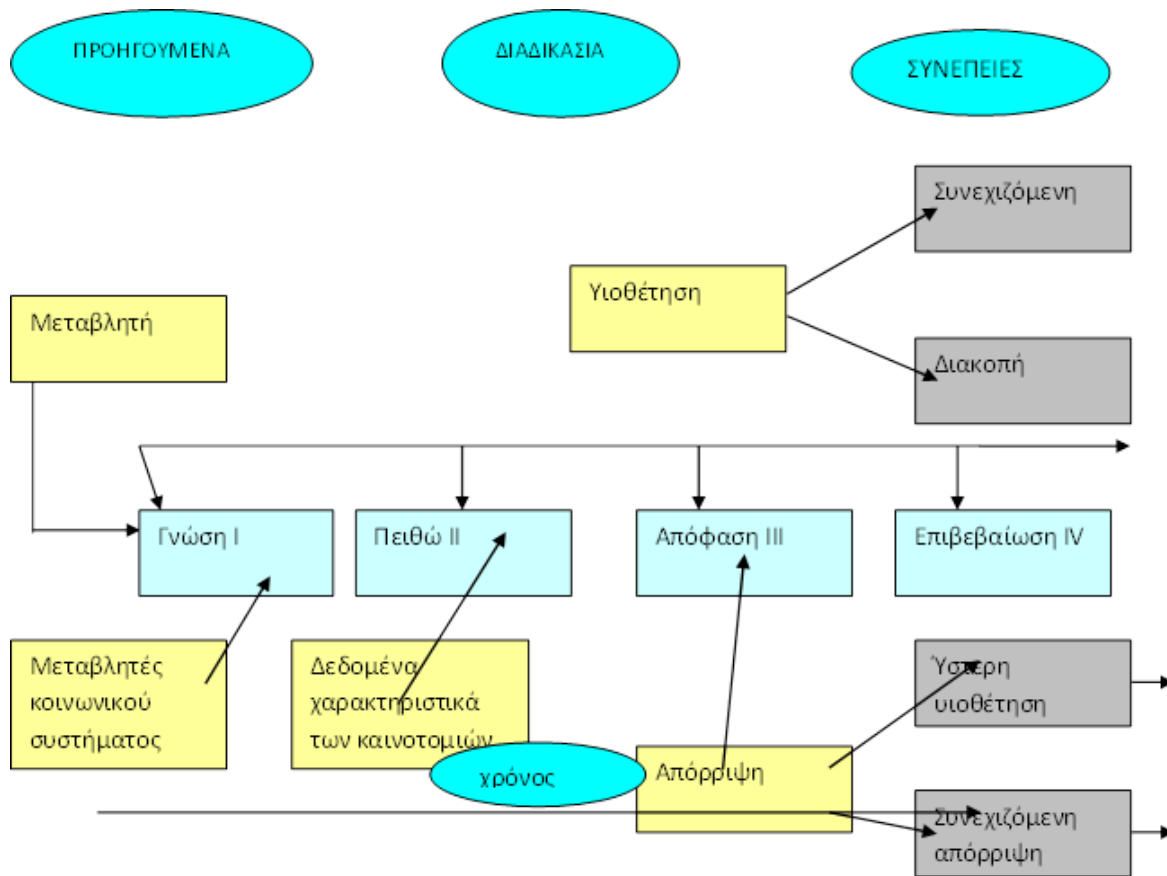
Σχήμα 1: Το μοντέλο διάχυσης καινοτομίας του Rogers(2003).

Η εισαγωγή των Τ.Π.Ε στην εκπαίδευση ως καινοτομία

Στον πυρήνα του μετασχηματισμού των εκπαιδευτικών δομών που επιβάλλει η κοινωνία της πληροφορίας δεσπόζουσα θέση κατέχουν οι νέες τεχνολογίες, γνωστές ως Τεχνολογίες Πληροφορίας και Επικοινωνιών που σύμφωνα με το Συμβούλιο της Ευρωπαϊκής Ένωσης (Πασιάς, 2006) συνιστούν σημαντικό τομέα με επιρροές σε όλες σχεδόν τις οικονομικές δραστηριότητες, έχουν άμεσο αντίκτυπο στην παραγωγικότητα και ανταγωνιστικότητα της οικονομίας και αποτελούν πολύτιμο εργαλείο τόνωσης της κοινωνικής/ γεωγραφικής συνοχής επειδή περιορίζουν το φαινόμενο του κοινωνικού αποκλεισμού, προωθούν την κοινωνική ένταξη και πολυγλωσσία και συμβάλλουν στην αύξηση της διαφάνειας. Έτσι, στα πλαίσια της στρατηγικής της Λισσαβόνας για την ενδυνάμωση της Ευρωπαϊκής Ένωσης μπροστά στις προκλήσεις της παγκοσμιοποίησης και της οικονομίας της γνώσης, το Συμβούλιο της Στοκχόλμης (2001) αποφάσισε την υιοθέτηση συγκεκριμένων μελλοντικών στρατηγικών στόχων στο πεδίο της εκπαίδευσης και της κατάρτισης που συνοψίζονται στην απόκτηση: "Ποιότητας", "Προσβασιμότητας" και "Ανοιχτότητας" για τα εκπαιδευτικά συστήματα των κρατών – μελών της. Το κεντρικό ζήτημα στο οποίο εστιάζει ο πρώτος στρατηγικός στόχος αφορά, αφενός στην παροχή επαρκούς εξοπλισμού και εκπαιδευτικού λογισμικού (αξιοποίηση των Τ.Π.Ε και της ηλεκτρονικής μάθησης) και αφετέρου στην ενθάρρυνση της χρήσης καινοτόμων τεχνικών διδασκαλίας και μάθησης που βασίζονται στις Τ.Π.Ε.

Σύμφωνα με τους Mooji & Smeets (2001) η εισαγωγή των Τ.Π.Ε στον εκπαιδευτικό χώρο στοχεύει στην υιοθέτηση τεχνολογικών εφαρμογών στη μάθηση, στην παρακολούθηση της επίδοσης των μαθητών αλλά και στη διοίκηση και οργάνωση του σχολικού χώρου. Είναι το στήριγμα τη Κοινωνίας της Πληροφορίας, αλλά και ο καταλύτης για τη μορφοποίηση της εκπαιδευτικής διαδικασίας, Στο πλαίσιο αυτό των νέων τεχνολογιών, η σύγχρονη σχολική μονάδα καλείται να εισάγει και να αξιοποιήσει τις Τ.Π.Ε ως καινοτομία σε δυο βασικούς τομείς στο

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σχολείο: στην εκπαιδευτική διαδικασία και στην περάτωση της διοικητικής εργασίας (Μακράκης, 2006).

Ο ρόλος του σύγχρονου καινοτόμου διευθυντή

Είναι αντιληπτό ότι ο Διευθυντής σήμερα δεν μπορεί να αποτελεί ένα απλοϊκό μοντέλο διεκπεραιωτή (Μιχόπουλος, 1998). Πρέπει πάντα να θυμάται ότι κάθε Εκπαιδευτική Μονάδα εντάσσεται σε ένα ευρύτερο σύστημα, το οποίο είναι αλληλένδετο με την κοινωνία, που το περιβάλει και για να είναι επιτυχημένος θα πρέπει να φροντίζει να διατηρεί επαφές και να ενημερώνεται για τις πολλαπλές εξελίξεις και ανάγκες. (Everard & Morris, 1999). Αυτό επιτυγχάνεται επικοινωνώντας ειδησεογραφικά με τον έξω κόσμο αλλά και με την καλλιέργεια θετικής νοοτροπίας, (Everard & Morris, 1999), μέσα στην εκπαιδευτική μονάδα, αναγνωρίζοντας ότι ο ρόλος του είναι να καθοδηγήσει τη σχολική μονάδα μέσα στο λαβύρινθο της αλλαγής, με διερευνητικές συζητήσεις με τους συναδέλφους του, (Everard & Morris, 1999) εφαρμόζοντας και υποστηρίζοντας εκπαιδευτικές καινοτομίες που προέρχονται μέσα από την ίδια την εκπαιδευτική κοινότητα, με συλλογικές διαδικασίες και συναντήσεις (Everard & Morris, 1999).
Επίσης, από πολλούς ερευνητές συνδέεται η αποτελεσματικότητα του διευθυντή με την προώθηση καινοτομιών στο σχολείο. Επομένως, οι ηγέτες αποτελούν το κύριο φορέα καινοτομιών στο σχολείο καθώς συμβάλλουν στη διαδικασία εισαγωγής νεωτερισμών, επιβλέπουν τον τρόπο με τον οποίο εισάγονται οι αλλαγές και τέλος, ευθύνονται για την επιτυχία ή την αποτυχία των εκπαιδευτικών καινοτομιών ανάλογα με το ενδιαφέρον το οποίο παρουσιάζουν (Πασιαρδής, 2004· Ράπτης & Βιτσιλάκη, 2007).
Ένας καινοτόμος διευθυντής-ηγέτης προωθεί την παρώθηση και την παρακίνηση των μαθητών και των εκπαιδευτικών και την προσφορά ίσων ευκαιριών μάθησης. Έχει σταθερή διοικητική πορεία, είναι δηλαδή αξιόπιστος, δημιουργεί κλίμα αλληλοσεβασμού, έχει την ικανότητα να θέτει στόχους, και να τους πραγματοποιεί, ευελιξία, και να αναλαμβάνει πρωτοβουλίες (Ιορδανίδης, 2006). Εμπιστεύεται, δημιουργεί βιώσιμα θετικό, ευχάριστο και δημιουργικό κλίμα, διαχειρίζεται ορθολογικά τα οικονομικά του σχολείου, έχει την ικανότητα καθοδήγησης των μαθητών και επιβολής της πειθαρχίας, έχει την ικανότητα να επηρεάζει τα μέλη της σχολικής κοινότητας και να τα οδηγεί σε θετικά αποτελέσματα, συλλέγει πληροφορίες, συνεργάζεται με μαθητές, γονείς, διδακτικό προσωπικό και άλλους φορείς (Everard & Morris, 1999). Με αυτόν τον τρόπο το σχολικό περιβάλλον οδηγείται στη βιώσιμη ανάπτυξη μέσω του ρόλου του διευθυντή.

Έρευνα STEPS, ΤΠΕ, βιώσιμη καινοτομία και ελληνική εκπαίδευση

Σύμφωνα με την ευρωπαϊκή έρευνα STEPS για την καινοτομία μέσω ΤΠΕ, με ποσοστό 33% των εκπαιδευτικών να χρησιμοποιούν υπολογιστές στην τάξη, η Ελλάδα κατατάσσεται 27η στην Ευρώπη. Η έμφαση εδώ είναι περισσότερο για τη χρήση από τους εκπαιδευτικούς παρά από τους μαθητές. Στις περισσότερες περιπτώσεις, το 25% του συνόλου των εκπαιδευτικών πρωτοβάθμιας χρησιμοποιούσαν υπολογιστές στην τάξη για παρουσίαση ή επίδειξη, ενώ το 20% του συνόλου των δασκάλων (ή το 60% των υπολογιστών που χρησιμοποιούν οι εκπαιδευτικοί) εργάζονται με τους μαθητές με ηλεκτρονικούς υπολογιστές στην τάξη (έρευνα STEPS, 2006).
Όλα τα ελληνικά δημοτικά σχολεία που ρωτήθηκαν χρησιμοποιούν τους υπολογιστές για την εκμάθηση και σχεδόν όλα έχουν πρόσβαση στο διαδίκτυο. Ένα μάλλον μικρό μέρος από αυτά χρησιμοποιεί το διαδίκτυο μέσω ευρυζωνικής σύνδεσης (8%, 27η θέση στην Ευρώπη). Τα Ελληνικά σχολεία σε μεγάλο βαθμό έχουν υιοθετήσει μια νωθρή θέση όσον αφορά τη χρήση των Τ.Π.Ε: 28% των σχολείων πρωτοβάθμιας εκπαίδευσης έχουν μια ιστοσελίδα, το 47% προσφέρουν e-mail σε δασκάλους, και 5% προσφέρει και στους μαθητές. Οι δάσκαλοι στην Ελλάδα, σε σύγκριση με την υπόλοιπη Ευρώπη, είναι πιο αισιόδοξοι από ό, τι ο ευρωπαϊκός μέσος όρος. Στο «δείκτη αισιοδοξίας των επιπτώσεων» που συνδυάζει κυρίως τα δύο στοιχεία, η Ελλάδα κατατάσσεται 11 από 27, με τη Μάλτα, την Πολωνία και την Κύπρο.

Η Ελλάδα, αν και είναι η χώρα με τα χαμηλότερα επίπεδα των εκπαιδευτικών με δεξιότητες στη χρήση των Τ.Π.Ε στην τάξη, έχει μάλλον υψηλά επίπεδα αισιοδοξίας όσο αφορά τις επιπτώσεις και βιώσιμες εφαρμογές από την χρήση των Τ.Π.Ε. Παρόμοια ποσοστά έχουν χώρες τόσο διαφορετικές σε σχέση με τις δεξιότητες και τη χρήση των Τ.Π.Ε, όπως η Ιταλία, η Λιθουανία, οι Κάτω Χώρες, το Ηνωμένο Βασίλειο και τη Σλοβενία. (έρευνα STEPS 2006).

Έρευνα

Στόχος της συγκεκριμένης μελέτης περίπτωσης είναι: α) να διερευνηθεί ο καινοτόμος ή μη, σύμφωνα με το μοντέλο του Rogers (2003), ρόλος της σχολικής διεύθυνσης στην εισαγωγή, χρήση των ΤΠΕ σε πραγματική σχολική μονάδα και β) να εξεταστεί συστημικά ο ρόλος της σχολικής διεύθυνσης στην εισαγωγή των ΤΠΕ ως βιώσιμη καινοτομία στη σχολική ζωή στην πράξη, σε δημόσιο δημοτικό σχολείο, όπου εξετάζεται αναλυτικά όλη η περιπλοκότητα και η εμπλοκή της διεύθυνσης στη διάχυση και εφαρμογή της καινοτομίας σε πραγματικό σχολικό περιβάλλον, με ιδιαιτερότητες και χαρακτηριστικά (οικονομικά, κοινωνικά προβλήματα) που το καθιστούν ιδιαίτερο και ξεχωριστό, δηλαδή άξιο προς μελέτη.
Βασικό ερευνητικό και μεθοδολογικό εργαλείο ερμηνείας του ρόλου του διευθυντή ως μοχλού και καταλύτη εισαγωγής καινοτομιών είναι η μελέτη περίπτωσης όπως αυτή ορίζεται από τους Cohen & Manion (1996) και κυρίως από τον R. K. Yin (2003, 2009) μέσω ερευνητικού πρωτοκόλλου. Η ερμηνεία των οργανωσιακών αλλαγών της σχολικής μονάδας βασίστηκε στα μοντέλα των Lewin (Schein, 1995) και Fullan (1991) ενώ το βασικό μεθοδολογικό εργαλείο μελέτης της καινοτομίας και σχηματισμού των κεντρικών υποθέσεων της μελέτης περίπτωσης βασίστηκε κυρίως στο μοντέλο διάχυσης της καινοτομίας του Rogers (2003), εστιασμένο όμως στον οργανοσυστημικό ρόλο του διευθυντή (παιδαγωγικός και διοικητικός ρόλος) ως μέλους της σχολικής κοινότητα και του κοινωνικού πλαισίου στο οποίο εντάσσεται. Για τη μέτρηση της βιώσιμης καινοτομικότητας του σχολείου σε σχέση με υπόλοιπα σχολεία της περιοχής και ιδιαίτερα του συστεγαζόμενου, έγινε χρήση του μοντέλου των Russell & Russell (1992) και της «τρίαινας» (Ellis & Hogard, 2006). Τέλος για την ερμηνεία των χαρακτηριστικών του διευθυντή που ευνόησαν την εισαγωγή των Τ.Π.Ε χρησιμοποιήθηκε και το μοντέλο που προτείνει η έρευνα των Flanagan & Jacobsen (2003).
Η παρατήρηση και μελέτη της σχολικής μονάδας ήταν διετής διάρκειας. Για την εκπόνηση του μεθοδολογικού εργαλείου (πρωτοκόλλου) της εργασίας χρησιμοποιήθηκαν ως πρότυπα οι οδηγοί: «Methodology for Case Studies of Organisational Change», «A Workbook for Case Studies Of Organisational Change (Version 9b—8 August 2000)» του ΟΟΣΑ και ο πολύ σημαντικός «Case study research» του Robert Yin (2009). Σε αυτούς βασίστηκαν οι έρευνες του ΟΟΣΑ, το πρόγραμμα SITES της IEA και τέλος η έρευνα STEPS.
Η προσέγγιση δηλαδή της αλλαγής στο σχολείο και της διάχυσης της καινοτομίας ήταν **οργανοσυστημική**, δηλαδή η αλλαγή -καινοτομία ερμηνεύτηκε και παρουσιάστηκε σε βιώσιμη συστημική σχέση με το σχολικό οργανισμό και το βασικό παιδαγωγικό του σκοπό και όχι ως ξεχωριστός διοικητικός ή μηχανογραφικός μηχανισμός. Επίσης η βιώσιμη συστημική προσέγγιση της καινοτομίας προσέγγισε το έργο του διευθυντή, τόσο από την οργανωτική- ηγετική του διάσταση όσο και την βασική παιδαγωγική, με κύριο άξονα την ηγετική του φυσιογνωμία. Εξετάζουμε δηλαδή το ρόλο του διευθυντή μέσα από οργανωτικές- παιδαγωγικές καινοτομίες μέσω των Τ.Π.Ε.
Συγκεκριμένα το υλικό συγκεντρώθηκε από:
- Συνεντεύξεις (γραπτές) από τον ερευνητή με τους δασκάλους και τη διοίκηση σχολείου (6).
- Συνεντεύξεις (γραπτές) από τον ερευνητή με τους γονείς και τους μαθητές, κυρίως ΣΤ' τάξης αλλά και Α' Δημοτικού (10).
- Επί τόπου παρατηρήσεις των τάξεων από τον ερευνητή(50+ μαθήματα που παρατηρήθηκαν, πρώτου τρίωρου και κυρίως προγραμμάτων Νέων Τεχνολογιών και Ευέλικτης ζώνης).
-216 ώρες παρακολούθησης της σχολικής ζωής από τον ερευνητή (.
- Παρατήρηση της γραπτής και οπτικής επικοινωνίας του σχολείου (σχολείο αρχική σελίδα, τα θέματα της ηλεκτρονική εφημερίδας του σχολείου, αρχικές σελίδες των εκπαιδευτικών που

σχετίζονται με ειδικούς κλάδους), του σχολικού ηλεκτρονικού περιοδικού και του ηλεκτρονικού καναλιού(you tube) από τον ερευνητή.

- Καταγραφή του ψηφιακού διδακτικού υλικού που αναπτύχθηκε από το προσωπικό και τους μαθητές (PowerPoint παρουσιάσεις των μαθητών και των εκπαιδευτικών) από τον ερευνητή..

-Ερωτηματολόγιο σχετικά με τη χρήση των Τ.Π.Ε, το 88% απάντησε (22 από τους 25).

-Κριτική ανάγνωση από τον ερευνητή των αιτήσεων σχεδίων και των εκθέσεων από τα μέλη του προσωπικού για τις επιχορηγήσεις και τις δωρεές στο σχολείο από ιδιώτες και από ιδρύματα σχετικά με τις Τ.Π.Ε.

- Παρατήρηση των εργασιών μαθητών που γίνονται με τη βοήθεια των ηλεκτρονικών υπολογιστών (έγγραφα, παρουσιάσεις, δοκιμές, δημιουργική εργασία, προγράμματα ηλεκτρονικών υπολογιστών κ.λπ.).

Πλαίσιο σχολικής μονάδας

Το σχολείο στο ερευνήσαμε τον ρόλο του διευθυντή στην εισαγωγή των Τ.Π.Ε ως ριζικό παράγοντα καινοτομικής αναμόρφωσης και αναπλαισίωσης του εκπαιδευτικού έργου, είναι ένα δημόσιο, δωδεκαθέσιο δημοτικό σχολείο. Το σχολείο βρίσκεται στην περιοχή του Αγίου Ελευθερίου Αθηνών, σε μια σχετικά πολιτιστικά και οικονομικά στερημένη περιοχή που από το 1990 και μετά βίωσε μια ραγδαία αύξηση του αριθμού των αλλοδαπών παιδιών με αποκορύφωμα το 2004.Ειδικότερα φοιτούν 218 μαθητές εκ των οποίων το 29, 5 % είναι αλλοδαποί με ποσοστό 1 εώς 2 % πολιτιστικές μειονότητες, ποσοστό που συνεχώς αυξάνεται (Ινδοί Σιχ, Μογγόλοι, Αφγανοί, Νιγηριανοί και άλλοι). Οι εκπαιδευτικοί είναι 24 (μόνιμοι, αναπληρωτές και ωρομίσθιοι σε πρωινό και ολοήμερο σχολείο) με 5 να είναι έως 35 ετών, 18 εκπαιδευτικοί είναι 36 ως 50 και μία άνω των 50. Αρκετοί είναι οι καινούργιοι εκπαιδευτικοί στο σχολείο με λιγότερο από 3 χρόνια στο σχολείο, γεγονός που δικαιολογείται από το βαθμό δυσκολίας της εκπαιδευτικής μονάδας. Ο βαθμός εμπειρίας των εκπαιδευτικών είναι κατά μέσο όρο μεγάλος για την πλειοψηφία με 13 εκπαιδευτικούς να έχουν πάνω από 10 έτη, 10 με 4 ως 10 έτη και μια συνάδελφο με ένα έτος.

Το σχολείο όπως αναφέρει ο διευθυντής, ως κεντρικό σημείο αναφοράς δημοτικών και πολιτιστικών δραστηριοτήτων, χαρακτηρίζεται από ικανοποιητική υλικοτεχνική υποδομή λόγω της φροντίδας της Δημαρχίας Αθηνών και του ενεργητικού συλλόγου Γονέων(συνδικαλιστική-οικονομική- πολιτιστική). Ιδιαίτερη εντύπωση προκαλεί το κλίμα ομόνοιας και αλληλεγγύης ανάμεσα σε γονείς, διεύθυνση και εκπαιδευτικούς όπως δηλώνει ο σχολικός σύμβουλος. Η κατάσταση του κτιρίου είναι καλή με 756 τ.μ επιφάνεια εσωτερικού χώρου. και 1244 τ.μ. επιφάνεια εξωτερικού χώρου. Στο κτίριο υπάρχουν τρεις ειδικά εξοπλισμένες αίθουσες εκδηλώσεων, πληροφορικής και Χημείας (εργαστήριο Φυσικής) και ειδικός χώρος σχολικής βιβλιοθήκης. Για την προαγωγή του αθλητισμού υπάρχουν δύο γήπεδα πετοσφαίρισης και δύο καλαθοσφαίρισης.

Ο ερευνητής (Ποταμιάς Γεώργιος) υπήρξε επί τρία έτη παρών στη σχολική μονάδα ως συνεργάτης του καθηγητή Ηλία Ματσαγγούρα στο μάθημα Διδακτική Μεθοδολογία I και II ως συντονιστής της ομάδας φοιτητών στα πλαίσια των παρακολουθήσεων, των διδασκαλιών αλλά και των ερευνών στο υπό μελέτη σχολείο.

ΑΠΟΘΗΚΗ 2ος ΟΡΟΦΟΣ

ΣΚΑΛΑ 2ος ΟΡΟΦΟΣ

ΧΗΜΕΙΟ

ΔΙΑΔΡΟΜΟΣ 2ΟΥ ΟΡΟΦΟΥ

ΣΚΑΛΑ 2ος ΟΡΟΦΟΣ

| 18 E1 | 17 E2 | 16 ΣΤ1 | 15 ΣΤ2 | 14 | 13 | 12 | 11 |

ΤΜΗΜΑ ΕΝΤΑΞΗΣ

ΣΚΑΛΑ 1ΟΣ ΟΡΟΦΟΣ

ΓΡΑΦΕΙΟ ΔΙΔΑΣΚΟΝΤΩΝ

ΔΙΑΔΡΟΜΟΣ 1ΟΥ ΟΡΟΦΟΥ

ΣΚΑΛΑ 1ΟΥ ΟΡΟΦΟΥ

| 10 ΑΙΘΟΥΣΑ Η/Υ | 9 Γ2 | 8 Γ1 | 7 | 6 Δ | 5 | 4 | 3 |

ΣΚΑΛΑ | ΑΠΟΘΗΚΗ | WC | WC ΜΑΘΗΤΩΝ | ΚΥΛΙΚΕΙΟ

ΣΚΑΛΑ ΙΣΟΓΕΙΟ

ΔΙΑΔΡΟΜΟΣ ΙΣΟΓΕΙΟΥ

ΑΙΘΟΥΣΑ ΕΚΔΗΛΩΣΕΩΝ ΤΡΑΠΕΖΑΡΙΑ

| | ΓΡΑΦΕΙΟ 39ΟΥ Δ.Σ | ΓΡΑΦΕΙΟ | 1 | 2 |

ΕΙΣΟΔΟΣ

ΠΡΟΑΥΛΙΟ

| ΕΞΩΤΕΡΙΚΕΣ ΑΙΘΟΥΣΕΣ | | | | |
| 19 | 20 | 21 A1 | 22 A2 | 23 B |

Σχήμα 2: Η σχολική μονάδα: με κόκκινο χρώμα σημειώνονται οι τάξεις του συστεγαζόμενου σχολείου στο οποίο δεν έγινε έρευνα ενώ με γαλάζιο η αίθουσα ηλεκτρονικών υπολογιστών.

Βασικοί ερευνητικοί πυλώνες: Υποθέσεις της έρευνας

Σε υποθετική μορφή οι ερευνητικοί πυλώνες της μελέτης περίπτωσης περιορίστηκαν στους εξής πέντε συνδέσμους- υποθέσεις που εφαρμόζονται σύμφωνα με τη θεωρία του Rogers σε κάθε εκπαιδευτικό οργανισμό αλλά στη μελέτη μας αφορούν το ελληνικό δημόσιο δημοτικό σχολείο και μάλιστα εστιάζουν στο ρόλο του διευθυντή:

α) Ο **Καταλύτης** για την καινοτόμα αλλαγή-μεταρρύθμιση, υποθετικά είναι ο διευθυντής.

β) Η **διάχυση των Τ.Π.Ε**. Η διάχυση των Τ.Π.Ε ακολούθησε το παραδοσιακό πρότυπο διάχυσης για καινοτομίες, όπως περιγράφεται από τον Rogers (2003). Η αντίπαλη υπόθεση είναι ότι η τεχνολογία λειτουργεί διαφορετικά από τις παραδοσιακές καινοτομίες.

γ) **Η επιτυχής εφαρμογή των Τ.Π.Ε**. Η επιτυχής εφαρμογή των Τ.Π.Ε εξαρτάται ως επί το πλείστον από την ικανότητα του προσωπικού και ειδικότερα του διευθυντή όσον αφορά την ενσωμάτωση των Τ.Π.Ε στη διδασκαλία, την οργάνωση και τη μάθηση. Η αντίθετη υπόθεση είναι ότι η σχολική τεχνολογική υποδομή και οι μαθητικές ικανότητες στον τομέα των Τ.Π.Ε καθορίζουν τα αποτελέσματα της εφαρμογής των Τ.Π.Ε τόσο στον Παιδαγωγικό όσο και στον οργανωσιακό τομέα.

δ) **Ισότητα**. Τα κενά στην ακαδημαϊκή επίδοση μεταξύ μαθητών με υψηλές και χαμηλές επιδόσεις δεν θα αυξηθούν λόγω της οικονομικής τους κατάστασης, όταν όλοι οι μαθητές θα έχουν ισότιμη πρόσβαση στις Τ.Π.Ε..

ε) **Ακαδημαϊκά πρότυπα- αποτελέσματα**. Η επιτυχής εφαρμογή των Τ.Π.Ε θα οδηγήσει στα ίδια ή σε υψηλότερα ακαδημαϊκά και οργανωσιακά πρότυπα, παρά τη χαμηλή ποιότητα της υλικοτεχνικής υποδομής που απαιτείται για την καινοτόμο εισαγωγή των Τ.Π.Ε. Η εναλλακτική υπόθεση είναι ότι η χρήση των Τ.Π.Ε θα οδηγήσει σε μείωση του ακαδημαϊκού και οργανωσιακού επιπέδου, όταν οι μαθητές και η διεύθυνση δε διαθέτουν στη διάθεσή τους το κατάλληλο υλικοτεχνικό και εκπαιδευτικό υλικό.

Βασικά συμπεράσματα

Με τη μέθοδο της τριγωνοποίησης το κεντρικό συμπέρασμα της μελέτης αυτής είναι ότι η εισαγωγή των Τ.Π.Ε σπάνια λειτουργεί ως καταλύτης από μόνη της για τη βιώσιμη καινοτόμο αλλαγή στην εκπαίδευση αλλά μπορεί να αποτελέσει ισχυρό μοχλό για την υλοποίηση προγραμματισμένων εκπαιδευτικών καινοτομιών. Σε αυτές ο εμπνευσμένος, ηγέτης-διευθυντής, ακόμη και όταν δεν κατείχε εξειδικευμένες ή ειδικές τεχνολογικές γνώσεις, ουσιαστικά υποστηρίζει και ενισχύει «καταλυτικά» και καθοριστικά με την στάση του, την καινοτομία.

Στην περίπτωση του σχολείου που μελετήθηκε, ο καταλύτης είναι ο διευθυντής της σχολικής μονάδας σε συνδυασμό με τον υποδιευθυντή. Η παρουσία και δραστηριότητα του διευθυντή ενίσχυσε και «ανέφλεξε» περισσότερο ήδη προϋπάρχουσες δομές και ψήγματα καινοτομίες από την πλευρά έστω μιας μικρής ομάδας δασκάλων. Το υπόλοιπο προσωπικό του σχολείου ουσιαστικά αποτελεί τον μοχλό προώθησης της καινοτομίας και της αλλαγής τόσο στη διοίκηση όσο και στην παιδαγωγική διάσταση του εκπαιδευτικού έργου. Η εκπόνηση ή η εφαρμογή των καινοτόμων εκπαιδευτικών προγραμμάτων μπορεί να έχει ως αποτέλεσμα απογοητεύσεις, στις οποίες πολλοί εκπαιδευτικοί ίσως δεν είναι διατεθειμένοι να υποβληθούν (Λαΐνας, 2000). Οι ιδιαιτερότητες κάθε σχολείου σχετικά με τη διαμορφωμένη κουλτούρα του, τα θέματα ομοιογένειας μαθητικού πληθυσμού, η σταθερότητα του εκπαιδευτικού προσωπικού, η ηλικία και τα προσόντα των καθηγητών απαιτείται να λαμβάνονται υπόψη κατά το σχεδιασμό μιας καινοτομίας (Hsiao & Chen, 2009).

Έρευνες επίσης των Flanagan & Jacobsen έχουν καταδείξει οκτώ κρίσιμα χαρακτηριστικά του ιδανικού ηγέτη που σχετίζονται άμεσα με την ένταξη των Τ.Π.Ε στο σχολείο τα οποία όπως εξετάσαμε στην ενότητα 5.3 του πρακτικού μέρους της εργασίας, διέθετε ο διευθυντής της σχολική μονάδας (Flanagan & Jacobsen 2003 · Θεοφιλίδης & Στυλιανίδης 2000):

- **Το όραμα που εστιάζει στη μάθηση** (learning-focused envisioning

- **Τη δίκαιη παροχή** (equitable providing)
- **Την τολμηρή μάθηση** (adventurous learning
- **Την υπομονετική διδασκαλία** (patient teaching)
- **Την προστατευτική ενδυνάμωση** (protective enabling)
- **Την συνεχή επίβλεψη** (constant monitoring):
- **Το επιχειρηματικό δίκτυο** (entrepreneurial networking):
- **Την προσεκτική πρόκληση** (careful challenging):.

Ένα σχολείο που εργάζεται συλλογικά σε ένα κλίμα εμπιστοσύνης με κουλτούρα καινοτομίας και εμπιστοσύνης στην αλλαγή, είναι ο καλύτερος συνεργάτης του διευθυντή στην εισαγωγή βιώσιμων καινοτομιών. Η εμπιστοσύνη στον οργανισμό είναι απαραίτητη για να επιτύχει η αλλαγή ή η καινοτομία. Η εμπιστοσύνη ξεκινά από τον σχολικό ηγέτη. Ο ηγέτης δίνει χώρο στους εκπαιδευτικούς να εκφράζουν τις απόψεις τους στο θέμα της αλλαγής και να βάζει σε εφαρμογή όποιες εισηγήσεις υπάρχουν.

Ο διευθυντής επομένως είναι σύμφωνα με τη θεωρία εισαγωγής καινοτομίας του Rogers και το ερευνητικό πρωτόκολλο της μελέτης περίπτωσης που θέσαμε, ο καταλύτης για την επιτυχή εισαγωγή και καινοτόμο εφαρμογή των Τ.Π.Ε στο υπό μελέτη δημοτικό σχολείο. Σε δεύτερο επίπεδο, ο σχεδιασμός εισαγωγής καινοτομίας σε ένα σχολικό οργανισμό θα πρέπει να εξασφαλίζει τη μετάβαση στην επιδιωκόμενη αλλαγή-καινοτομία. Η εισαγωγή μιας καινοτομίας στο εσωτερικό ενός εκπαιδευτικού οργανισμού αποτελεί διαδικασία που απαιτεί νέα γνώση, ικανότητα, πόρους, εμπλοκή και συνεργασία τόσο σε προσωπικό, ατομικό μικρό- επίπεδο όσο και γενικότερο συλλογικό μάκρο- επίπεδο (Fullan et al., 2005· Smith, 2006).

Επίλογος

Ο ρόλος του διευθυντή στην εισαγωγή των Τ.Π.Ε στη σχολική μονάδα είναι πολλαπλός. Ο διευθυντής του σχολείου που εξετάστηκε, παραμένει σταθερά θετικός απέναντι στον καινοτόμο ρόλο των Τ.Π.Ε. Αν και δε διαμοιράζεται μέσω των Τ.Π.Ε μεγάλο μέρος της διοικητικής του ευθύνης, η σταθερή του θετική στάση δημιούργησε ένα καταλυτικά ευνοϊκό και θετικό κλίμα απέναντι στις Νέες τεχνολογίες με αποτέλεσμα την καινοτόμο χρήση τους σε μεγάλο βαθμό στη διδακτική πράξη αλλά και στο σύνολο της σχολικής ζωής. Πολλαπλές πολιτιστικές εκδηλώσεις και διαθεματικά ερευνητικά project με βάση τις Νέες τεχνολογίες αποτελούν τον καρπό αυτής της προσπάθειας. Τα οφέλη καρπώνεται όχι μόνο το σχολείο αλλά και το σύνολο της κοινότητας στην οποία εντάσσεται το σχολείο. Με καταλύτη το διευθυντή η καινοτομία μέσω των Τ.Π.Ε διαχέεται στο σύνολο του ευρύτερου συγκείμενου- κοινωνικού πλαισίου. Με αυτόν τον τρόπο ο διευθυντής εκπληρώνει όχι μόνο το διοικητικό του ρόλο αλλά και τον παιδαγωγικό και κοινωνικό του, ως ηγέτης μιας ενταγμένης στην κοινωνία σχολικής μονάδας και όχι ως ένας απλός διοικητικός διαχειριστής και μάνατζερ.

Με τη στρατηγική εισαγωγή της καινοτομίας πρώτα στην εκπαίδευση, η ποιότητα εργασίας στην Ελλάδα θα αλλάξει, μετασχηματίζοντας ολόκληρη την κοινωνία. Φαινομενικά απλές πρακτικές εισαγωγής καινοτομιών μέσω των Τ.Π.Ε στην εκπαίδευση όπως στην περίπτωση που μελετήσαμε, είναι ικανές να δώσουν μια πρώτη αναγεννητική ώθηση σε μια χώρα που μαστιζόμενη από την οικονομική κρίση έχει ανάγκη από ποιοτική και ανανεωτική εργασία που θα την ξεχωρίσει από τις υπόλοιπες. Η Πολιτεία επομένως αλλά και η κοινωνία θα πρέπει να στηρίζουν καινοτόμες, ριζοσπαστικές δράσεις τόσο οικονομικά όσο και ηθικά, ώστε αυτές να αποτελέσουν την αφόρμηση για ριζική επαναξιολόγηση των στρατηγικών στόχων τόσο της ελληνικής εκπαίδευσης όσο και ολόκληρης της κοινωνίας.

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Η Κριτική των Δομικών Χαρακτηριστικών του Νέου Πιλοτικού Προγράμματος Σπουδών για τις ΤΠΕ στο Δημοτικό ως Αφορμή για τον Ανασχεδιασμό του με Βάση την Κριτική Παιδαγωγική και την Προοδευτική Εκπαίδευση

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Περίληψη

Στις συζητήσεις για την κρίση που αντιμετωπίζει το σχολείο, είναι συχνά η αξιοποίηση των Τεχνολογιών της Πληροφορίας και Επικοινωνίας (ΤΠΕ) που ανακηρύσσεται ως κεντρικό σύμβολο ριζοσπαστικής εκπαιδευτικής αλλαγής και συνιστά το κύριο αντίδοτο σε όλα τα εκπαιδευτικά δεινά. Η αμφισβήτηση αυτής της επιφανειακής και οπωσδήποτε τεχνοκρατικής αντίληψης, που προσλαμβάνει την εκπαίδευση ως «προϊόν προς κατανάλωση» και κατανοεί τα προβλήματα του προγράμματος σπουδών και της διδασκαλίας, ως προβλήματα επιλογής της κατάλληλης διδακτικής πρακτικής και των κατάλληλων εκπαιδευτικών μέσων, αποτελεί το πρωταρχικό βήμα για την ανάπτυξη ενός διαφορετικού και μάλλον ριζοσπαστικού οράματος τόσο για την αντιμετώπιση της σύγχρονης κρίσης του σχολείου, όσο και για το ρόλο των ΤΠΕ μέσα σε αυτό. Συνεπώς, το αίτημα για το «Νέο Σχολείο» θα ανταποκρίνεται στο περιεχόμενο της έννοιάς του, όταν έμπρακτα τοποθετεί στο επίκεντρο της εκπαιδευτικής διαδικασίας τον ίδιο το μαθητή και τις ανάγκες του, προάγει την οικοδόμηση της γνώσης, την κριτική και συνεργατική μάθηση, την επιστημονική σκέψη, τη διαθεματικότητα, αλλά και την κοινωνική παρέμβαση και δράση με σκοπό περισσότερη κοινωνική δικαιοσύνη και ισότητα. Στην υλοποίησή του η συμβολή των δύο Παιδαγωγικών σχολών σκέψης και πράξης: της Κριτικής Παιδαγωγικής και της Προοδευτικής Εκπαίδευσης κρίνονται ζωτικής σημασίας.

Abstract

In contemporary discussions about school crisis, it is usually the use of ICT that is often represented as a central symbol of revolutionary educational change and the main antidote to all educational ills. Disagreement with this narrow and technocratic view, which perceives education as a "product to be consumed" and understands problems of curriculum and teaching as problems of selecting the most appropriate teaching format, teaching method or media, is necessarily the first and crucial step in the process of developing a different, yet more radical vision for both the school crisis and the role of ICT in it. As a result, the need for a "New School" will be consistent with its meaning, when it realistically places at the center of the teaching process the student and her/his needs, when it promotes the construction of knowledge, when it encourages critical and cooperative learning, when it develops scientific thought processes, when it supports the integration of knowledge, and lastly when it adopts praxis and social intervention towards the direction of advancing social justice and equality. The contribution of two pedagogical paradigms of thought and practice, namely those of Critical Pedagogy and Progressive Education, may be critical in the process of the implementation of such an educational establishment and this is what this paper argues about.

Εισαγωγή

Η κρίση που σοβεί σήμερα στην κοινωνία (υποβάθμιση βιοτικού επιπέδου, όξυνση κοινωνικών εντάσεων, ανεργία, φτώχεια, λιτότητα, μεταναστευτικό ζήτημα κ.ά.) και με την οποία ποικιλότροπα έρχεται αντιμέτωπο καθημερινά το σχολείο, έχει ως κύρια αιτία τις αναδιαρθρώσεις που επιφέρουν οι σύγχρονες μορφές οργάνωσης και διαχείρισης της οικονομίας με σκοπό τη διατήρηση του κέρδους. Τα βασικά χαρακτηριστικά της οικονομίας του νέου καπιταλισμού είναι η υπερσυσσώρευση του χρηματοπιστωτικού κεφαλαίου, η άρση κάθε οικονομικής παρέμβασης από την πλευρά του κράτους, οι αλλαγές στη βιομηχανική παραγωγή (στόχοι παραγωγής και δομή επιχειρήσεων), οι συγκροτήσεις επιχειρήσεων με διεθνή δραστηριότητα και η μαζική αξιοποίηση των νέων τεχνολογιών στην παραγωγή. Σε συνθήκες οξυμένου διεθνούς ανταγωνισμού, η ανάγκη για τη μείωση του κόστους εργασίας και την αύξηση της παραγωγικότητας είναι το εναγώνια ζητούμενο (Κάτσικας κ.ά., 1998).

 Η νέα οικονομία για να επιτελέσει το σκοπό της μεταξύ άλλων βασίζεται σε πολλαπλές μορφές ευελιξίας στην εξειδίκευση, στην παραγωγή και στις συνθήκες εργασίας (κινητικότητα, κυμαινόμενο ωράριο, εκ περιτροπής απασχόληση, κυκλική εναλλαγή κ.ά.). Επομένως, είναι κρίσιμης σημασίας η διερεύνηση των κρατικών πολιτικών για την εκπαίδευση, καθώς αυτή προετοιμάζει το ανθρώπινο δυναμικό με κατάλληλες πνευματικές ικανότητες, δεξιότητες, γνώσεις, νοοτροπίες, για να ανταποκριθεί στις απαιτήσεις της νέας οικονομίας, με γνώμονα πάντα την ευέλικτη εξειδίκευση και παραγωγή.

Στο πλαίσιο αυτό εντάσσεται η κατανόηση και η κριτική των αλλαγών του Νέου Πιλοτικού προγράμματος για τις ΤΠΕ στο Δημοτικό, η αξιοποίηση των οποίων στο σχολείο ανακηρύσσεται ως κεντρικό σύμβολο «ριζοσπαστικής» εκπαιδευτικής αλλαγής. Όμως, όταν διακηρύσσονται άκριτα οι «απεριόριστες» δυνατότητες των ΤΠΕ για τη μάθηση και τη διδασκαλία, προδιαγράφεται η διαμόρφωση μιας «πολιτισμικής θεωρίας» που επιζητά να υπαγάγει την παιδαγωγική, κάτω από τον ολοποιητικό λόγο μιας τεχνολογικής ηγεμονικής ιδεολογίας (computer ideology) (Aronowitz & Giroux, 1991). Μια τέτοια επιφανειακή και οπωσδήποτε τεχνοκρατική αντίληψη για την εκπαιδευτική μεταρρύθμιση, προσλαμβάνει την εκπαίδευση ως «προϊόν προς κατανάλωση» και κατανοεί τα προβλήματα του προγράμματος σπουδών και της διδασκαλίας, ως προβλήματα επιλογής της κατάλληλης διδακτικής πρακτικής και των κατάλληλων εκπαιδευτικών μέσων, προσδίδοντάς τη χαρακτήρα «τεχνολογικής ουτοπίας». Επειδή οι ΤΠΕ συμβάλλουν στην παραγωγή, στη μετάδοση της γνώσης, στην κατανόηση ποικίλων κοινωνικοπολιτισμικών φαινομένων του κόσμου και στην εκδήλωση του εκφραστικού και δημιουργικού δυναμικού του ατόμου, καλλιεργείται η αντίληψη ότι μπορούν να αποτελέσουν από μόνες τους ένα βασικό αντίδοτο από την πλευρά του σχολείου στην αντιμετώπιση της σύγχρονης κρίσης. Χωρίς να αγνοούμε τη βαθιά επίδραση που ασκούν οι ΤΠΕ σε κάθε πλευρά της κοινωνίας και του πολιτισμού, είναι σημαντικό να εξεταστεί η επίδραση που ασκούν στη διδασκαλία και ειδικότερα στη μάθηση και τη συγκρότηση της ταυτότητας του υποκειμένου.

Με αφετηρία την αποδοχή των παραπάνω θεωρήσεων, η εργασία αυτή θα προσπαθήσει να μελετήσει την επίμαχη τοπιογραφία της πρόσφατης εκπαιδευτικής μεταρρύθμισης που επιχειρείται από το Υπουργείο Παιδείας, η οποία τιτλοφορείται «Νέο Σχολείο: Πρώτα ο Μαθητής», αποδίδοντας έμφαση στην ανάλυση των δομικών χαρακτηριστικών του Νέου Πιλοτικού Προγράμματος Σπουδών για τις Τεχνολογίες της Πληροφορίας και των Επικοινωνιών. Με γνώμονα αυτή την ανάλυση, η εργασία θα επιχειρήσει να απομακρυνθεί από εκείνες τις λογικές που αντιμετωπίζουν τον σχεδιασμό και την ανάπτυξη του προγράμματος σπουδών ως «τεχνική άσκηση των μηχανικών της συμπεριφοράς». Αντίθετα, θα επιχειρηματολογήσει υπέρ της υιοθέτησης ενός νέου, «έθους» απέναντι στη χάραξη εκπαιδευτικής πολιτικής και την ανάπτυξη του προγράμματος σπουδών. Και μάλιστα θα επιχειρηματολογήσει υπέρ μιας συλλογιστικής που εμπνέεται από τις θεωρήσεις της Κριτικής Παιδαγωγικής και της Προοδευτικής Εκπαίδευσης. Αποτελούν τα μόνα παιδαγωγικά παραδείγματα που μπορούν να μας επιτρέψουν να σκεφτούμε και να στοχαστούμε γύρω από τα χαρακτηριστικά ενός πραγματικά «νέου σχολείου», αφιερωμένου στην απελευθέρωση, την ενδυνάμωση και την κοινωνική ανασυγκρότηση, που τόσο πολύ έχει ανάγκη ο τόπος μας.

Το Νέο Σχολείο και οι διακηρύξεις του

Όταν το 2010 δημοσιεύθηκε το έντυπο του Υπουργείου Παιδείας με τον τίτλο «Νέο Σχολείο: Πρώτα ο μαθητής» (ΥΠΕΠΘ, 2010), αρκετοί είχαν τότε επισημάνει ότι οι άξονες προτεραιότητας που τοποθετούσε δεν οδηγούσαν στη διαμόρφωση ενός σημαντικά διαφοροποιημένου εκπαιδευτικού τοπίου. Και αυτό διότι:

⇒ Για τη μετεξέλιξη του σχολείου σε «Νέο σχολείο» δεν αρκεί ασφαλώς η ψηφιοποίησή του. Η εξασφάλιση της πρόσβασης όλων στο διαδίκτυο, η αναβάθμιση των δικτύων υπολογιστών, ο εξοπλισμός των σχολικών μονάδων με διαδραστικούς πίνακες, η δημιουργία πυλών πληροφόρησης και ψηφιακών βιβλιοθηκών εκπαιδευτικού υλικού, αποτελούν δράσεις επέκτασης ή βελτιστοποίησης των ήδη υπαρχόντων διδακτικών μέσων, υλικών μάθησης και υπηρεσιών εκπαίδευσης. Από την άλλη και με δεδομένο ότι τα εκπαιδευτικά μέσα, τα υλικά και οι υπηρεσίες προσαρμόζονται σε συγκεκριμένους προαποφασισμένους εκπαιδευτικούς στόχους και διδακτικά περιεχόμενα, οι ανωτέρω δράσεις θα μπορούσαν κάλλιστα να εφαρμοστούν και να προωθήσουν τις δομές και τη λειτουργία ενός εξαιρετικά συντηρητικού σχολείου.

⇒ Για τη μετεξέλιξη του σχολείου σε «Νέο σχολείο» δεν αρκούν ασφαλώς οι ειδικές και ελεγχόμενες παρεμβάσεις στο πρόγραμμα σπουδών, ούτε και η προσαρμοσμένη - ερμαφρόδιτη στροφή προς προοδευτικότερες μεθόδους και μορφές διδασκαλίας. Οι περικοπές στη διδακτέα ύλη, οι ήπιες και αυτονόητες διεπιστημονικές συνδέσεις μεταξύ συγγενών γνωστικών αντικειμένων και η διαμόρφωση στοχοκεντρικών προγραμμάτων σπουδών ενιαίων για όλη την επικράτεια δεν καταργούν το συγκεντρωτικό χαρακτήρα του εκπαιδευτικού οικοδομήματος που «κατακερματίζει» και ιεραρχεί τη γνώση. Εκ προοιμίου, η εφαρμογή αυτών των «αλλαγών» είναι ανακόλουθη και αναντίστοιχη με την έμπρακτη υιοθέτηση προοδευτικών αρχών, μεθόδων και ενεργητικών θεωρήσεων για τη μάθηση, όπως ο μαθητοκεντρισμός, ο εποικοδομητισμός, το project και η διαθεματικότητα, που επίσης συγκαταλέγονται στην λίστα «λέξεων-κλειδιών» των διακηρύξεων του «Νέου σχολείου». Στην καλύτερη περίπτωση, οι παραπάνω δράσεις θα προωθήσουν τη μετάβαση από τη «βιβλιοκεντρική» διδασκαλία στη διδασκαλία με βάση τους στόχους του προγράμματος σπουδών, δίνοντας στους εκπαιδευτικούς αυξημένα περιθώρια ελευθερίας στο επίπεδο της μετατροπής των στόχων σε καθημερινή διδακτική πράξη. Ωστόσο, το εύρος και η έκταση αυτών των περιθωρίων εξαρτάται καταρχήν και σε σημαντικό βαθμό από την οπτική σχεδιασμού, την οργάνωση και το περιεχόμενο του ίδιου του προγράμματος σπουδών. Από την άλλη και με δεδομένη τη χρόνια απομάκρυνση των εκπαιδευτικών μας από τον σχεδιασμό του εκπαιδευτικού έργου, η βελτιωτική μετάβαση από τη «βιβλιοκεντρική» στη «στοχοκεντρική» διδασκαλία θα είναι μάλλον δυσχερής και χρονοβόρα, καθώς το σχολικό βιβλίο αναμένεται σε πρώτη τουλάχιστον φάση να αντικατασταθεί από τις προκατασκευασμένες διδακτικές προτάσεις, τα τυποποιημένα σχέδια εργασίας και τις ψηφιακές πύλες του επίσημου, κεντρικά σχεδιασμένου εκπαιδευτικού υλικού.

Υπό το πρίσμα των παραπάνω επισημάνσεων, εύλογα καταλήγει κανείς στο συμπέρασμα ότι ο λόγος περί «Νέου σχολείου» με πρόταγμα τον μαθητή και τις ανάγκες του, δεν είναι παρά συνθηματικός. Επί της ουσίας, οι αλλαγές που συνοδεύουν τη διακήρυξη του «Νέου σχολείου» δεν συνιστούν την εικόνα μιας ξεκάθαρης και κατανοητής εκπαιδευτικής πολιτικής με συγκροτημένο προσανατολισμό. Από τη μια, η ψηφιοποίηση εκπαιδευτικών μέσων, υλικών και υπηρεσιών παρουσιάζεται ως ακρογωνιαίος λίθος της προβλεπόμενης εκπαιδευτικής μεταρρύθμισης. Από την άλλη, προοδευτικές παιδαγωγικές αρχές και προσεγγίσεις αναμειγνύονται με συμπεριφοριστικές διδακτικο-μαθησιακές πρακτικές και συμπορεύονται με τεχνοκρατικά μοντέλα σχεδιασμού του προγράμματος σπουδών. Τις εν λόγω παρανοήσεις, τα παράδοξα και τις αντιφάσεις πάνω στα οποία θεμελιώνεται το οικοδόμημα του «νέου σχολείου» μπορούμε να τις παρατηρήσουμε ευκρινώς στα πρόσφατα δημοσιευμένα «Νέα Πιλοτικά Προγράμματα Σπουδών και ιδιαίτερα το νέο πιλοτικό πρόγραμμα σπουδών (ΠΠΣ) Δημοτικού για τις Τεχνολογίες της Πληροφορίας και των Επικοινωνιών (ΥΠΕΠΘ, 2011).

Οι αντιφάσεις του προγράμματος σπουδών για τις ΤΠΕ

Με βάση το νέο ΠΠΣ του Δημοτικού, οι ΤΠΕ καθιερώνονται ως ένα διακριτό, βασικό και «παντοδύναμο» γνωστικό αντικείμενο που, όμως, λόγω των θεμελιωδών χαρακτηριστικών του περιεχομένου τους, αλλά και της συγκρότησης των διδασκόντων τους είναι αδύνατο να επιτύχουν στο ρόλο τους στο γενικό σχολείο.

Συγκεκριμένα, εξετάζοντας τους σκοπούς του διαπιστώνεται ότι εκτείνονται πέρα από τη μάθηση του κατεξοχήν αντικειμένου που εντοπίζεται στην εκμάθηση γνώσεων περιορισμένων στο πεδίο της πληροφορικής και της τεχνολογίας. Επιπλέον, οι σκοποί περιλαμβάνουν τη χρήση των ΤΠΕ ως εργαλείων που συμβάλλουν καθοριστικά στο γνωστικό τομέα. Αναφέρονται στις διεργασίες απόκτησης και χρήσης της μάθησης, επικεντρώνουν σε σύνθετες γνωστικές διαδικασίες και λειτουργίες (στην επεξεργασία της γνώσης και την προαγωγή της μάθησης, στην εφαρμογή και αξιοποίηση της μεθοδολογίας επίλυσης προβλημάτων). Ακόμη, περιλαμβάνουν, λόγω της ευρύτατης διάχυσης των ΤΠΕ στο κοινωνικο-οικονομικό και πολιτισμικό γίγνεσθαι, την επίδρασή που ασκούν σε ποικίλες πτυχές της καθημερινότητας του ανθρώπου εκτός του σχολικού πλαισίου (έχοντας χαρακτήρα κοινωνικού φαινομένου).

Από το γενικότερο σκοπό του μαθήματος μπορεί να ανιχνεύσει κανείς τις δύο θεωρίες μάθησης - πρόκειται για τον συμπεριφορισμό και τον εποικοδομητισμό (κονστρουκτιβισμό) -, που αν και αντιφάσκουν μεταξύ τους ως προς το περιεχόμενο, τον προσανατολισμό, τις συνθήκες και το αποτέλεσμα της μάθησης, τελικά, έχουν επιλεγεί από τους συγγραφείς να συνυπάρχουν μαζί και να υποβαστάζουν από την πλευρά της ψυχολογίας το ίδιο γνωστικό αντικείμενο.

Αρχικά, ο συμπεριφορισμός εφαρμόζεται κατά την εκμάθηση του χειρισμού και των στοιχείων του Η/Υ. Με βάση τη συγκεκριμένη θεωρία, οι μαθητές μαθαίνουν προκαθορισμένες συμπεριφορές/δεξιότητες από στόχους που ανήκουν κυρίως στον ψυχοκινητικό τομέα, πολύ λιγότερο στο γνωστικό κι ελάχιστα στον συναισθηματικό. Καθώς ανεβαίνει το επίπεδο των τάξεων οι απαιτήσεις των στόχων του ψυχοκινητικού τομέα, που αποτελούν και το βασικό δομικό υλικό του προγράμματος σπουδών γίνονται όλο και πιο σύνθετες. Οι στόχοι στο γνωστικό τομέα είναι κατεξοχήν χαμηλού επιπέδου, πολύ μικρός αριθμός ανώτερων στόχων (σύνθεσης και ανάλυσης) εντοπίζεται στις μεγάλες τάξεις (Ε΄, Στ΄), ενώ οι ελάχιστοι στόχοι του συναισθηματικού τομέα παραμένουν στο πρωταρχικό επίπεδο της συνειδητοποίησης (ευαισθητοποίηση). Πιο συγκεκριμένα, μια απλή καταμέτρηση του είδους των στόχων του προγράμματος για τις ΤΠΕ, αναδεικνύει ότι 80% (οι 177 από τους 223 συνολικά) αναφέρονται στην ανάπτυξη δεξιοτήτων, 14% (32 στους 223) στην απόκτηση γνώσεων και τη μετάδοση πληροφοριών, και 6% (14 στους 223) στην ανάπτυξη συμπεριφορών του συναισθηματικού τομέα. Η εκμάθηση των εν λόγω προκαθορισμένων συμπεριφορών/δεξιοτήτων γίνεται άλλες φορές απευθείας κι άμεσα, δηλαδή με χειρισμό του αντικειμένου ή υλοποίηση της εφαρμογής με ή χωρίς επίδειξη προηγουμένως. Άλλες φορές πάλι, γίνεται έμμεσα, με την πραγματοποίηση ποικίλων προαποφασισμένων δραστηριοτήτων του προγράμματος (ασκήσεων, εργασιών, σχεδίων έρευνας κ.ά.) και με τη μετάδοση γνώσεων. Οι τελευταίες υποβιβάζονται εν τέλει σε «υπομόχλια» ερεθίσματα, καθώς αγνοούνται οι αξίες και τα νοήματά τους, με σκοπό να οδηγήσουν απρόσκοπτα στην επιθυμητή αντίδραση, η οποία εκλαμβάνεται ως επιβεβαίωση απόκτησης της αναμενόμενης συμπεριφοράς (Νούτσος, 1983). Χαρακτηριστικό παράδειγμα αποτελεί η περίπτωση των προαποφασισμένων – προτεινόμενων «σχεδίων έρευνας», που δεν είναι παρά σχέδια εργασίας, των οποίων απώτερος στόχος είναι η ανάπτυξη ψηφιακών προϊόντων ή υπηρεσιών. Τα θέματά τους έτσι όπως αυτά προτείνονται στο κείμενο του νέου ΠΠΣ σχετίζονται μεν με τη σχολική ζωή ή με ενότητες διαφόρων σχολικών γνωστικών αντικειμένων αλλά επί της ουσίας, οι ενότητες αυτές αποτελούν το πλαίσιο ή το περίγραμμα μέσα στο οποίο οι μαθητές μαθαίνουν να χειρίζονται μια σειρά από ψηφιακά εργαλεία. Από την άλλη πουθενά στο νέο ΠΠΣ δεν αποσαφηνίζεται ή δεν διευκρινίζεται ότι τα θέματα των σχεδίων εργασίας θα πρέπει να έχουν επιλεγεί έτσι ώστε να συνεισφέρουν και να αναδεικνύουν κατά τρόπο αυθεντικό την υπηρεσία, το προϊόν ή το τελικό έργο που αναμένεται να σχεδιάσουν, να διαμορφώσουν και να κατασκευάσουν οι μαθητές. Έτσι, προτείνεται για παράδειγμα στις Γ΄ και Δ΄ Δημοτικού η κατασκευή ιστολογίου της τάξης, αλλά πουθενά δεν επισημαίνεται η συλλογιστική με βάση την οποία το συγκεκριμένο σχέδιο εργασίας θα υποβοηθήσει την κατανόηση της ίδιας της έννοιας ύπαρξης, ανάπτυξης και

κατασκευής ενός ιστολογίου. Είναι η «κατασκευή ενός ιστολογίου για την τάξη μας» μία αυθεντικά νοηματοδοτούμενη δραστηριότητα που βοηθά τους μαθητές να κατανοήσουν τον σκοπό ενός ιστολογίου, το πότε και για ποιο λόγο αναπτύσσεται και ποιες ακριβώς ανάγκες εξυπηρετεί στην καθημερινή ζωή; Εν πολλοίς, τα προτεινόμενα θέματα καταλήγουν να έχουν περιορισμένη συνεισφορά τόσο στο επίπεδο του ψηφιακού γραμματισμού, όσο και στο επίπεδο της γόνιμης και νοηματοδοτούμενης επεξεργασίας αυτών καθαυτών των ενοτήτων που αφορούν στη σχολική ζωή και τα γνωστικά αντικείμενα.

Σύμφωνα με τα παραπάνω, γίνεται φανερό ότι η μάθηση θεωρείται ατομική υπόθεση του κάθε μαθητή και επιζητείται, πρωταρχικά η εκμάθηση συμπεριφορών χειριστικού επιπέδου (δεξιότητες), λίγων γνωστικού και ελάχιστων συναισθηματικού τομέα. Οι μαθητές χρειάζεται να *«αναπτύξουν τις απαραίτητες ψηφιακές ικανότητες (δηλαδή τις γνώσεις, δεξιότητες και τις στάσεις που σχετίζονται με τις ΤΠΕ), έτσι ώστε να ενισχύσουν τη μάθηση, τη συνεχή και δια βίου ανάπτυξη και, τελικά, τη συμμετοχή τους στη σύγχρονη κοινωνία της γνώσης»)(σ. 1).*

Ακολούθως, η δεύτερη θεωρία μάθησης που αξιοποιείται είναι ο εποικοδομητισμός, ο οποίος όμως επιχειρείται να προσαρμοστεί στο γενικότερο τρόπο οργάνωσης του προγράμματος του συγκεκριμένου μαθήματος, δεδομένου ότι αυτό πρωταρχικά βασίζεται στις ταξινομίες προκαθορισμένων στόχων, ψυχοκινητικών περισσότερο, λιγότερο γνωστικών και ελάχιστα συναισθηματικών. Ως αποκύημα μιας τέτοιας προβληματικής προσαρμογής, μπορεί να νοηθεί και ο τρόπος με τον οποίο μια τεχνική διδασκαλίας, όπως ο εννοιολογικός χάρτης, με καταβολές από το χώρο των γνωστικών θεωριών μάθησης, ανάγεται σε κεντρικό μαθησιακό άξονα ενός προγράμματος σπουδών, το οποίο έχει ως επίκεντρο τις ΤΠΕ και έτσι αποκτά τους δικούς τους στόχους, τα δικά τους περιεχόμενα και τις δικές τους προτεινόμενες δραστηριότητες. Στην περίπτωση αυτή, ενώ ο εποικοδομητισμός αντιφάσκει τόσο με τον πυρήνα της προηγούμενης θεωρίας μάθησης (εισαγάγει την πρωτοβουλία μαθητή, τον πειραματισμό, τη συνεργασία ισότιμων ομάδων, την αναδόμηση εννοιολογικών σχημάτων, την οικοδόμηση γνώσεων, τη συνειδητοποίηση κ.ά.) (Wood, 1998), όσο και με το γενικότερο πλαίσιο οργάνωσης του προγράμματος (βασίζεται σε γενικούς στόχους που χαρακτηρίζονται από συμπληρωματικότητα και συλ-λειτουργική σχέση, επικεντρώνονται σε θεμελιακές μαθήσεις οι οποίες οδηγούν σε γενικές κι όχι εξειδικευμένες ικανότητες) (Perrenaud, 1996), οι συγγραφείς επικαλούνται την υψηλού επιπέδου ενεργητική μάθηση που θα οικοδομηθεί, στο μάθημα, καθώς θεωρούν ότι τα *«σύγχρονα υπολογιστικά και διαδικτυακά περιβάλλοντα, αξιοποιούνται παιδαγωγικά ως χώροι μελέτης, έρευνας, επικοινωνίας και συνεργασίας των μαθητών, ώστε να ενθαρρύνονται οι διερευνητικές και εποικοδομητικές προσεγγίσεις, η αλληλεπιδραστική και συνεργατική μάθηση, η αυτενέργεια και η δημιουργικότητα των μαθητών» (σ.1).*

Όμως, και στις δύο αντίπαλες εκδοχές η μάθηση δεν αποτελεί *πράξη (praxis)*, καθώς, λόγω του στοχοκεντρικού προγράμματος οι μαθητές δεσμεύονται (μαζί με το δάσκαλό τους) από τους προκαθορισμένους στόχους, τις προκαθορισμένες δραστηριότητες και συνεπώς κατευθύνονται σε προκαθορισμένα αποτελέσματα. Έτσι, η μάθηση δεν προσλαμβάνεται ως διαδικασία οικοδόμησης της γνώσης, *ως ενέργημα γνώσης*, που εμπεριέχει τη διαλεκτική σχέση στοχασμού και δράσης, όπου ο ένας πόλος επιδρά στον άλλο και αντίστροφα για την παραγωγή έργου. Μέσα στην υφιστάμενη πραγματικότητα οι κυρίαρχες αφηγήσεις και ο ηγεμονικός λόγος καθορίζουν τα εχέγγυα εγκυρότητας του ατομικού (ή και συλλογικού) στοχασμού, υπηρετώντας το τεχνικό, παρά το χειραφετικό ενδιαφέρον των μαθητών (Habermas, 1994). Εξ' αιτίας αυτού του γεγονότος, ακόμα και οι στόχοι που ανήκουν σε υψηλό ταξινομικό επίπεδο, συνεπάγονται απόκτηση χαμηλού επιπέδου ικανοτήτων. Ακόμη, λόγω της έλλειψης κατάλληλων συνθηκών για πλουραλισμό και αντιπαράθεση πολλών και διαφορετικών απόψεων κατά τη μάθηση, υποβαθμίζεται η συνθετότητά της προς όφελος μιας απλουστευτικής λογικής καθιέρωσης και αποδοχής της μεμονωμένης άποψης (Streibel, 1996), γεγονός που υποβιβάζει το επίπεδο των ανταλλαγών μεταξύ μαθητών και δασκάλου, όπως και παρεμποδίζει την συν-οικοδόμηση των σημασιών. Επιπλέον, όταν στις συγκεκριμένες διαδικασίες, λόγω των ίδιων συνθηκών, δεν λαμβάνεται υπόψη η συμβολή των παραγόντων του κοινωνικοπολιτισμικού πλαισίου του μαθητή (κουλτούρα, βιογραφία, δεδομένη κατάσταση κ.ά.), που προσδίδουν προσωπικό νόημα και αξία, αυτές χάνουν από πλευράς κινήτρου και σημασίας για το μαθητή, αλλά και ερμηνευτικής ισχύος για τον εκπαιδευτικό.

Μετά από ένα συνεχόμενο δίωρο την εβδομάδα που διατίθεται στο ωρολόγιο πρόγραμμα για διδασκαλία του μαθήματος, όπου συμπυκνώνονται και συνδυάζονται από διαφορετικές παιδαγωγικές και ψυχολογικές αφετηρίες και γνωστικά πεδία: γνώσεις, δεξιότητες, δραστηριότητες, θεωρίες μάθησης και διδακτικές πρακτικές, οι εμπνευστές του προγράμματος σπουδών ΤΠΕ με μια ευθύγραμμη και απλοϊκή συλλογιστική, που αγνοεί τις σχέσεις και τη δυναμική του φαινομένου της μάθησης, θεωρούν ότι θα υπάρξει επιτυχής έκβαση των σκοπών του μαθήματος, καθώς *«παρέχεται επαρκής χρόνος στους μαθητές, μέσα από κατάλληλες μαθησιακές δραστηριότητες με ποικίλα εργαλεία των ΤΠΕ, να διερευνήσουν, να πειραματιστούν, να συνεργαστούν, να σχεδιάσουν και να δημιουργήσουν ολοκληρωμένα ψηφιακά έργα»* (σ. 2). Με βάση τα πλαίσια της παραπάνω λογικής, καθώς και της ρητορικής για την προώθηση του «Νέου σχολείου», γίνεται φανερό ότι το συγκεκριμένο πρόγραμμα καθιστά το γνωστικό αντικείμενο των ΤΠΕ «παντοδύναμο». Ακόμη, εμπλέκει τον εκπαιδευτικό των ΤΠΕ και τα περιεχόμενα του μαθήματός του, με τις ιδιαιτερότητες της μαθησιακής διαδικασίας ποικίλων ετερόκλητων γνωστικών αντικειμένων (από πλευράς μεθόδου, μορφής διδασκαλίας, περιεχομένου, δραστηριοτήτων κ.ά.), καθώς και με τη διδασκαλία εκπαιδευτικών διαφορετικών ειδικοτήτων. Συνεπώς, είναι δεδομένο ότι οι εγγενείς αδυναμίες του μαθήματος και η συγκρότηση των εκπαιδευτικών που καλούνται να το υπηρετήσουν, θα δημιουργήσουν ανυπέρβλητα εμπόδια για την επιτυχημένη εφαρμογή του.

Το νέο σχολείο ως πράξη και ο ρόλος των ΤΠΕ

Για τη μετεξέλιξη του σχολείου σε «νέο σχολείο» ασφαλώς και απαιτούνται ολοκληρωμένες, πολυεπίπεδες και βαθιές αλλαγές. Ωστόσο, όποιες και αν είναι αυτές, είναι ανάγκη να συλλειτουργούν αρμονικά και να είναι συνεπείς με ένα συγκεκριμένο όραμα για το σκοπό και το ρόλο του σχολείου σε μια δημοκρατική κοινωνία. Οι ποικίλες σχολές παιδαγωγικής σκέψης, θεωρίας και πράξης μας έχουν ήδη προσφέρει αρκετές, διαφορετικές αλλά ταυτόχρονα και συγκροτημένες επιλογές σε σχέση με τη διαμόρφωση μιας ενιαίας και εμπεριστατωμένης εκπαιδευτικής πολιτικής. Σε κάθε περίπτωση πάντως, οι επιλογές μας περιορίζονται σημαντικά όταν μιλούμε για ένα «νέο σχολείο» που έμπρακτα τοποθετεί στο επίκεντρο της εκπαιδευτικής διαδικασίας τον ίδιο τον μαθητή και τις ανάγκες του, που αποδέχεται και εφαρμόζει τις αρχές του εποικοδομητισμού, που υιοθετεί στη πράξη τη διαθεματικότητα, που προτάσσει τη δημιουργική μάθηση, που χειραφετεί. Οι επιλογές που μας απομένουν εντάσσονται στον ευρύτερο χώρο της Κριτικής Παιδαγωγικής και της Προοδευτικής Εκπαίδευσης, το παράδειγμα των οποίων σαφώς και αντιτίθεται στη λογική που διέπει τα στοχοκεντρικά προγράμματα σπουδών και τα μετα-μπιχεβιοριστικά πρότυπα διδασκαλίας και μάθησης.

Στις μέρες μας εξαιτίας των ραγδαίων τεχνολογικών εξελίξεων, οι ΤΠΕ, τόσο σε επίπεδο αναζήτησης, επεξεργασίας πληροφορίας και επικοινωνίας στον κυβερνοχώρο όσο και στο επίπεδο της πολυτροπικής φύσης και της μορφής της πληροφορίας, δημιουργούν ένα περιβάλλον, που εμπεριέχει τεράστιο όγκο πληροφοριών προς επεξεργασία και διάθεση, καθώς και ποικίλες (κοινωνικά δομημένες) μορφές επικοινωνίας και αναπαράστασης τις οποίες συνάπτουν και δημιουργούν αντίστοιχα, άτομα και ομάδες (Kellner, 2000a). Στο περιβάλλον αυτό, οι ΤΠΕ διαμορφώνουν δυνατότητες για νέες μορφές εκπαιδευτικής και πολιτισμικής εμπειρίας, καθώς εντείνουν και διευρύνουν δραματικά τις επιδράσεις τους σε κάθε πλευρά της εκπαιδευτικής διαδικασίας (μάθηση, έρευνα, ανακάλυψη, παραγωγή έργου και γνώσης, μόρφωση, αυτο-έκφραση, κοινωνικοποίηση, επικοινωνία, αλληλεπίδραση) και συμβάλλουν, όχι μόνο στην κατασκευή της κατανόησης του κόσμου αλλά και της ταυτότητας του εαυτού (Kincheloe, 2008). Η χρηστική τους ευελιξία μπορεί να συνδυαστεί κατάλληλα με την ενότητα του τρόπου σύλληψης και υλοποίησης στη διδασκαλία, επεκτείνοντας τις μορφωτικές ανάγκες των μαθητών, την ελευθερία και τις δυνατότητες των παιδαγωγικών πρακτικών (διαφοροποίηση, εξατομίκευση, ομαδική διδασκαλία κ.ά.) και συνακόλουθα, επηρεάζοντας την ποιότητα της εκπαίδευσης. Ακόμη, επειδή είναι δυνατό να φέρουν στο προσκήνιο θέματα που είναι απόμακρα για ορισμένους μαθητές (π.χ. λογοτεχνικά κείμενα, θέατρο, συμφωνική μουσική, μουσεία, προορισμούς εξωτερικού κ.ά.) -καθώς, είναι δύσκολο πολλές φορές να τα γνωρίσουν άμεσα, λόγω του

πολιτισμικού τους κεφαλαίου και της οικονομικής κατάστασης της οικογένειάς τους -, οι ΤΠΕ έχουν τη δύναμη να περιορίζουν τον «εξωπραγματικό» χαρακτήρα της εκπαιδευτικής διαδικασίας και να την καθιστούν ελκυστική. Όμως, εδώ, χρειάζεται εκπαιδευμένους δασκάλους, τόσο πάνω στον τρόπο χειρισμού και αξιοποίησής των νέων τεχνικών μετάδοσης της γνώσης, όσο και στην επίγνωση των τεχνασμάτων και των συνεπειών τους, που χρησιμοποιούνται και προσδίδουν στις πληροφορίες *«την επίφαση του φυσικού και του αυτονόητου»* (Μπουρντιέ, 2004: 120), ενώ πρόκειται για γνώσεις, εικόνες κ.ά. που είναι κοινωνικά κατασκευασμένες. Η ηλεκτρονική πληροφορία *«αλλάζει ριζικά τις παραδοσιακές αντιλήψεις για το χρόνο, την κοινότητα και την ιστορία, ενώ θολώνει τα όρια μεταξύ πραγματικότητας και απεικόνισης»* (Giroux, 2010: 253).

Σήμερα είναι περισσότερο βέβαιο από ποτέ άλλοτε, ότι οι δεξιότητες του παρελθόντος για την αξιοποίηση των ΤΠΕ (π.χ. χειρισμού, αναζήτησης πληροφοριών, έντυπου γραμματισμού, προγραμματισμού) δεν αρκούν. Είναι απαραίτητες νέες πιο πλούσιες και πιο σύνθετες, όπως, του οπτικού και ακουστικού κριτικού γραμματισμού και του γραμματισμού στα ΜΜΕ, που εμπεριέχουν οργανωτικές, αναλυτικές, αποκωδικοποιητικές, ερμηνευτικές και κριτικές ικανότητες για ποικίλες πολιτισμικές μορφές έκφρασης και μέσα. Οι μαθητές είναι ανάγκη να τις εφαρμόζουν πάνω σε ένα νέο πολυσθενές, πολυσημειακό (polysemiotic) κειμενικό πεδίο, στο οποίο έχουν πρόσβαση, πλοήγηση και συμμετοχή (Kellner, 2000), ώστε να αποκαλύπτουν τη σημειολογία των συμφερόντων που υπηρετούνται. Σε κάθε μέσο αναπαραγωγής ιδεών η εξουσία ποικιλότροπα επιβάλλει έμμεσα τις σημασίες της, τη «συμβολική της βία». Είναι εκείνες οι ιδέες, αντιλήψεις, ερμηνείες, αρχές και αξιολογήσεις, οι οποίες παρουσιάζονται ως μοναδικές, κυρίαρχες και νόμιμες, παρεμποδίζοντας την κατανόηση των σχέσεων εξουσίας που διαπερνούν τις κοινωνικές σχέσεις.

Όμως, οι ΤΠΕ για να αποτελέσουν μορφωτικό αγαθό που προάγει τη διδασκαλία και τη μάθηση δεν απαιτείται απλά η «αυτοδύναμη» και «χρηστική» παρουσία τους ως εργαλείου στο μάθημα. Απαραίτητη είναι η μελέτη της επίδρασής τους στη διαμόρφωση των νοημάτων, των ταυτοτήτων, των ιδεολογικών αντιλήψεων και αξιών των μαθητών, η οποία είναι εξαιρετικά ισχυρή λόγω του ότι οι ΤΠΕ μεταβιβάζουν νοήματα, ήχο, εικόνα και τρόπους θέασης του κόσμου πάνω στον καμβά ενός πολυσθενούς και πολυσημειακού κειμενικού πεδίου που χαρακτηρίζεται από αμεσότητα και αλληλόδραση. Η άλληλεπιδραστικότητα, επιπλέον, προσδίδει στην εκπαιδευτική λειτουργία των ΤΠΕ, συναρπαστικό, ευχάριστο και συγκινησιακό χαρακτήρα, με αποτέλεσμα ο κοινωνικοπολιτικός ρόλος της γνώσης μέσω και της «πληροφοριοδιασκέδασης» (infotainment) να αποκτά βαρύνουσα σημασία στην εμπέδωση των κυρίαρχων κοινωνικών σχέσεων (Kincheloe, 2008). Γι' αυτό το λόγο οι μαθητές είναι ανάγκη να αναρωτιούνται κριτικά πάνω στη *σχέση* της αλληλεπίδρασης μεταξύ της εμπειρίας της προσωπικής τους ζωής και του περιεχομένου - με την ιδεολογία και τη μεθοδολογία του - που οι ΤΠΕ τους παρουσιάζουν, έτσι ώστε να τη διαμορφώνουν (Giroux, 1997; Bromley, 1998). Για να γίνουν όμως ικανοί γι' αυτό είναι απαραίτητη η συμβολή της Κριτικής Παιδαγωγικής σε συνδυασμό με την Προοδευτική Εκπαίδευση.

Καταρχήν, η συμβολή της Κριτικής Παιδαγωγικής είναι απαραίτητη ώστε να ενσωματωθούν οι ΤΠΕ οργανικά στη λειτουργία της εκπαιδευτικής διαδικασίας, στοχεύοντας στην κριτική κατανόηση και στο δημοκρατικό μετασχηματισμό του πλέγματος των σχέσεων, το οποίο συνυφαίνει τη σχολική ζωή και προετοιμάζει το μαθητή για την κοινωνία. Οι σχέσεις αυτές αφορούν τα υποκείμενά της (δάσκαλοι, μαθητές), την κοινωνία (γονείς, φορείς) και τις διδακτικές πρακτικές (στόχοι, περιεχόμενα, μορφές και μέθοδοι διδασκαλίας). Ειδικότερα, η Κριτική Παιδαγωγική:

⇒ τοποθετεί στο επίκεντρό της την ηθική,

⇒ οικοδομεί το γνωσιακό και αξιακό περιεχόμενο της κριτικής ιδιότητας του πολίτη,

⇒ δεν αναγάγει σε μια «μεγάλη αφήγηση» τα ζητήματα της εξουσίας, της δικαιοσύνης και της αναίρεσης κάθε είδους ανισότητας, αγνοώντας τα καθημερινά συμβάντα στα οποία αυτά εμφανίζονται και συνθέτουν τις εμπειρίες των ανθρώπων,

⇒ προάγει την παραγωγή νέας γνώσης που υπερβαίνει τα κατεστημένα επιστημονικά όρια και δημιουργεί νέες σφαίρες παραγωγής (κινηματογραφικές ταινίες, βίντεο, πολυτροπικά κείμενα, περιοδικά, ιστοσελίδες, στίχους και μουσική του δρόμου κ.ά.), για να έχουν φωνή όσοι στην κοινωνία ωθούνται στη σιωπή και το περιθώριο,

⇒ επαναδιατυπώνει την άποψη του ορθού λόγου του Διαφωτισμού, αναδεικνύοντας τη σημασία του ιστορικού και ιδεολογικού παράγοντα,

⇒ αναδεικνύει τον πλούτο εναλλακτικών δυνατών λύσεων, συνδυάζοντας τη γλώσσα της κριτικής με τη γλώσσα της δυνατότητας,

⇒ θεωρεί τους εκπαιδευτικούς ως αναμορφωτές διανοούμενους που όχι μόνο μορφώνουν, ενδυναμώνουν και διαπαιδαγωγούν τους μαθητές τους, αλλά και παρεμβαίνουν μετασχηματιστικά στην κοινωνία,

⇒ αναδεικνύει ως κεντρικής σημασίας την έννοια του διαφορετικού, όπου τα στοιχεία συγκρότησης της ταυτότητας (ιστορία, κουλτούρα, φύλο, κοινότητα, γλώσσα, φυλή και τάξη) γίνονται αντικείμενο θεωρητικής και κριτικής ανάλυσης και συνδέονται με την αλληλεγγύη, τον αγώνα και την πολιτική για την οικοδόμηση μιας πιο δίκαιης και ισότιμης κοινωνικής τάξης πραγμάτων που υπονομεύει τις σχέσεις ιεραρχίας, κυριαρχίας και εκμετάλλευσης(Giroux, 1993).

Οι κριτικοί δάσκαλοι για την υλοποίηση των παραπάνω θέσεων δεν μπορούν να οργανώσουν με πληρότητα το μάθημά τους αν σε επίπεδο αναλυτικού προγράμματος, μεθόδου και μορφής διδασκαλίας, δεν αξιοποιήσουν τη συνεισφορά του Βραζιλιάνου παιδαγωγού Paulo Freire. Χρειάζεται να εφαρμόσουν την πρότασή του για τη δημιουργία «παραγωγικών θεμάτων» (Φρέιρε, 1977) τα οποία καταλήγουν να τα επιλέξουν μετά από γνώση, μελέτη και κατανόηση των εμπειριών των μαθητών τους στο κοινωνικό, πολιτισμικό και οικονομικό τους περιβάλλον. Τα παραγωγικά θέματα αναφέρονται σε δύσκολες και επίμαχες καταστάσεις του κοινωνικού περίγυρου (εργασία, μόλυνση, ιδιότητα του πολίτη, σκουπίδια και απορρίμματα, φτώχεια κλπ) και προκαλούν την ενεργό δέσμευση και το ολόθερμο δόσιμο του μαθητή. Συμβαίνει αυτό, γιατί τα θέματα περικλείουν τις συγκινήσεις, τα συναισθήματα, τις ιδέες, τα νοήματα, τον φόβο, την αγωνία, τη χαρά, τις στενοχώριες, τις ελπίδες και τα όνειρά τους. Με επίκεντρο το παραγωγικό θέμα και με διάλογο, οι ομάδες των μαθητών και ο δάσκαλος, προχωρούν στην κριτική ανάλυση και κατανόησή του παραγωγικού θέματος, μέσα από την εξέταση ενός συνόλου ζητημάτων που ανακύπτουν προς διερεύνηση και εμπίπτουν σε ποικίλα γνωστικά πεδία και, παράλληλα, ανοίγουν το δρόμο για την κατανόηση του προσωπικού και κοινωνικού τους κόσμου. Στη βάση αυτή οικοδομείται η κριτική σκέψη και η ικανότητα για κοινωνική παρέμβαση και δράση με σκοπό την κοινωνική αλλαγή (O' Cadiz et al., 1998).

Κατά δεύτερο, η συμβολή της Κριτικής Παιδαγωγικής θα πρέπει να συνδυαστεί με την Προοδευτική Εκπαίδευση, η οποία ξεκινά τη διδασκαλία στην τάξη από την προσωπική εμπειρία / το βίωμα (ανάγκη) των μαθητών και πάνω του βασίζει:

⇒ τη συνεργατική μάθηση,

⇒ την καλλιέργεια της επιστημονικής μεθόδου σκέψης,

⇒ την οικοδόμηση της γνώσης στο πλαίσιο λύσης προβλημάτων (problem solving) και project, καθώς και

⇒ τη συγκρότηση του δημοκρατικού και υπεύθυνου πολίτη (Dewey, 1944).

Οι μαθητές μαθαίνουν να εξετάζουν τις εμπειρίες τους, τις ανάγκες τους, να προβληματίζονται και να τις κατανοούν. Καθώς τις θέτουν στο επίκεντρο, οδηγούνται στο να προσεγγίζουν «γενετικά» και να ανακαλύπτουν τις ειδικότερες γνωστικές περιοχές που θα προσφέρουν απαντήσεις στις αναζητήσεις τους. Με το δάσκαλο περισσότερο σε συμβουλευτικό και υποστηρικτικό ρόλο, μαθαίνουν τον επαγωγικό, πειραματικό και ιστορικό τρόπο σκέψης μαζί και τις ανάλογες τεχνικές διανοητικής εργασίας (συλλογής και επεξεργασίας δεδομένων) κατά την άντληση πληροφοριών από ποικίλες επιστημονικές, κοινωνικές, αισθητικές και πνευματικές περιοχές που τους ενδιαφέρουν. Με αυτό τον τρόπο, παράγουν γνώση.

Υπό το πρίσμα αυτών των παραδειγμάτων παιδαγωγικής θεωρίας και πράξης, εύλογα καταλήγει κανείς σε τρία πρωταρχικά συμπεράσματα. Πρώτον, σε ένα εκπαιδευτικό πλαίσιο που υιοθετεί τις αρχές της Κριτικής Παιδαγωγικής και τις κατευθύνσεις της Προοδευτικής Εκπαίδευσης, η ύπαρξη ενός διακριτού, ενιαίου, προαποφασισμένου και στοχοκεντρικού προγράμματος σπουδών για τις ΤΠΕ ή/και για οποιοδήποτε άλλο γνωστικό αντικείμενο είναι τουλάχιστον αδύνατη. Καθώς το πρόγραμμα σπουδών συγκροτείται στη βάση των «παραγωγικών θεμάτων» που προκύπτουν από στοχευμένη, εμπειρική μελέτη του κοινωνικού, οικονομικού και πολιτισμικού περιβάλλοντος στο οποίο εδράζει η σχολική μονάδα (Γρόλλιος,2005; Apple and Beane, 1999), σαφές είναι ότι τα θέματα αυτά δεν μπορούν ούτε να καθοριστούν, ούτε να προβλεφθούν, ούτε και να

προκατασκευαστούν. Αντίθετα, είναι μοναδικά, ιδιαίτερα και αυθεντικά για κάθε τάξη και για κάθε σχολική μονάδα.

Δεύτερον, σε ένα τέτοιο εκπαιδευτικό περιβάλλον, η αξιοποίηση των ΤΠΕ ως εκπαιδευτικών εργαλείων δεν μπορεί παρά να ενσωματωθεί και να λειτουργήσει υποστηρικτικά σε μία σειρά από απελευθερωτικές προσεγγίσεις και έμπρακτα μαθητοκεντρικές παιδαγωγικές πρακτικές. Ταυτόχρονα όμως, μπορεί και να τις επεκτείνει. Στο πλαίσιο της προσέγγισης και επεξεργασίας ρεαλιστικών προβλημάτων και project, η δημιουργία και κατασκευή προϊόντων ΤΠΕ και ηλεκτρονικών ΜΜΕ δίνει στους μαθητές την αναντικατάστατη, πρωτογενή ευκαιρία: (α) της πρόσβασης σε επίμαχο περιεχόμενο, συγκρουσιακές ιδέες και αντιλήψεις, αντιφατικές αξίες και ιδεολογίες, και (β) της διάδοσης προσωπικών αφηγήσεων και της δημιουργίας, παραγωγής γνωστικών κατασκευών και «προβολών» του κόσμου.

Τρίτον, η μελέτη και επεξεργασία «παραγωγικών θεμάτων» με επεκτάσεις και προεκτάσεις αμιγώς τεχνολογικού ενδιαφέροντος αποκτά μία ισχυρή διαλεκτική διάσταση, η οποία προκαλεί τον σκεπτικισμό των μαθητών και δημιουργεί προβληματισμούς για τα αυτονόητα και τα δεδομένα που αφορούν στη φύση της τεχνολογίας και τη χρήση της σε κάθε έκφανση της ζωής. Τέλος, και επειδή αυτή η μελέτη και επεξεργασία δεν μπορεί να σκοπεύει κυρίως σε κατάκτηση πραγματολογικών γνώσεων και πληροφοριών, ούτε και στην απόκτηση δεξιοτήτων και ικανοτήτων, αλλά αντιθέτως εστιάζει σε εκείνους τους κανόνες, τις αξίες και τις τάσεις που καθορίζουν τη μελλοντική μας συμπεριφορά (Apple, 2008), επιτρέπει στις μελλοντικές γενιές την ανάληψη δράσης προς την οικοδόμηση ενός δημοκρατικότερου τεχνολογικού γίγνεσθαι και την ενεργοποίηση της συμμετοχής όλων στην κοινή ζωή και στην παραγωγή γνώσης, τεχνολογίας και πολιτισμού.

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Επαγγελματικές Κοινότητες Μάθησης στα Οικολογικά Σχολεία και Παράγοντες που τις Επηρεάζουν

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Περίληψη

Οι Επαγγελματικές Κοινότητες Μάθησης (Ε.Κ.Μ.) συνιστούν δυναμικά εργαλεία συνεχούς επαγγελματικής ανάπτυξης των εκπαιδευτικών και μέσα για τη βελτίωση του εκπαιδευτικού έργου που παρέχουν οι σχολικοί οργανισμοί. Εμφανίζονται σε σχολικά περιβάλλοντα που παρουσιάζουν υποστηρικτική και συμμετοχική ηγεσία, κοινό όραμα και αξίες, συνεργατική μάθηση των εκπαιδευτικών και εφαρμογή της νέας γνώσης, δημοσιοποίηση των προσωπικών διδακτικών πρακτικών και κατάλληλες υποστηρικτικές συνθήκες. Η παρούσα εργασία μελετά την εμφάνιση των παραπάνω στοιχείων στα ελληνικά «Οικολογικά Σχολεία» μέσα από τις απόψεις των Διευθυντών τους με σκοπό να εντοπίσει το βαθμό λειτουργίας των Ε.Κ.Μ. στα πλαίσια τους. Από την ποσοτική έρευνα φάνηκε ότι στα «Οικολογικά Σχολεία» εμφανίζονται υποστηρικτικές δομές και λειτουργίες οι οποίες ευνοούν την ανάπτυξη κοινοτήτων μάθησης με τη συμμετοχή αρκετών εκπαιδευτικών. Ωστόσο, αυτές οι κοινότητες δε φάνηκε να λειτουργούν σε συνεχή και συστηματική βάση ούτε να εξελίσσονται σε ωριμότερα σχήματα με την πάροδο του χρόνου. Επιπρόσθετα, από τα αποτελέσματα της έρευνας φάνηκε ότι η ανάπτυξη Ε.Κ.Μ. στους σχολικούς οργανισμούς μπορεί να επηρεασθεί από διάφορους παράγοντες όπως η προϋπηρεσία του Διευθυντή στο συγκεκριμένο σχολείο, η ύπαρξη στο σχολείο εκπαιδευτικών με πρόσθετες σπουδές, η βαθμίδα του σχολείου ή τοποθεσία στην οποία εδρεύει.

Abstract

Professional Learning Communities (P.L.C.) are considered a great tool for teachers' continuing professional development and a vehicle for whole school improvement. P.L.C. operate in schools that can provide supportive and shared leadership, shared values and vision, collective learning and application of learning, shared personal practices and supportive conditions. This study investigates the development of P.L.C. in Greek primary and secondary "Eco-Schools" through their head-teachers' opinions. The quantitative results indicated that, in this type of school appeared a number of functions and supportive conditions that encourage the development of P.L.C. and teachers' collaborative learning. However, these actions do not involve the entirety of the school's educational staff, do not occur in a systematic and long lasting manner and do not progress as the years pass by. Furthermore, from the results it seems that the development of P.L.C. is affected by a number of factors such as the head teacher's work experience at the particular school, the existence of teachers in school with extra qualifications in educational issues, the school's educational stage or the school's geographical area.

Εισαγωγή

Η κοινωνία του 21^{ου} αιώνα χαρακτηρίζεται από ραγδαίες εξελίξεις σε όλους τους τομείς: οικονομία, πολιτική, τεχνολογία, περιβάλλον, ανθρώπινες σχέσεις. Σε αυτό το νέο πλαίσιο γίνεται επιτακτική η ανάγκη αλλαγής του σχολείου όπως το γνωρίζουμε ως σήμερα και κατά συνέπεια κρίνεται απαραίτητη η συνεχής επιμόρφωση και επαγγελματική ανάπτυξη των εκπαιδευτικών ώστε να

μπορούν να ανταποκριθούν αποτελεσματικά στις εξελίξεις και απαιτήσεις των καιρών. Δυναμικά εργαλεία γι' αυτή τη διαδικασία και τη βελτίωση κάθε σχολικής μονάδας θεωρούνται οι Επαγγελματικές Κοινότητες Μάθησης (Ε.Κ.Μ.). Μέσα σε αυτές αναπτύσσεται η συνεργατική μάθηση των εκπαιδευτικών και ενθαρρύνεται η εφαρμογή νέων γνώσεων και καινοτομιών προς όφελος όλων των μαθητών του σχολείου (Harris & Jones, 2010˙ Hord, 2009). Επιπλέον, θεωρούνται αποτελεσματικότερες μορφές επαγγελματικής ανάπτυξης γιατί εστιάζονται σε ζητήματα που απασχολούν τους εκπαιδευτικούς στο χώρο εργασίας τους, στοιχείο το οποίο δεν παρατηρείται σε επιμορφωτικές δραστηριότητες που διεξάγονται εκτός σχολείου (Early & Bubb, 2004˙ Yildirim, 2008).

Έρευνες στο ελληνικό εκπαιδευτικό σύστημα επανειλημμένα έχουν υπογραμμίσει την περιορισμένη συνεργασία των εκπαιδευτικών σε «κοινά» σχολεία πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης. Συγκεκριμένα, έχουν τονίσει ότι η συνεργασία των ελλήνων εκπαιδευτικών οριοθετείται κυρίως στην ανάπτυξη κοινωνικών σχέσεων και σε επιφανειακά, διαδικαστικά ζητήματα λειτουργίας του σχολικού οργανισμού και δεν σχετίζεται με ζητήματα που αφορούν την ουσία του παρεχόμενου εκπαιδευτικού έργου που είναι η διδασκαλία και μάθηση (Μλεκάνης, 2005˙ Πομάκη, 2007˙ Πυργιωτάκης, 1992). Ωστόσο, αξίζει να σημειωθεί ότι δε βρέθηκαν αναφορές για τις συνεργατικές διαδικασίες που συντελούνται σε σχολεία που εφαρμόζουν πολυετή καινοτόμα προγράμματα όπως το πρόγραμμα «Οικολογικά Σχολεία».

Η παρούσα μελέτη λαμβάνοντας υπόψη τις παραπάνω παρατηρήσεις επικεντρώθηκε στα «Οικολογικά Σχολεία» για τρεις κυρίως λόγους. Καταρχάς, μελετώντας το καθοδηγητικό υλικό για την εφαρμογή του προγράμματος «Οικολογικά Σχολεία» διαπιστώθηκε ότι αυτό, ωθεί τα μέλη της σχολικής κοινότητας (εκπαιδευτικούς, γονείς, παιδιά, τοπική αυτοδιοίκηση) σε αλληλεπίδραση και συνεργασία για την επίτευξη ενός κοινού σκοπού (μείωση του οικολογικού ίχνους του σχολείου), γεγονός, που επιδρά θετικά στην ανάπτυξη κοινοτήτων μάθησης (Kilpatrick, Barrett & Jones, 2003). Επίσης, η ελλιπής κατάρτιση των ελλήνων εκπαιδευτικών σε θέματα εκπαίδευσης για την αειφορία και το περιβάλλον τόσο σε προπτυχιακό όσο και σε επίπεδο επαγγελματικής επιμόρφωσης (Spiropoulou, Antonakaki, Kontaxaki & Bouras, 2007) είναι στοιχείο το οποίο προκαλεί βάσιμες εικασίες για την οργάνωση και λειτουργία Ε.Κ.Μ. σε αυτό τον τύπο σχολείων. Η μη εξοικείωση των εκπαιδευτικών σε ζητήματα περιβάλλοντος και αειφορίας είναι πιθανό να δημιουργεί συνθήκες για την συνεργασία και την αλληλοϋποστήριξή τους με στόχο τη βελτίωση των ικανοτήτων και των γνώσεων τους ώστε να ανταποκριθούν αποτελεσματικά στους στόχους του σχολείου τους. Τέλος, οι προσδοκίες για την ύπαρξη και λειτουργία Ε.Κ.Μ. σε αυτά τα σχολεία ενισχύθηκαν όταν συγκρίνοντας πορίσματα άλλων ερευνών διαπιστώθηκε ότι οι Διευθυντές που επιδιώκουν την αλλαγή του σχολείου τους σε αειφόρο, όπως οι Διευθυντές των «Οικολογικών Σχολείων», παρουσιάζουν κοινά χαρακτηριστικά με τους Διευθυντές[1] που επιδιώκουν αλλαγές στον τρόπο εργασίας των εκπαιδευτικών με τη δημιουργία Ε.Κ.Μ. (Jackson, 2008˙ Δημοπούλου & Μπαμπίλα, 2010˙ Morrissey, 2000˙ Clement & Vandenberghe, 2001).

Θεωρητικό πλαίσιο

Ο όρος Ε.Κ.Μ. δεν έχει ένα κοινά αποδεκτά ορισμό (Bolam, McMahon, Stoll, Thomas, Wallace, Greenwood, & Smith, 2005). Ύστερα από βιβλιογραφική έρευνα οι Stoll, Bolam, McMahon, Wallace & Thomas (2006) κατέληξαν ότι αυτός συνήθως αναφέρεται σε
«ομάδα ατόμων που λειτουργούν ως συλλογική επιχείρηση και οι οποίοι μοιράζονται και εξετάζουν κριτικά τις πρακτικές τους σε συνεχή, στοχαστική, συνεργατική, περιεκτική, μαθησιακά προσανατολισμένη βάση» (σελ. 223).
Σύμφωνα με τη Hord, (1997) Ε.Κ.Μ. δημιουργείται σε ένα σχολικό οργανισμό όταν
«η διεύθυνση και οι εκπαιδευτικοί ενός σχολείου συνεχώς αναζητούν και μοιράζονται τη μάθηση ενώ ταυτόχρονα δρουν πάνω σε αυτή. Σκοπός των ενεργειών τους είναι να αυξήσουν την αποτελεσματικότητά τους ως επαγγελματίες προς όφελος των μαθητών τους» (σελ.10).

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[1] Με τον όρο Διευθυντές-Διευθυντής εννοούνται οι γυναίκες και άνδρες εκπαιδευτικοί που κατέχουν τη θέση της διεύθυνσης κάθε σχολείου.

Μελέτες (DuFour, 2004˙ Early & Bubb, 2004˙ Hord & Sommers, 2008˙ Morrissey, 2000) σε σχολεία που λειτουργούν Ε.Κ.Μ. διαπίστωσαν ότι παρουσιάζουν τουλάχιστον πέντε κοινά χαρακτηριστικά αυτά είναι:

1. Υποστηρικτική και συμμετοχική ηγεσία η οποία έχει τη δυνατότητα και την ικανότητα να προσφέρει στήριξη και δομές που ενθαρρύνουν τη συνεργασία των εκπαιδευτικών, τη συμμετοχή τους στη λήψη αποφάσεων και την ανάληψη πρωτοβουλιών και καινοτομιών.

2. Κοινό όραμα και στόχους το οποίο δημιουργείται μέσα από τη συνεργασία της εκπαιδευτικής κοινότητας του σχολείου βασίζεται στις κοινές αξίες και απόψεις των εκπαιδευτικών και καθορίζει τι είναι σημαντικό για τον εκπαιδευτικό οργανισμό και τα μέλη του.

3. Συνεργατική μάθηση των εκπαιδευτικών και εφαρμογή της νέας γνώσης τους με σκοπό να βελτιωθεί η μαθησιακή διαδικασία που προσφέρει το σχολείο.

4. Δημοσιοποίηση από τους εκπαιδευτικούς των προσωπικών διδακτικών πρακτικών τους σε συστηματική βάση όχι με σκοπό την αξιολόγηση του εκπαιδευτικού έργου τους αλλά την εισαγωγή αλλαγών στην εκπαιδευτική διαδικασία μέσω της συναδελφικής καθοδήγησης και ανατροφοδότησης.

5. Υποστηρικτικές συνθήκες σε δύο επίπεδα. Το πρώτο επίπεδο αφορά λειτουργικές δομές και φυσικούς πόρους όπως είναι: ο καθορισμός χρόνου για συνεργασία, η ύπαρξη πολλαπλών μέσων επικοινωνίας και ενημέρωσης, η επαρκής υλικοτεχνική στήριξη της διδακτικής πράξης. Το δεύτερο επίπεδο αφορά τις ανθρώπινες σχέσεις στο σχολικό οργανισμό και σχετίζεται με την ύπαρξη κλίματος δεκτικότητας και αμοιβαίας εμπιστοσύνης και τη δημιουργία κουλτούρας, αλληλεγγύης και συνεργασίας.

 Η δημιουργία και λειτουργία Ε.Κ.Μ. σε ένα σχολικό οργανισμό όπως κάθε καινοτομία ή αλλαγή είναι *«μια διαδικασία και όχι ένα γεγονός»* (Fullan, 2001, σελ. 52). Η αλλαγή του τρόπου εργασίας των εκπαιδευτικών και ο σχηματισμός Ε.Κ.Μ. δεν είναι μια ευθύγραμμη διαδικασία ούτε ακολουθεί την ίδια πορεία στις διαφορετικές σχολικές κοινότητες, επηρεάζεται από τα ιδιαίτερα χαρακτηριστικά, τις συνθήκες και τις συνήθειες που επικρατούν σε κάθε μία από αυτές (Fullan, 2001˙ Kiefer Hipp, Bumpers Huffman, Pankake & Olivier, 2008). Έτσι η ανάπτυξη και λειτουργία των Ε.Κ.Μ. μπορεί να επηρεασθεί από τα γενικά χαρακτηριστικά του σχολείου όπως το μέγεθος, η βαθμίδα εκπαίδευσης που ανήκει ή η περιοχή που βρίσκεται (Bolam et al., 2005). Από τα ιδιαίτερα χαρακτηριστικά του Διευθυντή κάθε σχολείου όπως η κατάρτισή του, η εμπειρία του σε θέματα διοίκησης και οργάνωσης, οι προσωπικές του απόψεις για την εκπαίδευση ή ο τρόπος που επιλέγει να διοικεί το σχολείο (Harris, & Jones, 2010). Από τα ατομικά χαρακτηριστικά των εκπαιδευτικών όπως το επίπεδο επαγγελματικής εκπαίδευσης τους, η επαγγελματική εμπειρία τους, οι προσωπικές απόψεις, αντιλήψεις και στάσεις τους για την εκπαίδευση γενικά, το ρόλο του σχολείου ή την αναγκαιότητα και τη σπουδαιότητα της συνεργασίας με συναδέλφους τους (Stoll et al., 2006˙ Zimmerman, 2006).

 Κατά συνέπεια οι Ε.Κ.Μ. δεν είναι εφικτό να παρουσιάζουν την ίδια ανάπτυξη σε όλους τους σχολικούς οργανισμούς. Έτσι αυτή, σύμφωνα με ερευνητικά πορίσματα μπορεί να διακριθεί σε τρία επίπεδα: αρχικό (starter), αναπτυσσόμενο (developer) ή εξελιγμένο (ώριμο) (mature) ανάλογα με τον αριθμό των εκπαιδευτικών που εμπλέκεται σε διαδικασίες σχετικές με την υποστηρικτική και συνεργατική ηγεσία, τη δημιουργία κοινού οράματος, τη συνεργατική μάθηση, τη δημοσιοποίηση των προσωπικών εκπαιδευτικών πρακτικών, και την ύπαρξη υποστηρικτικών συνθηκών στη σχολική μονάδα (Bolam, et al., 2005).

Σκοπός της έρευνας

Με βάση τα παραπάνω σκοπός της παρούσας μελέτης ήταν να ερευνήσει τη λειτουργία των πέντε χαρακτηριστικών γνωρισμάτων που υποδηλώνουν την ύπαρξη Ε.Κ.Μ. στα «Οικολογικά Σχολεία». Να προσδιορίσει το γενικό επίπεδο ανάπτυξης των Ε.Κ.Μ. στα «Οικολογικά Σχολεία» και να ερευνήσει αν υπάρχει σχέση μεταξύ του επιπέδου ανάπτυξης Ε.Κ.Μ. και των ετών που ένα σχολείο συμμετέχει στο συγκεκριμένο πρόγραμμα.

Επιπλέον, σκοπός της ήταν να εξετάσει τη σχέση της διοικητικής εμπειρίας του Διευθυντή στο συγκεκριμένο σχολείο με το επίπεδο ανάπτυξης Ε.Κ.Μ.. Να μελετήσει τη σχέση του πλήθους των εκπαιδευτικών του σχολείου και την επίδραση του αριθμού των εκπαιδευτικών του σχολείου με

μεταπτυχιακές/διδακτορικές σπουδές σε παιδαγωγικά θέματα στο επίπεδο ανάπτυξης Ε.Κ.Μ.. Τέλος, να ερευνήσει κατά πόσο η βαθμίδα εκπαίδευσης του σχολείου και η τοποθεσία του σχολείου επιδρούν στο επίπεδο ανάπτυξης Ε.Κ.Μ.

Μεθοδολογία - Δείγμα – Στατιστική Ανάλυση

Οι απαντήσεις στα ερευνητικά ερωτήματα δόθηκαν με τη μέθοδο της περιγραφικής επισκόπησης. Το γεγονός ότι τα «Οικολογικά Σχολεία» βρίσκονται διάσπαρτα στην ελλαδική επικράτεια, οι ελάχιστοι οικονομικοί πόροι και ο περιορισμένος χρόνος για τη διεξαγωγή της έρευνας ήταν παράγοντες που υπέδειξαν τη χρήση ερωτηματολογίου ως μέσο για τη συλλογή των ερευνητικών δεδομένων. Επίσης, οι ίδιοι παράγοντες οδήγησαν στην απόφαση η έρευνα να διεξαχθεί με ηλεκτρονικό τρόπο. Έτσι, χρησιμοποιήθηκε ηλεκτρονικό ερωτηματολόγιο πολλαπλών επιλογών πεντάβαθμης κλίμακας Likert, το οποίο δημιουργήθηκε βασιζόμενο στο ερευνητικό εργαλείο της Hord, (1996) με τίτλο: «Σχολικό Επαγγελματικό Προσωπικό ως Κοινότητα Μάθησης». Το ερωτηματολόγιο περιείχε δέκα εφτά περιγραφικούς δείκτες, οι οποίοι ομαδοποιούνται και σχετίζονται με τη συμμετοχική και υποστηρικτική ηγεσία (δύο δείκτες), το κοινό όραμα (τρεις δείκτες), τη συλλογική μάθηση (πέντε δείκτες), τη δημοσιοποίηση των προσωπικών διδακτικών πρακτικών (δύο δείκτες) και τις υποστηρικτικές συνθήκες κάθε σχολείου (πέντε δείκτες). Το συνολικό άθροισμα των δεκαεφτά δεικτών δείχνει το βαθμό στον οποίο οι ερωτώμενοι θεωρούν το σχολείο τους ως περιβάλλον το οποίο υποστηρίζει τη λειτουργία Ε.Κ.Μ.. Όσο υψηλότερο είναι το συνολικό άθροισμα τόσο θετικότερη είναι η άποψη των ερωτώμενων για τη λειτουργία του σχολείου τους ως κοινότητας μάθησης (Meehan, Orletsky & Satters, 1997˙ Cowly, 1999). Η εσωτερική συνοχή του τελικού ερευνητικού εργαλείου ήταν α=0,858.

Το ερωτηματολόγιο στάλθηκε μέσω ηλεκτρονικού ταχυδρομείου σε 128 σχολεία 80 Α/θμιας και 48 Β/θμιας εκπαίδευσης. Αυτά συμμετείχαν στο πρόγραμμα «Οικολογικά Σχολεία» πάνω από ένα έτος κατά την περίοδο διεξαγωγής της έρευνας, σύμφωνα με τα στοιχεία της συντονίστριας του προγράμματος μη κυβερνητικής οργάνωσης «Ελληνική Εταιρεία Προστασίας της Φύσης». Επιλέχθηκαν να εξετασθούν σχολεία με πάνω από ένα έτος συμμετοχής στο πρόγραμμα ώστε να εξασφαλιστεί η μελέτη σχολικών μονάδων οι οποίες ήταν εξοικειωμένες με την εφαρμογή του προγράμματος και κατ᾽ επέκταση με τις συνεργατικές διαδικασίες που αυτό απαιτούσε. Επίσης, το ερευνητικό εργαλείο απευθύνθηκε στους Διευθυντές των σχολείων: α) για να εξασφαλισθεί η ομοιομορφία του δείγματος της, β) γιατί αυτοί έχουν την κύρια ευθύνη του προγραμματισμού, του συντονισμού, της εποπτείας, της καθοδήγησης και της εκπροσώπησής της σχολικής μονάδας και γ) γιατί στάθηκε αδύνατο να έχουμε πρόσβαση στις ηλεκτρονικές διευθύνσεις των εκπαιδευτικών που εργάζονται στα συγκεκριμένα σχολεία.

Το ερωτηματολόγιο συμπλήρωσαν 73 Διευθυντές «Οικολογικών Σχολείων» από τους οποίους οι 38 (52,05%) ήταν άνδρες και 35 (47,94%) γυναίκες, με μέσο όρο ηλικίας τα 49 έτη (ΤΑ= 5,68). Η προϋπηρεσία τους στη διευθυντική θέση του σχολείου κυμαινόταν από 1 έως 27 έτη (Μ.Ο.=7,26, Τ.Α.=5,34).

Ο αριθμός των εκπαιδευτικών στα σχολεία του δείγματος κυμαίνονταν από 4 έως 50 (Μ.Ο.=17, 44 και Τ.Α= 8,762) και είχαν κατά μέσο όρο 1,56 (Τ.Α.=3,19) εκπαιδευτικούς με πρόσθετες μεταπτυχιακές ή διδακτορικές σπουδές σε θέματα εκπαίδευσης.

Οι Διευθυντές που απάντησαν στο ερωτηματολόγιο εκπροσωπούσαν 58 σχολεία Α/θμιας (79,5% επί του συνόλου των απαντήσεων και 72.5% επί των σχολείων της Α/θμιας) και 15 Σχολεία Β/θμιας (20,5% επί του συνόλου των απαντήσεων και 31,25% επί των σχολείων της Β/θμιας) 70 από αυτά ήταν Δημόσια και 3 Ιδιωτικά. Το 41,10% ήταν αστικά, το 24,66% ημιαστικά και το 34,25% αγροτικά. Τέλος, συμμετείχαν στο πρόγραμμα «Οικολογικά Σχολεία» κατά μέσο όρο 3,19 (Τ.Α.= 2,039) έτη.

Τα στοιχεία που συλλέχθηκαν επεξεργάστηκαν στο πρόγραμμα PASW statistics 18. Για τις ανάγκες των ερευνητικών ερωτημάτων δημιουργήθηκαν 6 νέες μεταβλητές οι οποίες αντιπροσώπευαν τον γενικό μέσο όρο κάθε σχολείου ο οποίος έκφραζε το επίπεδο Ε.Κ.Μ. και το μέσο όρο σε κάθε ένα από τα πέντε χαρακτηριστικά των Ε.Κ.Μ. Οι νέες μεταβλητές ελέγχθηκαν για την κανονικότητα των κατανομών τους και θεωρήθηκαν ως μη κανονικές. Για τη στατιστική

ανάλυση των δεδομένων χρησιμοποιήθηκαν περιγραφικές μέθοδοι που αφορούσαν τον υπολολογισμό των μέσων όρων (Μ.Ο.) και των τυπικών αποκλίσεων (Τ.Α.) των μεταβλητών. Επίσης διεξήχθηκαν κριτήρια επαγωγικής στατιστικής με σκοπό να αναζητηθούν απαντήσεις στα ερευνητικά ερωτήματα.

Αποτελέσματα-Συζήτηση

Από τα αποτελέσματα διαπιστώθηκε ότι στα υπό εξέταση σχολεία το χαρακτηριστικό της υποστηρικτικής και συμμετοχικής ηγεσίας ήταν πολύ αναπτυγμένο (Μ.Ο.=4,46 Τ.Α.=,63). Συγκεκριμένα οι ηγεσίες των σχολείων επέτρεπαν σε κάθε εκπαιδευτικό που το επιθυμούσε την ανάληψη ηγετικών ρόλων για την επίλυση σχολικών προβλημάτων και την εφαρμογή καινοτομιών. Επίσης, ενέπλεκαν το σύνολο των εκπαιδευτικών στη διαδικασία λήψης αποφάσεων και ελάμβαναν όσο ήταν δυνατόν κοινά αποδεκτές αποφάσεις. Αυτές οι δηλώσεις των Διευθυντών βρίσκονται σε συμφωνία με την σχετική ελληνική νομοθεσία η οποία ορίζει το Σύλλογο Διδασκόντων ως όργανο λήψης αποφάσεων για τα θέματα του σχολείου (Υ.Α. Αρ.Φ.353.1./324/105657/41. ΦΕΚ. 1340/16/10/2002 άρθρο 39). Επίσης, δημιούργησαν προσδοκίες για την ύπαρξη σημαντικής σχέσης μεταξύ της συνεργατικής ηγεσίας και άλλων χαρακτηριστικών που σηματοδοτούν την ύπαρξη Ε.Κ.Μ. (Αθανασούλα-Ρέππα, Κουτούζης, Μαυρογιώργος, Νιτσόπουλος, & Χαλκιώτης, 1999 · Bollam, Stoll, & Greenwood, 2007· Hord & Sommers, 2008) στοιχείο που όμως δεν επιβεβαιώθηκε στην παρούσα έρευνα (πίνακας 1).

Η σχέση των πέντε χαρακτηριστικών γνωρισμάτων των Ε.Κ.Μ. στα «Οικολογικά Σχολεία»				
Spearman's rho	Μ.Ο. Ηγεσίας	Μ.Ο. Κοινό Όραμα	Μ.Ο. Συνεργασία	Μ.Ο .Διδασκαλία	Μ.Ο. Συνθήκες
Μ.Ο. Ηγεσίας	1,000	,317[**]	,103	-,029	,204
Μ.Ο. Κοινό Όραμα	,317[**]	1,000	,543[**]	,397[**]	,648[**]
Μ.Ο. Συνεργασία	,103	,543[**]	1,000	,547[**]	,724[**]
Μ.Ο. Διδασκαλία	-,029	,397[**]	,547[**]	1,000	,527[**]
Μ.Ο. Συνθήκες	,204	,648[**]	,724[**]	,527[**]	1,000
** Η συσχέτιση είναι σημαντική στο επίπεδο ,01 (διπλής κατεύθυνσης)					

Πίνακας 1

Αποτέλεσμα το οποίο ίσως να οφείλεται στο γεγονός ότι τα ερωτηματολόγια συμπληρώθηκαν μόνο από τους Διευθυντές των σχολείων. Οι απαντήσεις τους στα θέματα της ηγεσίας είναι πιθανό να επηρεάζονται από τις υποκειμενικές απόψεις τους για το έργο τους. Γι' αυτό το λόγο θα ήταν χρήσιμη περαιτέρω διερεύνηση του θέματος της υποστηρικτικής και συνεργατικής ηγεσίας στα «Οικολογικά Σχολεία» με την καταγραφή και των απόψεων των εκπαιδευτικών.
Στα «Οικολογικά Σχολεία» του δείγματος φάνηκε να εμφανίζεται πολύ συχνά το χαρακτηριστικό του κοινά αποδεκτού οράματος προσανατολισμένο στη μάθηση όλων των μαθητών του σχολείου (Μ.Ο.=4,00, Τ.Α.=,77). Συγκεκριμένα, σύμφωνα με τις δηλώσεις των Διευθυντών οι κοινοί στόχοι του σχολείου δημιουργούνται με την εμπλοκή του συνόλου των εκπαιδευτικών και τη συναίνεση της πλειονότητας τους. Επίσης, το όραμα και οι στόχοι των συγκεκριμένων σχολείων εστιάζονται κατά το πλείστον στους μαθητές και στη βελτίωση των διαδικασιών διδασκαλίας και μάθησης με σκοπό την παροχή υψηλής ποιότητας εκπαίδευσης. Από αυτές τις επισημάνσεις, οδηγούμαστε στο συμπέρασμα ότι πιθανά το μεγαλύτερο ποσοστό των εκπαιδευτικών των «Οικολογικών Σχολείων» του δείγματος διακατέχονται από κοινές αρχές και αξίες οι οποίες καθοδηγούσαν τις αποφάσεις τους σχετικά με την εκπαιδευτική διαδικασία και το όραμα του σχολείου (Hord, 1997). Επίσης, είναι πιθανό να υποδηλώνουν την ύπαρξη συνεργασίας μεταξύ των εκπαιδευτικών αφού η δημιουργία κοινά αποδεκτού οράματος προϋποθέτει εκπαιδευτικές κοινότητες που μπορούν να επικοινωνούν και να συνεργάζονται (Hord & Sommers, 2008). Ωστόσο, για να διαμορφωθεί μια σφαιρικότερη και αντικειμενικότερη εικόνα για το θέμα της ύπαρξης κοινού οράματος στα

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«Οικολογικά Σχολεία», είναι αναγκαίο να διερευνηθούν και οι απόψεις των εκπαιδευτικών στο ζήτημα αυτό.

Σχετικά με το χαρακτηριστικό της συνεργατικής μάθησης των εκπαιδευτικών και την εφαρμογή της νέας γνώσης στα σχολεία του δείγματος φάνηκε ότι ήταν μέτρια (Μ.Ο.=3,53, Τ.Α.=,78). Αναλυτικότερα, οι Διευθυντές ανέφεραν ότι περισσότεροι από τους μισούς εκπαιδευτικούς συζητούσαν αρκετές φορές κατά τον ελεύθερο χρόνο τους στο σχολείο (διαλείμματα, ή ώρες χωρίς διδακτικά καθήκοντα) γενικά θέματα διδασκαλίας και μάθησης, εμπλούτιζαν μαζί τις επαγγελματικές τους γνώσεις και μάθαιναν ο ένας από τον άλλο. Επίσης, αρκετές φορές συζητούσαν τις προσωπικές διδακτικές πρακτικές τους και την επίδραση που είχαν στους μαθητές τους και με την ίδια συχνότητα εφάρμοζαν τις νέες γνώσεις που αποκτούσαν σε επιμορφωτικές δραστηριότητες με σκοπό να επιτύχουν αποτελεσματικότερη διδασκαλία και επιτυχημένη μάθηση. Ωστόσο, αυτές οι ενέργειες δεν αφορούσαν το σύνολο του εκπαιδευτικού προσωπικού και υλοποιούνταν περιστασιακά. Τα συγκεκριμένα αποτελέσματα μπορούν να ερμηνευθούν αν ληφθεί υπόψη η κριτική που έχει ασκηθεί στο ελληνικό εκπαιδευτικό σύστημα (Κατσαρός, 2008˙ Σαΐτης, 2008). Ο πάγιος συγκεντρωτικός χαρακτήρας του ελληνικού εκπαιδευτικού συστήματος ρυθμίζει όλες τις λειτουργίες της σχολικής μονάδας οδηγώντας την εκπαιδευτική του κοινότητα σε τυπικές συναντήσεις ρουτίνας οι οποίες κανονίζουν συνήθως διαδικαστικά ζητήματα λειτουργίας του σχολείου (Μλεκάνης, 2005˙ Πυργιωτάκης, 1992˙ Σαΐτης 2008). Αυτό το μοντέλο πιθανά επηρεάζει και την εργασία των εκπαιδευτικών στα «Οικολογικά Σχολεία» του δείγματος.

Σχετικά με το χαρακτηριστικό της δημοσιοποίησης των προσωπικών διδακτικών πρακτικών τα στατιστικά αποτελέσματα έδειξαν ότι οι εκπαιδευτικοί ποτέ δεν αντάλλασσαν επισκέψεις σε τάξεις συναδέλφων τους (ή στην καλύτερη περίπτωση μόνο όταν οι ίδιοι το επιθυμούσαν) για να παρακολουθήσουν τη διεξαγωγή της διδασκαλίας και να βοηθήσουν με τις παρατηρήσεις τους στη βελτίωσή της (Μ.Ο.=2,02, Τ.Α.=1,15). Οι πρακτικές αυτές μπορούν να κατανοηθούν και πάλι με βάση την ελληνική εκπαιδευτική πραγματικότητα σύμφωνα με την οποία, επί δεκαετίες, ο σχολικός σύμβουλος είναι ο μόνος αρμόδιος να επισκεφθεί τη σχολική αίθουσα για να παρακολουθήσει τη διδασκαλία και να παρέχει συμβουλές βελτίωσης της και μόνο ύστερα από σχετική ενημέρωση του εκπαιδευτικού (Υ.Α. Αρ.Φ.353.1./324/105657/41. ΦΕΚ. 1340/16/10/2002, άρθρο 9). Κατά συνέπεια, η σχολική αίθουσα κάθε εκπαιδευτικού με βάση τις καθιερωμένες και νόμιμες διαδικασίες ορίζεται ως αυστηρά προσωπική υπόθεση ενισχύοντας την αυτονομία του αλλά και την επαγγελματική του απομόνωση (Fullan & Hargreaves, 1991). Το στοιχείο αυτό αναστέλλει την ανάπτυξη ωριμότερων Ε.Κ.Μ. οι οποίες χαρακτηρίζονται από διαδικασίες οι οποίες θέτουν την αποτελεσματικότερη μάθηση όλων των μαθητών του σχολείου ως σκοπό όλης της εκπαιδευτικής κοινότητας και όχι του εκπαιδευτικού κάθε τάξης χωριστά.

Μελετώντας τις υποστηρικτικές συνθήκες που πρόσφεραν στους εκπαιδευτικούς τα σχολεία του δείγματος φάνηκε ότι αυτές ήταν υψηλές (Μ.Ο.=4,18, Τ.Α.=,78). Ειδικότερα, τα αποτελέσματα έδειξαν ότι στα συγκεκριμένα σχολεία υπήρχε χρόνος για τη συνεργασία των εκπαιδευτικών ο οποίος όμως δεν ήταν αρκετός. Η διαρρύθμιση και το μέγεθος των κτιρίων τους διευκόλυναν την αλληλεπίδραση και συνεργασία των περισσοτέρων εκπαιδευτικών. Έδιναν έμφαση στην επικοινωνία και ενημέρωση της εκπαιδευτικής κοινότητας χρησιμοποιώντας πάνω από τρεις τρόπους (ηλεκτρονικό ταχυδρομείο, πίνακες ανακοινώσεων, προσωπικά σημειώματα κλπ) για την εξυπηρέτηση αυτών των διαδικασιών. Μεταξύ της πλειονότητας των εκπαιδευτικών υπήρχε κλίμα δεκτικότητας και αμοιβαίας εμπιστοσύνης και αναπτύσσονταν σχέσεις αλληλοβοήθειας και συνεργασίας σε θέματα διδασκαλίας και μάθησης. Τα συγκεκριμένα ευρήματα συμφώνησαν και με συμπεράσματα άλλων ερευνών (Day, 2005˙ Hargreaves, 2003˙ Levine, 2011) οι οποίες υποστήριξαν ότι αλλαγή των παραδοσιακών πρακτικών των εκπαιδευτικών παρατηρήθηκε σε σχολικές μονάδες που εξασφάλιζαν χρόνο για συνεργασία, απαραίτητες δομές για πλήρη και έγκαιρη επικοινωνία και ενημέρωση και ανθρώπινες σχέσεις που ικανοποιούσαν την ανάγκη για εμπιστοσύνη, αλληλοβοήθεια, ασφάλεια και αποδοχή στο χώρο εργασίας.

Προβαίνοντας σε συνολική εξέταση των παραπάνω αποτελεσμάτων με σκοπό να προσδιοριστεί το επίπεδο των Ε.Κ.Μ. στα «Οικολογικά Σχολεία» του δείγματος από τις δηλώσεις των Διευθυντών διαπιστώθηκε ότι κατά μέσο όρο λειτουργούσαν αναπτυσσόμενες Ε.Κ.Μ. (Μ.Ο. 3,74 με Τ.Α= ,619.) (2ο επίπεδο) Πίνακας 2

Περιγραφικά στατιστικά στοιχεία κατηγορικής μεταβλητής Μ.Ο. Ε.Κ.Μ.		
	Συχνότητα	Ακριβές Ποσοστό (%)
1ο επίπεδο: <= 2,50	**2**	**2,7**
2ο επίπεδο: 2,51 - 4,00	**42**	**57,5**
3ο επίπεδο: 4,01+	**29**	**39,7**
Σύνολο	**73**	**100,0**

Πίνακας 2

 Συγκεκριμένα, στα σχολεία που συμμετείχαν στην έρευνα επικρατούσαν μοντέλα ηγεσίας και υποστηρικτικές συνθήκες που ωθούσαν μεγάλο ποσοστό του εκπαιδευτικού προσωπικού, αλλά όχι το σύνολο του, να εμπλέκεται αρκετές φορές σε διεργασίες που βοηθούν τη δημιουργία κοινού οράματος και την ανάπτυξη συνεργατικής μάθησης με σκοπό τη πρόοδο των μαθητών του σχολείου. Ως συνέπεια, η πλειοψηφία των εκπαιδευτικών τους, έθετε αρκετές φορές σε εφαρμογή εργασιακές πρακτικές οι οποίες διέφεραν από τις καθιερωμένες συνήθειες των ελλήνων εκπαιδευτικών (Μλεκάνης, 2005˙ Πομάκη, 2007˙ Πυργιωτάκης, 1992). Ωστόσο, οι Ε.Κ.Μ. των σχολείων του δείγματος δεν μπορούν να χαρακτηρισθούν ως ώριμες/εξελιγμένες αφού όπως προαναφέρθηκε, οι πρωτοβουλίες συνεργατικής μάθησής τους δε φάνηκε να αποτελούσαν εργασιακές πρακτικές που διεξάγονταν σε μόνιμη και σταθερή βάση από το σύνολο των εκπαιδευτικών κάθε σχολικής μονάδας ούτε να συνεισέφεραν στην αλλαγή μοντέλων της ελληνικής εκπαιδευτικής πραγματικότητας όπως η εργασιακή απομόνωση και η αυτονομία κάθε εκπαιδευτικού στην αίθουσα διδασκαλίας του.
Αναζητώντας απάντηση στο ερώτημα της σχέσης μεταξύ των ετών συμμετοχής στο πρόγραμμα «Οικολογικά Σχολεία» και στο επίπεδο Ε.Κ.Μ. από τα αποτελέσματα φάνηκε ότι τα έτη που συμμετέχει ένα σχολείο στο πρόγραμμα δεν σχετίζονται στατιστικά σημαντικά (rho=,108 n=73 p<,05) αλλά ούτε και επιδρούν (F(2-72)=1,553 p=,219) στο επίπεδο της Ε.Κ.Μ. Ο πίνακας 3 περιγράφει το Μ.Ο. Ε.Κ.Μ. των σχολείων σε σχέση με τα έτη συμμετοχής τους στο πρόγραμμα.

Μ.Ο. επιπέδου Ε.Κ.Μ. ανά κατηγορία ετών συμμετοχής στο πρόγραμμα «Οικολογικά Σχολεία»						
Χρόνια συμμετοχής στο πρόγραμμα	N	Μέσος Όρος	Τυπική Απόκλιση	Τυπικό Σφάλμα	Ελάχιστος	Μέγιστος
<= 2 λίγα	**29**	**3,7099**	**,65953**	**,12247**	**2,24**	**4,59**
3 - 3 αρκετά	**29**	**3,6471**	**,63995**	**,11884**	**2,18**	**4,59**
4+ πολλά	**15**	**3,9843**	**,44437**	**,11474**	**3,06**	**4,71**
Σύνολο	**73**	**3,7413**	**,61895**	**,07244**	**2,18**	**4,71**

Πίνακας 3

Από το συγκεκριμένο αποτέλεσμα συμπεραίνουμε ότι ενδέχεται τα σχολεία αυτά να υιοθέτησαν το σχετικό πρόγραμμα διότι οι απαιτήσεις και οι διαδικασίες του ταίριαζαν με την κουλτούρα και τον τρόπο της πρότερης λειτουργίας τους (Greenlee & Bruner, 2004). Παράλληλα όμως δημιουργείται το εξής ερώτημα: Γιατί η συμμετοχή των ελληνικών σχολείων σε προγράμματα που προωθούν τη συνεργασία των μελών της σχολικής κοινότητας, όπως αυτό των «Οικολογικών Σχολείων», δεν φαίνεται να συνεισφέρει στην αναβάθμιση της συνεργατικής κουλτούρας των εκπαιδευτικών τους; Είναι πιθανό το φαινόμενο αυτό να οφείλεται σε διάφορες αιτίες, όπως οι αντιστάσεις που εμφανίζουν σε διαδικασίες αλλαγής εσωτερικοί σχολικοί παράγοντες όπως το είδος και ο βαθμός της συνεργατικής κουλτούρας και οι συνήθειες της συνεργατικής μάθησης των εκπαιδευτικών πριν την έναρξη του συγκεκριμένου προγράμματος (Morrissey, 2000). Επίσης, ενδέχεται ανασταλτικό ρόλο να διαδραματίζουν εξωτερικοί παράγοντες όπως η περιρρέουσα εκπαιδευτική κουλτούρα και η κυριαρχούσα άποψη της κοινής γνώμης για θέματα που αφορούν τον τρόπο λειτουργίας ενός «καλού» σχολείου, τον τρόπο εργασίας ενός «καλού» εκπαιδευτικού, το είδος της «σωστότερης» συνεργασίας των εκπαιδευτικών ή το είδος της «ορθής» επαγγελματικής ανάπτυξης των εκπαιδευτικών (Bolam, et al., 2005˙ Morrissey, 2000). Τέλος,

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άλλη μια πιθανή αιτία μη εξέλιξης των Ε.Κ.Μ. σε ωριμότερα σχήματα με την πάροδο του χρόνου στα «Οικολογικά Σχολεία», ίσως, να είναι οι περιορισμένες παραδοσιακά εμπειρίες που έχουν οι έλληνες εκπαιδευτικοί σε συνεργατικές διαδικασίες στοιχείο που τους εμποδίζει να προχωρήσουν σε ωριμότερες μορφές συνεργατικής μάθησης. Σε κάθε περίπτωση το ζήτημα χρίζει περαιτέρω διερεύνησης.

Αναζητώντας απάντηση στο ερώτημα της σχέσης των ετών προϋπηρεσίας του Διευθυντή στο σχολείο με το επίπεδο των Ε.Κ.Μ. στα «Οικολογικά Σχολεία» από τα αποτελέσματα φάνηκε να υπάρχει θετική σχέση (rho=,316, n=73, p<,01). Αναλυτικότερα, σχολεία που είχαν για πολλά έτη τον ίδιο Διευθυντή εμφάνιζαν υψηλότερα επίπεδα Ε.Κ.Μ. Πιθανά γιατί σε αυτή την περίπτωση οι Διευθυντές γνωρίζουν καλύτερα τη σχολική μονάδα και τους εκπαιδευτικούς που τη στελεχώνουν και κατανοούν τις μαθησιακές ανάγκες τους. Παράλληλα, έχουν περισσότερες ευκαιρίες για την εξασφάλιση απαραίτητων πόρων, δημιουργίας υποστηρικτικών δομών και σχολικού κλίματος ώστε να στηρίξουν αποτελεσματικότερα τη συνεργατική μάθηση των εκπαιδευτικών (Harris & Jones, 2010 ˙ Morrissey, 2000).

Επικεντρώνοντας τη μελέτη των στατιστικών αποτελεσμάτων στους παράγοντες που αφορούν το εκπαιδευτικό προσωπικό του σχολείου καταρχήν διαπιστώθηκε ότι ο αριθμός των εκπαιδευτικών της σχολικής μονάδας σχετίζεται και επιδρά στο επίπεδο ανάπτυξης Ε.Κ.Μ.. Εύρημα που έδωσε θετική απάντηση στο σχετικό ερώτημα. Συγκεκριμένα, ο μεγάλος αριθμός εκπαιδευτικών σε μια σχολική μονάδα (πάνω από δώδεκα) σχετιζόταν με χαμηλό επίπεδο ανάπτυξης Ε.Κ.Μ. (rho= -,259 n=73, p<,05). Σε παρόμοια αποτελέσματα κατέληξαν και άλλες μελέτες (Bolam et al, 2005˙ Stoll, et al., 2006), οι οποίες τόνισαν ότι σχολεία με μικρό αριθμό εκπαιδευτικών δημιουργούσαν ευκολότερα κατάλληλο σχολικό κλίμα το οποίο χαρακτηριζόταν από καλύτερες κοινωνικές σχέσεις, συχνότερη αλληλεπίδραση και ευκολότερη επικοινωνία, στοιχεία τα οποία ενθάρρυναν και διευκόλυναν τη δημιουργία και λειτουργία Ε.Κ.Μ..

Άλλο χαρακτηριστικό του εκπαιδευτικού προσωπικού που φάνηκε να επιδρά στο επίπεδο των Ε.Κ.Μ. ήταν η ύπαρξη στη σχολική μονάδα εκπαιδευτικών με πρόσθετες σπουδές (μεταπτυχιακό ή διδακτορικό) σε εκπαιδευτικά και διδακτικά ζητήματα (F(2-70)=4,665, p=,013). Συγκεκριμένα, από τα αποτελέσματα φάνηκε ότι σχολεία με τρεις ή περισσότερους εκπαιδευτικούς με πρόσθετες σπουδές παρουσίαζαν υψηλότερο επίπεδο ανάπτυξης Ε.Κ.Μ. (Μ.Ο.=4,05, Τ.Α.=,49). Το εύρημα αυτό μπορεί να εξηγηθεί από τα αποτελέσματα παραπλήσιων ερευνών (Newmann, Bruce King, & Youngs,2000˙ Πομάκη, 2007), οι οποίες υπογράμμισαν ότι οι εκπαιδευτικοί με πρόσθετες σπουδές συμμετείχαν ευκολότερα σε συνεργατικές διαδικασίες και, παράλληλα, λόγω των αυξημένων προσόντων τους υποστήριζαν την προσπάθεια του σχολείου να βελτιώσει το παρεχόμενο εκπαιδευτικό έργο του προς τους μαθητές τους. Ανάλογα, η ύπαρξη αρκετών εκπαιδευτικών με πρόσθετες σπουδές σε σχολικές μονάδες του δείγματος είναι πιθανό να ενίσχυε το επίπεδο των Ε.Κ.Μ. αφού με τη στάση τους μπορούσαν να στηρίξουν τη συνεργατική κουλτούρα του σχολείου και με τις γνώσεις τους να εμπλουτίσουν τη συνεργατική μάθηση της εκπαιδευτικής κοινότητας που ανήκουν.

Σχετικά με τα χαρακτηριστικά του σχολείου και ειδικότερα με την επίδραση της βαθμίδας του σχολείου στο επίπεδο Ε.Κ.Μ. τα αποτελέσματα έδειξαν ότι υπάρχει στατιστικά σημαντική διαφορά μεταξύ των σχολείων Α/θμιας (Μ.Ο=3,82 Τ.Α= ,57) και Β/θμιας εκπαίδευσης (ΜΟ=3,41 ΤΑ=,70; t(71)=2,388 p=,020 διπλής κατεύθυνσης). Πιθανά γιατί οι εκπαιδευτικοί της Α/θμιας εκπαίδευσης λόγο των σπουδών τους είναι προσανατολισμένοι στη παιδαγωγική διάσταση του αντικειμένου τους και στη συνολική πρόοδο των μαθητών (μαθησιακή, κοινωνική, ψυχολογική) στοιχεία που τους ωθούν να αναπτύξουν κοινούς στόχους και συνεργατικές μορφές μάθησης (Harris & Jones, 2010). Σε αντίθεση με τους εκπαιδευτικούς της Β/θμιας οι οποίοι είναι προσανατολισμένοι λόγω των βασικών τους σπουδών και την έλλειψη της παιδαγωγικής και διδακτικής κατάρτισής τους, κυρίως, στη διδασκαλία του αντικειμένου τους στοιχείο που εμποδίζει την ανάπτυξη κοινών στόχων μεταξύ διαφορετικών ειδικοτήτων μειώνοντας ανάλογα τις πιθανότητες για την εμφάνιση συνεργατικών μορφών μάθησης στο σύνολο της εκπαιδευτικής κοινότητας του σχολείου (Bolam et al., 2005˙ Harris & Jones, 2010˙ Πομάκη, 2007˙ Stoll & Seashore Louis, 2007).

Άλλο χαρακτηριστικό του σχολείου που σύμφωνα με τα αποτελέσματα φάνηκε να επηρεάζει την ανάπτυξη των Ε.Κ.Μ. ήταν η περιοχή στην οποία άνηκε (F(2/70)=6,587, p=,002). Σχολεία τα

οποία έδρευαν σε αγροτικές ή νησιωτικές περιοχές παρουσίαζαν υψηλότερο επίπεδο Ε.Κ.Μ. (Μ.Ο=4,08, Τ.Α.=,44) από σχολεία που έδρευαν σε αστικές (ΜΟ=3,55, ΤΑ=,63) ή ημιαστικές περιοχές (ΜΟ=3,58, ΤΑ=62). Αποτέλεσμα το οποίο μπορεί να οφείλεται στο μικρότερο αριθμό εκπαιδευτικών που συνήθως έχουν αυτά τα σχολεία, αλλά και στις λιγότερες εξωσχολικές ευκαιρίες επαγγελματικής ανάπτυξης που έχουν οι εκπαιδευτικοί αυτών των περιοχών. Γεγονός που πιθανόν τους έστρεφε ευκολότερα σε συνεργατικές μορφές μάθησης εντός της σχολικής μονάδας με σκοπό να ανταπεξέλθουν στις ιδιαιτερότητες της εργασίας τους και με απώτερο αποτέλεσμα την αύξηση του επιπέδου ανάπτυξης των Ε.Κ.Μ.

Κλείνοντας αξίζει να σημειωθεί ότι η παρούσα μελέτη ήταν μία μικρού μεγέθους έρευνα η οποία διερεύνησε το φαινόμενο των Ε.Κ.Μ. στα Οικολογικά Σχολεία στηριζόμενη μόνο στις απόψεις των Διευθυντών. Αυτό το χαρακτηριστικό της ερευνητικής μεθοδολογίας μείωσε την οπτική γωνία της η οποία θα μπορούσε να ήταν ευρύτερη, εάν συμπεριελάμβανε και τις απόψεις των εκπαιδευτικών για τα συγκεκριμένα ζητήματα. Επίσης, θα μπορούσε να αποκτήσει σαφέστερη κατανόηση των ζητημάτων που την απασχόλησαν αν είχε τη δυνατότητα να συνδυάσει τη χρήση του ερωτηματολογίου με τη διεξαγωγή συνεντεύξεων. Ακόμη, πρέπει να τονισθεί ότι τα αποτελέσματά της αφορούσαν τις συνθήκες των σχολείων του δείγματος σε μια συγκεκριμένη χρονική περίοδο. Ενδέχεται, αν τα ερωτηματολόγια συλλέγονταν από τα ίδια σχολεία σε μια άλλη χρονική στιγμή να προέκυπταν διαφορετικά αποτελέσματα καθώς οι εκπαιδευτικές κοινότητες είναι ζωντανοί οργανισμοί οι οποίοι συνεχώς μεταβάλλονται. Ωστόσο, τα αποτελέσματά της δημιουργούν νέα ερωτήματα και δίνουν το έναυσμα για περαιτέρω εμβάθυνση και μελέτη του φαινομένου των Ε.Κ.Μ. στα «Οικολογικά Σχολεία» αλλά και γενικότερα στο ελληνικό εκπαιδευτικό σύστημα.

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Ανίχνευση των Παιδαγωγικών Αντιλήψεων κατά Becker, Εκπαιδευτικών Α/θμιας και Β/θμιας Εκπαίδευσης, πριν και μετά από Επιμόρφωσή τους στη Χρήση ΤΠΕ στο Πλαίσιο της Εκπαίδευσης για την Αειφορία και της Μετανεωτερικότητας.

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Περίληψη

Έχοντας ως σημείο αναφοράς το μετανεωτερικό σχολείο, δηλαδή το σχολείο όπου υπάρχει χώρος για διαφορετικότητα στον τρόπο σκέψης, σε ένα ελεύθερο, ανοιχτό και πολύμορφο εκπαιδευτικό περιβάλλον, με εκπαιδευτικούς και μαθητές να σχεδιάσουν και να αποφασίσουν για το χρόνο, τον τόπο και το περιεχόμενο της εκπαιδευτικής διαδικασίας, η παρούσα έρευνα-μελέτη είχε ως αντικείμενο τον εκπαιδευτικό και τις παιδαγωγικές αντιλήψεις του. Αφορούσε στο α) να ανιχνευτούν και να διερευνηθούν οι αρχικές παιδαγωγικές αντιλήψεις εκπαιδευτικών πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης, σύμφωνα με τη διάκριση της δασκαλοκεντρικής (παραδοσιακής) και της κονστρουκτιβιστικής παιδαγωγικής θεώρησης, όπως την προσδιόρισε ο Becker (2000), β)να ανιχνευτεί και να αναλυθεί η όποια μεταβολή ή ενίσχυση επήλθε στις δασκαλοκεντρικές/κονστρουκτιβιστικές πεποιθήσεις τους ως απόρροια της επιμόρφωσής τους.

Περιεχόμενο της επιμόρφωσης ήταν ο σχεδιασμός Μαθησιακών Σχεδίων (ΜΣ) από τους συμμετέχοντες εκπαιδευτικούς , με βάση μοντέλα σχεδιασμού εκπαιδευτικών δραστηριοτήτων με χρήση ΤΠΕ (σχέδιο εργασίας, ιστοεξερεύνηση, μικρομάθημα) στο πλαίσιο της Εκπαίδευσης για την Αειφορία (ΕΑ). Η μελέτη των τεχνημάτων που προέκυψαν, αναφορικά με τις παιδαγωγικές πεποιθήσεις των δημιουργών τους, έδωσε τη δυνατότητα για εξαγωγή συμπερασμάτων σχετικά με την επαγγελματική πρακτική που αναμενόταν να ακολουθήσουν οι συγκεκριμένοι εκπαιδευτικοί του δείγματος. Αυτός είναι άλλωστε και ο λόγος για τον οποίο οι πεποιθήσεις των εκπαιδευτικών αποτελούν σημείο αναφοράς σε κάθε προσπάθεια παιδαγωγικής κατάρτισης και υποστήριξης (Φεσάκης, Καράκιζα, 2010).

Το όλο εγχείρημα αναπτύχθηκε στη σχολική δομή που έχει ήδη ενσωματώσει τη μετανεωτερική θεωρία και τις αρχές της Εκπαίδευσης για την Αειφορία στη λειτουργία και στις πρακτικές της, δηλαδή σε ένα Κέντρο Περιβαλλοντικής Εκπαίδευσης.

Λέξεις κλειδιά: εκπαιδευτικός σχεδιασμός, ιστοεξερευνήσεις, μικρομαθήματα, μαθησιακά σχέδια, μοντέλα εκπαιδευτικού σχεδιασμού, ΤΠΕ, μετανεωτερική θεωρία, Εκπαίδευση για την Αειφορία.

Abstract

Taking as reference the post-modernism school, where there is room for diversity in thinking, in a free, open and multi directional educational environment, with teachers and students planning together and decide the time, the place and the content of the whole educational process. The article is focused on the primary and secondary education teacher and his pedagogical attitudes, concerning a) the detection and investigation of his pre-training pedagogical beliefs, according to the distinction of teacher-centered (traditional) and constructivist pedagogical approach, as proposed by Becker (2000), b) the detection and analysis of any modification or enhancement occurred in his teacher-centered / constructionist beliefs as his training result.

The concerned teachers' training was targeted onto the Learning Design (LD) by each one of the teachers participants, which was based on special ICT learning activity models (i.e. project based

learning, webquest, microLESSON[TM]) on the Education for Sustainability (EfS) point of view. The study of produced artifacts concerning the pedagogical beliefs of their creators, produced conclusions about the educational professional practices that be expected to be followed by the specific sample of the trained teachers. That is also analyses why teachers' beliefs are a benchmark issue of in any attempt on pedagogical training and support (Fesakis, Karakiza, 2010).

The whole project was conducted in an Environmental Educational Center (EEC), i.e. a school structure that has already adopted and integrated in its operational practices, the postmodernism theory, as well as the principles of Education for Sustainability.

Key-words: learning design, webquests, microLESSONS[TM], learning projects, learning activity models, ICT, postmodernism theory, Education for Sustainability

Εισαγωγή

Η επιστημονική ανάγκη που οδήγησε σε αυτή τη μελέτη, απαντά στο κάλεσμα των καιρών που ζητά από το σημερινό σχολείο να ανταποκριθεί στην επίτευξη των δύο βασικών σκοπών της Αγωγής και της Εκπαίδευσης, δηλαδή, στην αυτοπραγμάτωση του μαθητή και στη λειτουργία του ως μοχλού ανάπτυξης και προόδου της κοινωνίας. Στο πλαίσιο αυτό είναι αναγκαία η μετεξέλιξή του σε αποτελεσματικό σχολείο, δημοκρατικό, αειφορικό, δημιουργικό και καινοτόμο σχολείο, όπου θα υπάρχει χώρος για διαφορετικότητα στον τρόπο σκέψης, θα αναπτύσσεται διάλογος ανάμεσα σε πολιτισμούς, σε ένα ελεύθερο, ανοιχτό και πολύμορφο εκπαιδευτικό περιβάλλον, με εκπαιδευτικούς και μαθητές να σχεδιάσουν και να αποφασίσουν για το χρόνο, τον τόπο και το περιεχόμενο της εκπαιδευτικής διαδικασίας. Επίσης θα περιέχει στους «κόλπους» του και θα καλλιεργεί τη μεγάλη απούσα του ελληνικού σχολείου, την αξία «της χαράς».

Θεωρήσεις και κινήματα όπως αυτό της μετανεωτερικότητας «ντύνουν» ιδεολογικά την αναμενόμενη στροφή της εκπαίδευσης, καθώς δίνουν θέση και βήμα στον αφηγηματικό λόγο και στην εμπειρία των εμπλεκομένων. Είναι σημαντικό να σημειωθεί ότι οι θεωρίες του μεταμοντερνισμού προέκυψαν ως απάντηση σε μια απώλεια πίστης στο σύγχρονο πρόγραμμα (Hucle, 2006c). Στο πλαίσιο των αρχών του, ο εκπαιδευτικός παύει να είναι απλός εκφραστής-διεκπεραιωτής και αναβιβάζεται σε δημιουργό που σχεδιάζει και εφαρμόζει τα μαθησιακά του σχέδια στη διδακτική πράξη. Μέσα από αυτό το πρίσμα η επιμόρφωσή του αποτελεί «δομικό στοιχείο για τη βελτίωση της ποιότητας της εκπαίδευσης» (Παμουκτσόγλου, 2003:366-374).

Η σχολική δομή που έχει ήδη ενσωματώσει τις νέες τάσεις, προς τις οποίες τώρα στρέφεται το ελληνικό σχολείο, είναι τα Κέντρα Περιβαλλοντικής Εκπαίδευσης (ΚΠΕ). Αποτελούν τον κατεξοχήν εκπαιδευτικό χώρο, όπου η όλη δομή και φιλοσοφία του αναφορικά με το έργο του, βασίζονται στις αρχές της Αειφόρου Ανάπτυξης. Συγκροτεί έναν από τους πλέον δυναμικούς θεσμούς της Εκπαίδευσης, από τη σύστασή του, *άρθρο 111 του ν. 1892/1990 (ΦΕΚ 101 Α'),* έως σήμερα. Το χαρακτηρισμό αυτό δικαιολογεί η πολυσχιδής δραστηριοποίησή του τόσο ως φορέας καινοτόμων προσεγγίσεων στην εκπαίδευση (μαθητοκεντρισμός, συμμετοχικότητα, συνεργατικότητα, διεπιστημονικότητα, πολιτειότητα, προσανατολισμός στην πράξη, δημιουργική προσέγγιση, βιωματικότητα, καλλιέργεια δεξιοτήτων για αειφορική διαχείριση πόρων, δημοκρατικότητα, ισονομία) όσο και ως φορέας εκπαίδευσης με στοχοθεσία τον περιβαλλοντικό γραμματισμό των μαθητών Α/θμιας και Β/θμιας Εκπαίδευσης, δηλαδή την περιβαλλοντική εκπαίδευσή τους. Ο υψηλός βαθμός της τεχνογνωσίας των ΚΠΕ, από τη μέχρι τώρα καταγεγραμμένη εμπειρία τους σε έργο εκπαιδευτικό και επιμορφωτικό, συνηγορεί στα ανωτέρω. Αυτός εντέλει ήταν και ο βασικός λόγος που επιλέχθηκε το περιβάλλον ενός ΚΠΕ, ως πεδίο διενέργειας έρευνας για τις ανάγκες της παρούσας εργασίας.

Το περιεχόμενο της εργασίας αφορά στην ανίχνευση παιδαγωγικών αντιλήψεων κατά Becker, εκπαιδευτικών Α/θμιας και Β/θμιας εκπαίδευσης, πριν και μετά από επιμόρφωσή τους, η οποία αναπτύχθηκε στο πλαίσιο της Εκπαίδευσης για την Αειφορία (ΕΑ) με χρήση ΤΠΕ1. Έχοντας ως σημείο αναφοράς το μετανεωτερικό σχολείο, η έρευνα που πραγματοποιήθηκε στο πλαίσιο αυτής της εργασίας, επέχει τη θέση παιδαγωγικού προβλήματος, το οποίο απαίτησε για να διερευνηθεί, την προσέγγιση της περιοχής των παιδαγωγικών αντιλήψεων εκπαιδευτικών που προέρχονται από τις δύο πρώτες βαθμίδες εκπαίδευσης. Το τέχνημα που προέκυψε αποτελεί το τελικό προϊόν μιας «άσκησης επί χάρτου» στην περιοχή της αναζήτησης του βαθμού ωρίμανσης και των δυνατοτήτων για αποδοχή του μεταμοντέρνου στην εκπαίδευση.

Θεωρητική προσέγγιση

Η Εκπαίδευση για την Αειφορία[2] (ΕΑ) είναι μία από τις διαστάσεις που υπεισέρχονται στην πορεία της ερευνητικής διαδικασίας. Η σύλληψη και αξιοποίησή της οφείλεται στην επιτακτική ανάγκη για ανάπτυξη στην τυπική (σχολείο) και μη τυπική εκπαίδευση (κατάρτιση, δια βίου εκπαίδευση) μίας εκπαίδευσης που θα έχει σαν αφετηρία την ΠΕ, η οποία καθώς θα μετεξελίσσεται, θα μετατοπίζει το κέντρο βάρους της από *«τη φύση στην κοινωνία, από τεχνοκρατικές λογικές σε εναλλακτικές, από συμπεριφοριστικές σε κριτικές, από προσωπικές διεκδικήσεις σε συλλογικές, από ανταγωνιστικές σχέσεις, σε συνεργατικές, από νατουραλιστικές αναζητήσεις σε πολιτικές, από τεχνοεπιστημονικές λύσεις, σε κοινωνικο-πολιτικο-οικονομικές, από απολίτικες προσεγγίσεις σε πολιτικές, από ποσοτικές αντιλήψεις σε ποιοτικές»* (Φλογαΐτη, 2006).
Η χωροθέτηση της αειφορίας στον εννοιολογικό χάρτη ιδεών, περικλείει την έννοιά της μεταξύ των πόλων ενός τριγώνου που αντιπροσωπεύουν τον άνθρωπο, την κοινωνία και το περιβάλλον. Κάθε πλευρά αυτού του τριγώνου αντιστοιχεί στις μεταξύ τους σχέσεις, οι οποίες ανάλογα με τη βαρύτητα και τη δύναμη των δεσμών που αναπτύσσονται, προσεγγίζουν τη σημασία της, κατευθύνοντας κάθε ερμηνευτική προσπάθεια σε διαφορετικό συμπέρασμα.
«Ως Εκπαίδευση για την Αειφορία (ΕΑ) χαρακτηρίζεται κάθε μορφή εκπαίδευσης που ενσωματώνει την έννοια της αειφορίας, επιφορτιζόμενη αναγκαστικά και με όλη την προβληματική που τη συνοδεύει, δηλαδή την πολυδιάστατη και εξελίξιμη φύση της, τις ασάφειες, τις αντιφάσεις, του συγκρουσιακού χαρακτήρα διαφωνίες, τους φόβους και τις προσδοκίες που αυτή προκαλεί» (Φλογαΐτη, 2006). Η ΕΑ παρακολουθεί, ενίοτε ενισχύει και άλλοτε ακυρώνει όλες εκείνες τις δυνάμεις που αναπτύσσονται, πότε συγκρουσιακά και πότε συνεργατικά, μεταξύ των πόλων του κλειστού συστήματος «άνθρωπος, κοινωνία και περιβάλλον», σε μια αέναη προσπάθεια διατήρησής του, δηλαδή διατήρησης της πολυπόθητης αειφορίας. Επομένως η ΕΑ, ως διαδικασία αγωγής, στοχεύει να διαμορφώνει στάσεις και συμπεριφορές που διέπονται από αξίες όπως η προστασία του περιβάλλοντος, η κοινωνική δικαιοσύνη, η κοινωνική συνοχή και η οικονομική ευημερία, οι οποίες θα οδηγούν την ανθρωπότητα σε βιώσιμο μέλλον. … συνδέεται άρρηκτα με την αειφόρο ανάπτυξη, αφού συνυφαίνεται μαζί της με μια διαδικασία συνεχούς μάθησης, που μεταξύ άλλων διευρύνει και την έννοια της Περιβαλλοντικής Εκπαίδευσης ενσωματώνοντάς την

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[1] Ο όρος Τ.Π.Ε. (Τεχνολογίες της Πληροφορίας και των Επικοινωνιών) είναι η απόδοση του όρου Informational and Communicational Technology (ICT). Περιγράφεται ως η τεχνολογία που χρησιμοποιείται για επικοινωνιακούς σκοπούς (Κυρίδης, Δρόσος & Ντίνας, 2003:35). Συναντάται επίσης και με τους όρους "Νέες Τεχνολογίες (ΝΤ), "Εκπαιδευτική Τεχνολογία" και Πληροφοριακή Επικοινωνιακή Τεχνολογία ή Π.Ε.Τ (Information and Communications Technologies). Οι Τεχνολογίες της Επικοινωνίας και των Πληροφοριών (Τ.Π.Ε), ορίζονται ως οι τεχνολογίες που επιτρέπουν την επεξεργασία και τη μετάδοση μιας ποικιλίας μορφών αναπαράστασης της πληροφορίας (σύμβολα, εικόνες, ήχος, βίντεο) και ως τα μέσα που είναι φορείς αυτών των μηνυμάτων (Κόμης, 2004-α: 16).

[2] Η Φλογαΐτη αναφέρεται σε αυτήν, με τον όρο Εκπαίδευση για το Περιβάλλον και την Αειφορία (2006), συνυφαίνοντας έτσι την αειφορία με την προβληματική που φέρνει στο περιβαλλοντικό πεδίο και συντασσόμενη α)με τον Huckle ο οποίος αποφαίνεται ότι μόνο η εκπαίδευση για το περιβάλλον μπορεί να είναι μια εκπαίδευση για την αειφορία (2002), β) όπως επίσης και με τον Breiting ο οποίος προσεγγίζει την αειφορία ως την εννοιολογική απόδοση του περιβαλλοντικού λόγου στον 21ο αιώνα (2000).

σε αυτήν –την ΕΑ-. (Θεοδωρίδου, Τόλης, Κυριακίδης& Τσαγκάρης, 2009). Στις διαπιστώσεις αυτές στηρίζεται η επιλογή να αποτελέσει η ΕΑ το πεδίο μέσα στο οποίο αναπτύσσεται η υπό μελέτη παρέμβαση.

Το γεγονός ότι η ΕΑ προσεγγίζει τη γνώση και τη μαθησιακή πράξη ιδωμένες από παρόμοια οπτική με αυτήν της μετανεωτερικής θεώρησης, συμβάλλει στη δημιουργία ενός σταθερού πλαισίου αναφοράς για την ανίχνευση και ανάλυση των ερευνητικών ευρημάτων. Συγκεκριμένα η ΕΑ ενεργεί και διέπεται από την οικολογική νοημοσύνη η οποία παρέχει τη δυνατότητα να μάθουμε από την εμπειρία μας και να φερθούμε αποτελεσματικά απέναντι στο περιβάλλον μας (Goleman 2009). Μέσα από διαφορετικές ιδεολογικές διαδρομές αλλά καταλήγοντας στην ίδια θέση, ο μεταμοντερνισμός αμφισβητεί την κυριαρχία του επιστημονικού λόγου, αφού κατά τον Βέλτσο «η εποχή του μηδενισμού στην οποία ...εισερχόμαστε, προσφέρει την ευκαιρία μιας υπέρβασης, μιας κυριολεκτικής διάρρηξης των ορθολογικών δεσμών εντός των οποίων έχουν εγκλωβίσει οι σύγχρονες επιστήμες τα δημιουργικά-αισθητικά δυναμικά του κοινωνικού γλωσσικού παιγνίου». (1988, 1990). Συμπερασματικά μπορεί να ειπωθεί ότι στις μέρες μας ο αφηγηματικός λόγος (λόγος μη επιστημονικός), κατεξοχήν εμπειρικός, διεκδικεί και παίρνει ισότιμη θέση (με τον επιστημονικό) στην αναζήτηση της αλήθειας και της γνώσης.

Ο εκπαιδευτικός καλείται στο σημερινό εκπαιδευτικό σύστημα να επιλέξει ανάμεσα σε δύο αντιδιαμετρικά κείμενες θέσεις: η μία τον οδηγεί να αναπτύσσει χειραφετητική παιδαγωγική, καθοδηγούμενη από την εμπειρία, την έμπνευση και τη δημιουργικότητα και η οποία τον ενδυναμώνει μαζί με τους μαθητές του μέσα από μια πορεία επιτυχών και εσφαλμένων πρακτικών τις οποίες προσεγγίζει αναστοχαστικά και κριτικά, ενώ η άλλη απαιτεί από αυτόν, (McLaren P. & Farahmnandpur R. 2005b: 22) αποδοχή και συμμόρφωση καταλήγοντας σε θλιβερές απολογητικές της δεσπόζουσας πραγματικότητας (Λιάμπας, Κάσκαρης, 2007). Στην κατεύθυνση της ενίσχυσης της παιδαγωγικής αυτοτέλειας του εκπαιδευτικού, καθώς διαπιστώνεται ότι «...χρειάζεται ανάπτυξη της σφαιρικής του μόρφωσης, των κριτικών και δημιουργικών ικανοτήτων, των προσωπικών και κοινωνικών του δεξιοτήτων» (Ράπτης & Ράπτη, 1998:239-240), η επιμόρφωσή του αποτελεί «δομικό στοιχείο για τη βελτίωση της ποιότητας της εκπαίδευσης» (Παμουκτσόγλου, 2003:366-374). Είναι προφανές ότι χρειάζεται να συνεχίσουμε να μαθαίνουμε, γιατί δεν είναι εφικτό να μάθουμε εφάπαξ όλα όσα θα χρειαστούμε κατά τη διάρκεια της ζωής μας. Επομένως η μάθηση συνεχίζεται σε όλη τη διάρκεια της ζωής και μάλιστα αποτελεί απαραίτητο στοιχείο της ίδιας της ζωής (Rogers, 1999, σ. 310).

Έρευνα

Αντικείμενο της προκείμενης ερευνητικής εργασίας είναι ο εκπαιδευτικός. Κατά τη διάρκεια της ερευνητικής διαδικασίας εντάχθηκαν και προσεγγίστηκαν οι συμμετέχοντες εκπαιδευτικοί μέσα από μαθησιακά περιβάλλοντα (επιμορφωτικά σεμινάρια).

Η στοχοθεσία της έρευνας περιελάμβανε:

1. Αναφορικά με την ανίχνευση των παιδαγωγικών αντιλήψεων των συμμετεχόντων εκπαιδευτικών:

   α. Να διαγνωστεί στην έναρξη του προγράμματος η παραδοσιακή ή κονστρουκτιβιστική αντίληψη κάθε εμπλεκόμενου εκπαιδευτικού του δείγματος απέναντι στην εκπαιδευτική διαδικασία. Αξιολόγηση μέσω διερεύνησης μαθησιακών σχεδίων πολύμηνων σχολικών προγραμμάτων Περιβαλλοντικής Εκπαίδευσης που εκ προοιμίου κατέθεσε στο φορέα διοργάνωσης, με τη χρήση ρουμπρίκας (ποιοτική έρευνα).

   β. Να διαπιστωθεί η παραδοσιακή ή κονστρουκτιβιστική αντίληψη που διέπει μαθησιακά το ΜΣ (ποιοτική έρευνα) που κατατέθηκε ως παραδοτέο από κάθε εμπλεκόμενο εκπαιδευτικό στο πέρας της επιμόρφωσης (υποχρεωτικά ένα μαθησιακό σχέδιο (ΜΣ) project και προαιρετικά ένα ΜΣ ιστοεξερεύνησης και ένα ΜΣ μικρομαθήματος), με τη χρήση ρουμπρίκας.

2. Αναφορικά στην αξιολόγηση της αποτελεσματικότητας της παρέμβασης, διερευνήθηκε για κάθε επιμορφούμενο εκπαιδευτικό:

α.   η όποια μεταβολή ή ενίσχυση επήλθε στις παραδοσιακές/κονστρουκτιβιστικές πεποιθήσεις του, ως απόρροια της επιμόρφωσής του. Προσεγγίστηκε μέσα από τη συγκριτική αξιολόγηση μεταξύ των καταγεγραμμένων αντιλήψεων πριν και μετά την επιμορφωτική παρέμβαση, μέσω των ΜΣ πολύμηνων σχολικών δραστηριοτήτων και των ΜΣ project ή και ΜΣ ιστοεξερεύνησης, ή και ΜΣ μικρομαθήματος και με βάση συγκεντρωτικό πίνακα αποτύπωσης των καταχωρημένων αντιλήψεων (ποιοτική & ποσοτική έρευνα) .

Ειδικότερα το παρόν ερευνητικό εγχείρημα αναφέρεται στη διεξαγωγή μελέτης που επιχειρήθηκε κατά τη διάρκεια επιμόρφωσης. Η έρευνα πραγματοποιήθηκε σε δύο φάσεις. Αφορούσε σε εκπαιδευτικούς που προέρχονται από την Α/θμια (ΠΕ60 &70) και Β/θμια Εκπαίδευση (διάφορες ειδικότητες), οι οποίοι συμμετείχαν ως εκπαιδευόμενοι σε επιμορφωτικά προγράμματα υβριδικής εκπαίδευσης (συνδυασμός εκπαίδευσης εκ του σύνεγγυς, με σύγχρονη και ασύγχρονη τηλεκπαίδευση), που διοργάνωσε α)το Κέντρο Περιβαλλοντικής Εκπαίδευσης Έδεσσας, σε πρώτη φάση κατά το ακαδημαϊκό έτος 2010-2011   και β)το Κέντρο Περιβαλλοντικής Εκπαίδευσης Έδεσσας-Γιαννιτσών -συγχωνευμένο Κέντρο που προήλθε από την ένωση των ΚΠΕ Έδεσσας και ΚΠΕ Γιαννιτσών-σε δεύτερη κατά το ακαδημαϊκό έτος 2011-2012.

Το ιστορικό του ΚΠΕ Έδεσσας περιλαμβάνει ήδη από το 2009[3] καινοτόμες επιμορφωτικές παρεμβάσεις, με κονστρουκτιβιστικές προσεγγίσεις της επιμορφωτικής πράξης,   που συνάδουν με το «νέο» πνεύμα στην Εκπαίδευση. Η καινοτομία τους δεν εντοπίζεται μόνο στην εργαλειακή χρήση των ΤΠΕ, αλλά και στην πρόταξη της σκοποθεσίας τους να εμπλέκεται ο εκπαιδευτικός στο εκπαιδευτικό γίγνεσθαι με νέο ρόλο: α) διαδραστικά, εναλλάσσοντας στη διάρκεια του σεμιναρίου, αλλά και μετά το πέρας του, την ιδιότητα του επιμορφούμενου με αυτήν του επιμορφωτή-πολλαπλασιαστή και β)ως δημιουργός που παράγει για παραδοτέο, τέχνημα, το οποίο μπορεί να αξιοποιηθεί άμεσα από τον ίδιο ή και από άλλους στη διδακτική πράξη. Όλες λοιπόν οι επιμορφωτικές παρεμβάσεις που προηγήθηκαν στο ΚΠΕ Έδεσσας αποτέλεσαν τη βάση για το σχεδιασμό του επιμορφωτικού προγράμματος[4] στο πλαίσιο του οποίου πραγματοποιήθηκε η παρούσα μελέτη.

Οι διερευνητικές υποθέσεις και **οι μέθοδοι συλλογής δεδομένων** αφορούσαν στο   α) να ανιχνευτούν και να διερευνηθούν οι αρχικές παιδαγωγικές αντιλήψεις εκπαιδευτικών πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης, σύμφωνα με τη διάκριση της δασκαλοκεντρικής (παραδοσιακής) και της κονστρουκτιβιστικής παιδαγωγικής θεώρησης, όπως την προσδιόρισε ο Becker (2000), έχοντας η ερευνήτρια ως μέσα συλλογής δεδομένων τα Μαθησιακά Σχέδια (ΜΣ) που οι εμπλεκόμενοι στην έρευνα εκπαιδευτικοί ήδη είχαν δημιουργήσει για τις ανάγκες των πολύμηνων προγραμμάτων ΠΕ, τα οποία συντόνιζαν στο σχολείο τους στο πλαίσιο της ΕΑ, β) να ανιχνευτεί και να αναλυθεί, μέσα από τα ΜΣ που δημιούργησαν οι συμμετέχοντες στη διάρκεια της επιμόρφωσης, η όποια μεταβολή ή ενίσχυση επήλθε στις δασκαλοκεντρικές/κονστρουκτιβιστικές πεποιθήσεις των υποκειμένων του δείγματος ως απόρροια

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[3]   Σχεδιασμός και ανάπτυξη του πιλοτικού επιμορφωτικού προγράμματος Περιβαλλοντικής Εκπαίδευσης (ΠΕ) υβριδικής μορφής, -πρώτη πανελλαδικά τέτοιου τύπου επιμόρφωση από δομή Α/θμιας & Β/θμιας Εκπαίδευσης-, με τίτλο «Ψηφιακές διαδρομές στο περιβάλλον-Σχεδιάζοντας εκπαιδευτικό υλικό για υγροτόπους μέσω τηλεκπαίδευσης», εγκρ. απόφαση του ΥΠΕΠΘ με αρ. πρ. 935/Γ7/07-01-2009. Αναπτύχθηκε εκ του σύνεγγυς στην Έδεσσα μεταξύ 11 και 13 Ιανουαρίου 2009 και στη συνέχεια, μέσω της πλατφόρμας τηλεκπαίδευσης του ΚΠΕ Έδεσσας, ολοκληρώθηκε με τηλεκπαίδευση διάρκειας 120 ωρών. Συμμετείχαν 30 εκπαιδευτικοί Α/θμιας και Β/θμιας Εκπαίδευσης και 13 στελέχη ΠΕ –μέλη Παιδαγωγικών Ομάδων ΚΠΕ και Υπεύθυνοι ΠΕ-. Παραδοτέο του προγράμματος υπήρξε εκπαιδευτικό υλικό που δημιούργησαν οι επιμορφούμενοι για 30 ελληνικά υγροτοπικά συστήματα, υποστηρικτικό για σχολικά προγράμματα   ΠΕ.   Σχετικές   πληροφορίες   βρίσκονται   αναρτημένες   στο http://www.ecokpe.gr/lms/course/view.php?id=4

[4] Θεματικό σεμινάριο μικτής εκπαίδευσης (blended) με τίτλο «Blended Εκπαίδευση στην υπηρεσία της Εκπαίδευσης για την Αειφορία»: Διαμόρφωση σχεδίων project, ιστοεξερευνήσεων και μικρομαθημάτων στις θεματικές περιοχές «Νερό & Βιώσιμη Ανάπτυξη» και «Μείωση & χρηστή Διαχείριση των Απορριμμάτων», εκ του σύνεγγυς και από απόσταση», στην Έδεσσα το διάστημα από 16-12-2011 έως 17-12-2011 και στη συνέχεια 15ωρη από απόσταση σύγχρονη και ασύγχρονη τηλεκπαίδευση (σύμφωνα με την με αρ. πρ. 138694/Γ7/22-12-2011 απόφαση του ΥΠΔΜΒΘ).

της επιμόρφωσής τους -τα συγκεκριμένα ΜΣ αναπτύχθηκαν με βάση μοντέλα σχεδιασμού εκπαιδευτικών δραστηριοτήτων με χρήση ΤΠΕ (project, ιστοεξερεύνηση, μικρομάθημα), γ) να ανιχνευτεί η όποια μεταβολή ή ενίσχυση επήλθε στις δασκαλοκεντρικές (παραδοσιακές)/κονστρουκτιβιστικές πεποιθήσεις του, ως απόρροια της επιμόρφωσής του, μέσω συγκριτικής αξιολόγησης μεταξύ των καταγεγραμμένων *αντιλήψεων πριν και μετά την* επιμορφωτική παρέμβαση.

Το κεντρικό σημείο εστίασης της παρούσας έρευνας αναφέρεται στη διάκριση της παραδοσιακής και της κονστρουκτιβιστικής παιδαγωγικής θεώρησης, όπως την προσδιόρισε ο Becker (2000). Τα σχεδιασμένα από αυτόν βασικά ερευνητικά εργαλεία διερεύνησης των πεποιθήσεων, χρησιμοποιήθηκαν σε δευτερογενή μορφή, όπως μετασχηματίστηκαν σε αυτήν από τους Φεσάκη και Καράκιζα (2010), καθώς προσαρμόστηκαν στις ερευνητικές απαιτήσεις εργασίας τους για την καταγραφή των παιδαγωγικών πεποιθήσεων των εκπαιδευτικών Πληροφορικής. Η ανάλυση που επιχειρήθηκε στη συνέχεια στηρίζεται στους τέσσερις άξονες που έθεσε ο Becker: *πρόγραμμα σπουδών, διδακτική προσέγγιση, εργασία μαθητών και αξιολόγηση.*

Για τον προσδιορισμό της **ταυτότητας του δείγματος** στο πλαίσιο της παρούσας ερευνητικής προσπάθειας και για τη διερεύνηση τυχόν συσχετίσεων μεταξύ των παραμέτρων που την επηρεάζουν, συλλέχθηκαν διάφορα δημογραφικά στοιχεία (*κατηγορικές μεταβλητές*) όπως: *φύλο, έτος γέννησης, έτος διορισμού, προϋπηρεσία, βασικός τίτλος σπουδών, έτος λήψης πτυχίου, μεταπτυχιακές σπουδές, παιδαγωγική κατάρτιση, εκπαιδευτική βαθμίδα.* Το δείγμα περιλάμβανε 22 άτομα, άνδρες (27%) και γυναίκες (73%). Ως προς την ηλικία η ομάδα κατά το μισό μέρος της αποτελούνταν από άτομα που είχαν περάσει το 45 έτος της ηλικίας τους, και το άλλο μισό ισοκατανέμονταν σε άτομα ηλικίας από τριάντα χρόνια έως σαράντα τέσσερα. Πέραν των μισών εκπαιδευτικών είχαν λάβει το πτυχίο τους πριν το 1989, ενώ ισοκατανέμεται το υπόλοιπο μισό ως προς το έτος λήψης πτυχίου, από το 1990 έως το 2000. Από τους συμμετέχοντες στην ομάδα, οι μισοί είχαν διοριστεί πριν το 1995, ενώ η πλειονότητα των υπολοίπων, είχε διοριστεί σχετικά πρόσφατα (2005). Οι περισσότεροι είχαν λιγότερα από 10 χρόνια προϋπηρεσίας, ενώ μόνο τρεις υπηρετούσαν στο χώρο της εκπαίδευσης πλέον των 15 χρόνων. Το σύνολο των μελών της δεν είχαν, ως βασικό τίτλο σπουδών, πτυχίο που προέρχεται από ΑΕΙ/ΤΕΙ Πληροφορικής ή ΑΕΙ/ΤΕΙ Περιβαλλοντικών Επιστημών/Οικολογίας. Οι εκπαιδευτικοί της 1^{ης} ομάδας, εκτός από τις βασικές, είχαν πραγματοποιήσει και άλλες ανώτερες σπουδές, οι οποίες ισοκατανέμονται σε 2 εκπαιδευτικούς να κατέχουν μεταπτυχιακό στις επιστήμες της αγωγής, 2 να κατέχουν μεταπτυχιακό τίτλο σπουδών εκτός των επιστημών αγωγής, ενώ 2 είχαν φοιτήσει σε ΠΑΤΕΣ/ΣΕΛΕΤΕ/ΑΣΠΑΙΤΕ. Ένας συμμετέχων/ουσα παρακολούθησε κύκλο ενδοϋπηρεσιακής επιμόρφωσης στην Περιβαλλοντική Εκπαίδευση. Το σύνολο των μελών της 1^{ης} ομάδας είχαν λάβει πιστοποίηση στις ΤΠΕ. Το 40% των εκπαιδευτικών προέρχονταν από την Α/θμια και το 60% από τη Β/θμια εκπαίδευση. Στους δεύτερους υπερτερούσαν οι διδάσκοντες σε Επαγγελματικά λύκεια σε σχέση με τους εργαζόμενους σε Γυμνάσια και Γεν. Λύκεια. Όλοι είχαν εμπειρία ενασχόλησης με τις ΣΔ και την ΠΕ, κυρίως μέσα από επιμόρφωση και εμπλοκή σε πολύμηνα προγράμματα ΣΔ και λιγότερο από εμπλοκή σε τοπικά, περιφερειακά και εθνικά δίκτυα. Η έρευνα έδωσε τη δυνατότητα για μία καλύτερη καταγραφή, κατανόηση και εμβάθυνση στην χαρτογράφηση των αντιλήψεων των εκπαιδευτικών, παρά το μικρό μέγεθος του δείγματος.

Η ανίχνευση των παιδαγωγικών αντιλήψεων των συμμετεχόντων πραγματοποιήθηκε με **κριτήρια** που σχετίζονται με τους τέσσερις άξονες του Becker, δηλαδή αναφορικά με *πρόγραμμα σπουδών, διδακτική προσέγγιση, εργασία μαθητών και αξιολόγηση και τα οποία αναλύθηκαν σε περισσότερα πεδία (δέκα).* Ειδικότερα τα πεδία αυτά αφορούσαν: α)κατά τη σύνδεση με το πρόγραμμα σπουδών, στο περιεχόμενο των προβλεπόμενων δραστηριοτήτων, β)κατά τη σύνδεση με τη διδακτική πρακτική, στους στόχους των διαδικασιών, στην ποικιλία στη διαδικασία, στη σαφήνεια της περιγραφής περιεχομένου, στην εμπλοκή και κινητοποίηση μέσω εκπαιδευτικού σεναρίου, στην υποστήριξη (σκαλωσιά) της διαδικασίας, στη συνεργασία, γ) κατά τη σύνδεση με την εργασία μαθητών, στο είδος της εργασίας δ)κατά τη σύνδεση με την αξιολόγηση, στη σαφήνεια των κριτηρίων αξιολόγησης και στα εργαλεία της.

Τα δεδομένα που συγκεντρώθηκαν, πριν την επιμόρφωση, από τα προαναφερόμενα σχέδια σχολικών προγραμμάτων Περιβαλλοντικής Εκπαίδευσης, αποτυπώθηκαν συνολικά και για τους 4 άξονες του Becker (*ατομικοί Πίνακες-Ρουμπρίκες/Διαγράμματα αντίστοιχα των μαθησιακών*

σχεδίων με χρήση ΤΠΕ), καθώς και διακριτά ανά άξονα. Επίσης, σε αντιπαραβολή, αυτοί οι πίνακες/διαγράμματα συνοδεύονταν από αντίστοιχα διαγράμματα που αφορούσαν σε δεδομένα που συγκεντρώθηκαν μετά την επιμόρφωση, μέσω των μαθησιακών σχεδίων που δημιουργήθηκαν σε πρωτότυπη φόρμα καταγραφής από τους ανωτέρω εκπαιδευτικούς και σε περιβάλλον web2. Ειδικότερα οι εκπαιδευτικοί του ερευνητικού δείγματος, πριν την επιμόρφωση, σε σχέση με τη σύνδεση των πονημάτων τους με το πρόγραμμα σπουδών (ΠΣ) εμφάνισαν σε ποσοστό 64% επί του συνόλου τους μικτή προσέγγιση και 36% παραδοσιακή (Διάγραμμα 1).

Διάγραμμα 1: Παιδαγωγικές Αντιλήψεις 1^{ης} ομάδας δείγματος για το ΠΣ πριν την επιμόρφωση.

Μετά την επιμόρφωση οι ίδιοι εκπαιδευτικοί σε σχέση με τον ίδιο άξονα του Becker, δηλαδή με το πρόγραμμα σπουδών (ΠΣ), εμφάνισαν σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση και 82% κονστρουκτιβιστική (Διάγραμμα 2).

Διάγραμμα 2: Παιδαγωγικές αντιλήψεις 1^{ης} ομάδας δείγματος για το ΠΣ μετά την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος σε σχέση με τη σύνδεση των πονημάτων τους με τη διδακτική παρέμβαση εμφάνισαν σε ποσοστό 58% επί του συνόλου τους μικτή προσέγγιση, 48% παραδοσιακή και μόνο 4% κονστρουκτιβιστική (Διάγραμμα 3).

450
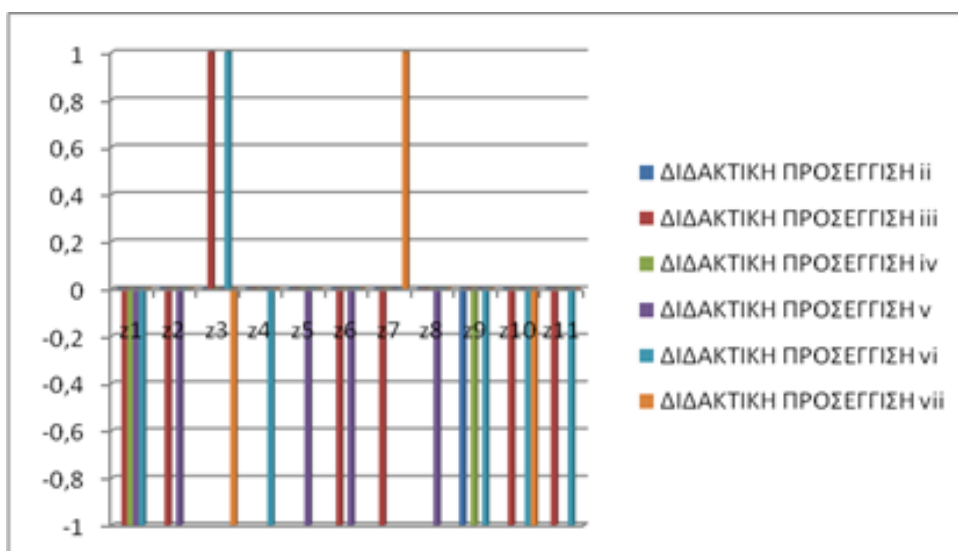
Διάγραμμα 3: Παιδαγωγικές αντιλήψεις $1^{ης}$ ομάδας δείγματος για τη διδακτική παρέμβαση, πριν την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος σε σχέση με τη σύνδεση των πονημάτων που σχεδίασαν μετά την επιμόρφωσή τους, αναφορικά με τη διδακτική παρέμβαση εμφάνισαν σε ποσοστό 30% επί του συνόλου τους μικτή προσέγγιση, 2% παραδοσιακή και 68% κονστρουκτιβιστική (Διάγραμμα 4).
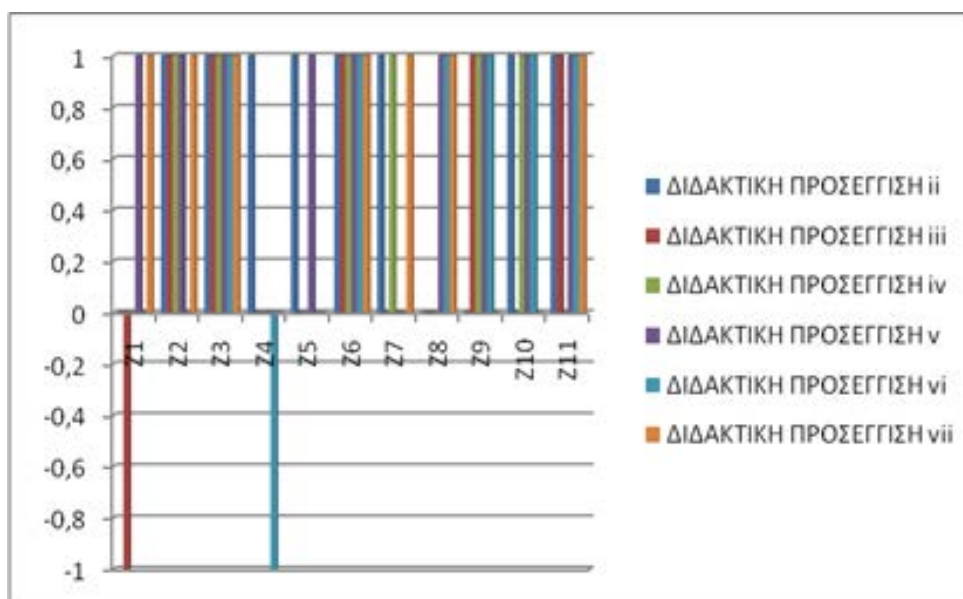
Διάγραμμα 4: Παιδαγωγικές αντιλήψεις $1^{ης}$ ομάδας δείγματος για τη διδακτική παρέμβαση μετά την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος σε σχέση με τη σύνδεση των πονημάτων τους πριν την επιμόρφωση, αναφορικά με την εργασία των μαθητών εμφάνισαν σε ποσοστό 45% επί του συνόλου τους μικτή προσέγγιση, 45% παραδοσιακή και 10% κονστρουκτιβιστική (Διάγραμμα 5).

Διάγραμμα 5: Παιδαγωγικές αντιλήψεις 1^{ης} ομάδας δείγματος για την εργασία των μαθητών, πριν την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος σε σχέση με τη σύνδεση των πονημάτων τους μετά την επιμόρφωση, αναφορικά με την εργασία των μαθητών εμφάνισαν σε ποσοστό 27% επί του συνόλου τους μικτή προσέγγιση, 0% παραδοσιακή και 73% κονστρουκτιβιστική (Διάγραμμα 6).

Διάγραμμα 6: Παιδαγωγικές αντιλήψεις 1^{ης} ομάδας δείγματος για την εργασία των μαθητών μετά την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος, πριν την επιμόρφωση, σε σχέση με τη σύνδεση των πονημάτων τους με την αξιολόγηση των μαθητών, εμφάνισαν σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση, 82% παραδοσιακή και 0% κονστρουκτιβιστική (Διάγραμμα 7).
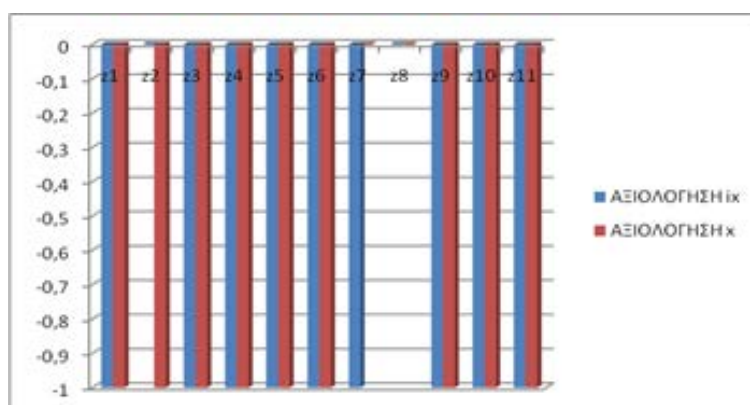
Διάγραμμα 7: Παιδαγωγικές αντιλήψεις 1^{ης} ομάδας δείγματος για την αξιολόγηση, πριν την επιμόρφωση.

Οι εκπαιδευτικοί του ερευνητικού δείγματος, μετά την επιμόρφωση, σε σχέση με τη σύνδεση των πονημάτων τους με την αξιολόγηση των μαθητών, εμφάνισαν σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση, 0% παραδοσιακή και 82% κονστρουκτιβιστική (Διάγραμμα 8).
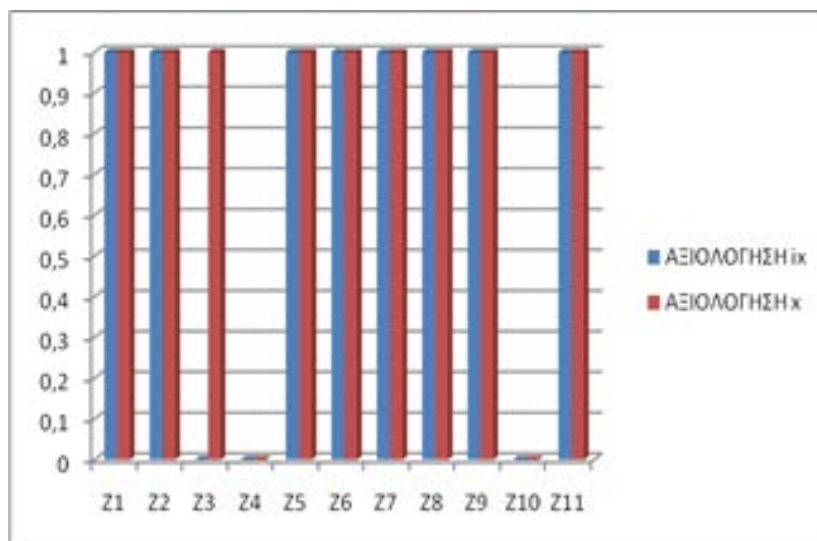
Διάγραμμα 8: Παιδαγωγικές αντιλήψεις $1^{ης}$ ομάδας δείγματος για την αξιολόγηση μετά την επιμόρφωση.

Εντέλει τα **συμπεράσματα**, σε ερμηνεία των ευρημάτων που σχετίζονται με το πρώτο διερευνητικό ερώτημα/α υποερώτημα, από την εξέταση των αποτελεσμάτων που προέκυψαν από τα σχέδια σχολικών προγραμμάτων Περιβαλλοντικής Εκπαίδευσης -προϊόν εργασίας των εκπαιδευτικών πριν την έναρξη της επιμόρφωσής τους- , που δημιουργήθηκαν κατά τη $2^η$ φάση της έρευνας, και με τη βοήθεια των μέσων καταγραφής των δεδομένων, οδήγησαν στα ακόλουθα:

i. Οι εκπαιδευτικοί του ερευνητικού δείγματος, κατά την έναρξη του σεμιναρίου, παρουσίασαν, αναφορικά με τους τέσσερις θεματικούς άξονες του Becker, στην πλειονότητά τους αντιλήψεις μικτού τύπου που συνοδεύονταν και από ένα παραδοσιακό προφίλ, ενώ οι όποιες κονστρουκτιβιστικές απόψεις ήταν ελάχιστες.

ii. Συγκεκριμένα στον άξονα ΠΡΟΓΡΑΜΜΑ ΣΠΟΥΔΩΝ εμφάνισαν σε ποσοστό 64% επί του συνόλου τους μικτή προσέγγιση και 36% παραδοσιακή, στον άξονα ΔΙΔΑΚΤΙΚΗ ΠΡΟΣΕΓΓΙΣΗ εμφάνισαν σε ποσοστό 58% επί του συνόλου μικτή προσέγγιση, 48% παραδοσιακή και μόνο 4% κονστρουκτιβιστική, αναφορικά με τον άξονα ΕΡΓΑΣΙΑ ΜΑΘΗΤΩΝ εμφάνισαν σε ποσοστό 45% επί του συνόλου τους μικτή προσέγγιση, 45% παραδοσιακή και 10% κονστρουκτιβιστική και τέλος στον άξονα ΑΞΙΟΛΟΓΗΣΗ εμφάνισαν σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση, 82% παραδοσιακή και 0% κονστρουκτιβιστική.

iii. Από τα δημογραφικά στοιχεία του δείγματος προέκυψε σώμα που στο μεγαλύτερο μέρος του (64%) έλαβε πτυχίο πριν το 1989, με εκπαιδευτική εμπειρία κι επομένως ήταν αναμενόμενες οι παγιωμένες θέσεις και πεποιθήσεις του για τα εκπαιδευτικά θέματα. Τόσο η μακρόχρονη τριβή του με την εκπαιδευτική πραγματικότητα που ήταν παραδοσιακής απόχρωσης, όσο και τα πριν από αυτήν βιώματά του μαθητικά και σπουδαστικά, διαμόρφωσαν αντιλήψεις φιλικές προς ένα σχολείο κανονιστικό, επιστημολογικό και κάθετα καθοδηγητικό. Σε αυτό συνέβαλε και το γραφειοκρατικό μοντέλο διοίκησης των σχολείων, καθώς και το δύσκαμπτο αναλυτικό και ωρολόγιο πρόγραμμα. Βεβαίως η εμπλοκή των συγκεκριμένων εκπαιδευτικών στις Σχολικές Δραστηριότητες (ΣΔ) αναμενόταν να τους καλλιεργήσει μία νέα κουλτούρα και αντίληψη για τα εκπαιδευτικά δρώμενα. Η προσδοκία αυτή οφείλεται τόσο στο υφιστάμενο θεσμικό πλαίσιο των ΣΔ, όσο και στο παιδαγωγικό πλαίσιο λειτουργίας τους το οποίο διέπεται από τις αρχές και τις αξίες της μετανεωτερικότητας. Πιθανόν αυτή να

είναι και μία από τις αιτίες που καταγράφηκε ποσοστό 27% να κλίνει σε μικτού τύπου παιδαγωγικές αντιλήψεις, παρόλο το υπάρχον κλίμα στο σχολικό χώρο.

Στην προσπάθεια ερμηνείας των ευρημάτων που σχετίζονται με το πρώτο διερευνητικό ερώτημα/β υποερώτημα, τα αποτελεσμάτων που προέκυψαν από παραδοτέα μαθησιακά σχέδια που δημιουργήθηκαν στο πλαίσιο του σεμιναρίου, σε πρωτότυπη φόρμα καταγραφής και σε περιβάλλον web2, -προϊόν εργασίας τους μετά το τέλος της επιμόρφωσης- και με τη βοήθεια των μέσων καταγραφής των δεδομένων, οδήγησαν στα ακόλουθα:

α) Οι εκπαιδευτικοί του ερευνητικού δείγματος, στο τέλος της επιμορφωτικής παρέμβασης, παρουσίασαν, αναφορικά με τους τέσσερις θεματικούς άξονες του Becker, στην πλειονότητά τους ένα κονστρουκτιβιστικό προφίλ που συμπληρώνονταν και από αντιλήψεις μικτού τύπου, ενώ οι όποιες παραδοσιακές απόψεις ήταν πλέον ελάχιστες. Συγκεκριμένα στον άξονα ΠΡΟΓΡΑΜΜΑ ΣΠΟΥΔΩΝ εμφάνισαν, μετά την επιμόρφωση, σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση, 82% κονστρουκτιβιστική και 0% παραδοσιακή, στον άξονα ΔΙΔΑΚΤΙΚΗ ΠΡΟΣΕΓΓΙΣΗ εμφάνισαν, μετά την επιμόρφωση, σε ποσοστό 30% επί του συνόλου μικτή προσέγγιση, 2% παραδοσιακή και 68% κονστρουκτιβιστική, αναφορικά με τον άξονα ΕΡΓΑΣΙΑ ΜΑΘΗΤΩΝ, μετά την επιμόρφωση, εμφάνισαν σε ποσοστό 27% επί του συνόλου τους μικτή προσέγγιση, 0% παραδοσιακή και 73% κονστρουκτιβιστική και τέλος στον άξονα ΑΞΙΟΛΟΓΗΣΗ, μετά την επιμόρφωση, εμφάνισαν σε ποσοστό 18% επί του συνόλου τους μικτή προσέγγιση, 0% παραδοσιακή και 82% κονστρουκτιβιστική.

β) Από τα δημογραφικά στοιχεία του δείγματος προέκυψε, όπως αναφέρθηκε και προηγούμενα, σώμα που έλαβε πτυχίο πριν το 1989 σε ποσοστό 64% και το 27% μεταξύ 1990 και 1999, με εκπαιδευτική εμπειρία και ενασχόληση με τις ΣΔ. Η εξέλιξη που παρουσίασαν οι αντιλήψεις αυτών των ατόμων σε σχέση με όσες τους εξέφραζαν πριν την επιμόρφωση, μπορούν να αποδοθούν στα παιδαγωγικά αδιέξοδα που αντιμετώπιζαν στην σχολική τους πραγματικότητα και πρακτική, στην ικανότητα που είχαν λόγω της εμπειρίας τους να διαχειρίζονται και να αφομοιώνουν με ταχύτητα τις νέες παιδαγωγικές προσεγγίσεις, στην επίδραση που έγινε στο παιδαγωγικό τους προφίλ μέσω της εμπλοκής τους στις σχολικές δραστηριότητες.

γ) Αυτή καθεαυτή η δομή του συγκεκριμένου επιμορφωτικού προγράμματος, που σχεδιάστηκε σύμφωνα με τις αρχές του κονστρουκτιβιτισμού και της συνεργατικής μάθησης (ο επιμορφούμενος είχε εμπλοκή και λόγο για το περιεχόμενο της επιμόρφωσης, συμμετείχε δημιουργικά, σε φάσεις του σεμιναρίου λειτούργησε ομαδικά και συνεργατικά, έθεσε τα κριτήρια αξιολόγησής του και αξιολόγησε με βάση αυτά το σεμινάριο μέσω focus group) συνεισέφερε στην αλλαγή των αντιλήψεων των συμμετεχόντων. Στην άποψη αυτή συνηγορούν και μελετητές (Gokhale, 1995. Schwienhorst, 1998. Ράπτης, 1998), θεωρώντας ότι η ανάπτυξη κι εμβάθυνση της συνεργατικής μάθησης πρέπει να είναι εκπαιδευτικός στόχος, καθώς μέσω αυτής οι επιμορφούμενοι επιτυγχάνουν υψηλότερα επίπεδα σκέψης και συγκρατούν τις πληροφορίες για μεγαλύτερο χρονικό διάστημα από ότι οι μαθητές που εργάζονται ατομικά.

δ) Καθ' όλο το διάστημα της επιμορφωτικής παρέμβασης καταβλήθηκε προσπάθεια να δημιουργηθεί το κατάλληλο περιβάλλον ώστε να προκύψουν το δυνατόν βέλτιστα αποτελέσματα. Μεταξύ άλλων υπήρξε μέριμνα να τηρηθούν στη διάρκειά της δύο κεντρικές αρχές της εκπαίδευσης ενηλίκων (Malkom Knowels, 1968) :
-πρώτη αρχή: οι εκπαιδευόμενοι ενήλικες είναι αυτοδιοικούμενοι και αυτόνομοι και
-δεύτερη αρχή: οι εκπαιδευόμενοι ενήλικες θέλουν τον εκπαιδευτή να διευκολύνει τη μάθηση και όχι απλά να παρουσιάζει την ύλη ενός μαθήματος.

Σύμφωνα με την άποψη της ερευνήτριας το κατάλληλο περιβάλλον, στη δημιουργία του οποίου συνέβαλαν και οι εισηγητές αναλαμβάνοντας το ρόλο του συνεργάτη - διευκολυντή σε σχέση με τους δραστηριοποιούμενους εκπαιδευτικούς, επέδρασε θετικά στην αλλαγή των πεποιθήσεων των τελευταίων. Το μεγαλύτερο ποσοστό των περιπτώσεων του δείγματος εμπίπτουν σε ένα σύνολο που χαρακτηρίζεται από έμπειρους εκπαιδευτικούς προερχόμενους και από τις δύο

βαθμίδες εκπαίδευσης, άντρες και γυναίκες, οι οποίοι αρχικά έδειξαν να έχουν μίγμα παραδοσιακών και μικτού τύπου αντιλήψεων απέναντι στην εκπαιδευτική πρακτική. Μάλιστα οι παραδοσιακές πεποιθήσεις τους εμφανίζονταν σε μεγαλύτερο βαθμό από τις μικτές. Άκρως εντυπωσιακή υπήρξε η αλλαγή όλων, μετά την επιμόρφωση, προς ένα μίγμα αντιλήψεων, όπου στα συστατικά του πλέον επικράτησαν οι κονστρουκτιβιστικές αντιλήψεις, ακολούθως οι μικτές και περιορίστηκαν σε πολύ μικρά ποσοστά οι παραδοσιακές. Παράγοντες όπως το φύλο και η βαθμίδα των εκπαιδευτικών δεν συσχετίζονται με τα αποτελέσματα της έρευνας.

Στην προσπάθεια ερμηνείας των ευρημάτων που σχετίζονται με το δεύτερο διερευνητικό ερώτημα αναφορικά με τη συμβολή του επιμορφωτικού σεμιναρίου στη μεταβολή ή ενίσχυση των παιδαγωγικών αντιλήψεων των συμμετεχόντων εκπαιδευτικών υπέρ της κονστρουκτιβιστικής προσέγγισης, μεταξύ των κύριων λόγων που επέδρασαν στη θετική εξέλιξη των παιδαγωγικών αντιλήψεων κατά Becker των εκπαιδευτικών, εξ αιτίας της επιμόρφωσης, συγκαταλέγονται τα ακόλουθα:

i. η εμπλοκή των εκπαιδευτικών του ερευνητικού δείγματος στις Σχολικές Δραστηριότητες (ΣΔ), δημιούργησε πρόσφορο έδαφος για θετική αλλαγή στις παιδαγωγικές αντιλήψεις τους, κάτω από την επίδραση των κατάλληλων ερεθισμάτων που δόθηκαν στο πλαίσιο της επιμόρφωσης.

ii. Το υφιστάμενο θεσμικό πλαίσιο των ΣΔ και το παιδαγωγικό πλαίσιο λειτουργίας τους, έδωσαν τη δυνατότητα εφαρμογής μιας εκπαιδευτικής πρακτικής που να διέπεται από τις αρχές και τις αξίες της μετανεωτερικότητας. Η αξιοποίηση αυτής της δυνατότητας στην σχολική ζωή προϋποθέτει, μεταξύ άλλων, την καλλιέργεια κατάλληλων δεξιοτήτων στους εκπαιδευτικούς, ώστε να ανταποκρίνονται στο νέο τους ρόλο. Η ανάγκη αυτή καλύφθηκε στη συγκεκριμένη επιμόρφωση μέσα από τη σκοποθεσία και το περιεχόμενό της.

iii. Στο πλαίσιο μιας μετανεωτερικής θεώρησης της συγκεκριμένης επιμόρφωσης, προσεγγίστηκε ο εκπαιδευτικός σαν ατομική οντότητα, αποδίδοντας σε αυτόν δυνάμεις και δυνατότητες που προέρχονταν από την εμπειρία του, τη συναισθηματική και κοινωνική νοημοσύνη του (δημιουργία ΜΣ από τους επιμορφούμενους), σε μία προσπάθεια κατάληξης σε «μεθοδολογικό ατομισμό» (Αλεξίου Θ. 2002: 210 - 228) στο σχεδιασμό της εκπαιδευτικής πρακτικής.

iv. Το περιεχόμενο της επιμόρφωσης έδωσε απαντήσεις, με πρακτικό και υλοποιήσιμο τρόπο, σε κάποια από τα παιδαγωγικά αδιέξοδα που αντιμετώπιζαν οι συμμετέχοντες στην σχολική τους πραγματικότητα.

v. Η ικανότητα που είχαν οι εκπαιδευτικοί του δείγματος -λόγω της πολύχρονης εμπειρίας τους (91%), σε συνδυασμό με την κουλτούρα, εξ αιτίας της ενασχόλησή τους με τις ΣΔ-, να διαχειρίζονται με αυτοπεποίθηση και να αφομοιώνουν με ταχύτητα τις νέες παιδαγωγικές προσεγγίσεις.

vi. Οι συντελεστές της επιμόρφωσης (διοργανωτές και εκπαιδευτές) αναγνωρίζοντας τον πλούτο των εμπειριών μέσα από την τάξη που οι εκπαιδευτικοί κατείχαν, τους συμπεριφέρονταν ως ίσους όσον αφορά την εμπειρία και τη γνώση και τους επέτρεπαν να ακούγονταν ελεύθερα οι απόψεις τους (Lieb, 1991), οι οποίες συχνά ήταν αντιδιαμετρικά αντίθετες από αυτές των επιμορφωτών.

vii. Η κουλτούρα μίας μετανεωτερικής εκπαιδευτικής δομής, όπως είναι τα ΚΠΕ, επέτρεψε-εισηγήθηκε, στη διάρκεια του σεμιναρίου, καινοτομίες αναφορικά με τρόπους αναδόμησης του αναλυτικού προγράμματος και του σχολικού περιβάλλοντος (μέσα από την ανάδειξη του εκπαιδευτικού επιμορφούμενου σε πρωταγωνιστή και δημιουργικό διαμορφωτή της σχολικής ζωής, κινητοποιώντας τον να συνειδητοποιήσει τη δική του συμβολή στο νέο ζητούμενο της σύγχρονης εποχής: τη δημιουργία του μελλοντικού αυτόνομου κριτικού πολίτη) Γιαβρίμης, Παπάνης κ.ά. (2010). Η επιμόρφωση λοιπόν κρίνεται ότι ενεργοποίησε, μέσα από τον προσανατολισμό της διδακτικής πράξης σε στόχους αναπτυξιακούς και μετασχηματιστικούς, διαδικασίες ευαισθητοποίησης σχετικά με τις νέες παιδαγωγικές αντιλήψεις.

viii. Δύο σημαντικές παράμετροι που εκτιμάται ότι δημιούργησαν πρόσφορο έδαφος για τη θετική επίδραση της επιμόρφωσης αναφορικά με τις παιδαγωγικές αντιλήψεις των

συμμετεχόντων, δηλαδή η αξιοποίηση των ΤΠΕ και η ΕΑ ως το πλαίσιο της παρέμβασης, λόγω της σημαντικότητάς τους προσεγγίστηκαν διεξοδικότερα σε νέα έρευνα.

Προτάσεις

Είναι προφανές ότι χρειάζεται να συνεχίσουμε να μαθαίνουμε, γιατί δεν είναι εφικτό να μάθουμε εφάπαξ όλα όσα θα χρειαστούμε κατά τη διάρκεια της ζωής μας. Επομένως η μάθηση συνεχίζεται σε όλη τη διάρκεια της ζωής και μάλιστα αποτελεί απαραίτητο στοιχείο της ίδιας της ζωής (Rogers, 1999, σ. 310). Σύμφωνα με Φεσάκη, Καράκιζα (2010) οι παιδαγωγικές πεποιθήσεις των εκπαιδευτικών καθορίζουν σε μεγάλο βαθμό την εκπαιδευτική τους πρακτική. Επομένως απαιτείται άμεσα παιδαγωγική κατάρτιση των εκπαιδευτικών για μεταστροφή των παραδοσιακών και καλλιέργεια και ενίσχυση των κονστρουκτιβιστικών πεποιθήσεών τους, κάτω από πνεύμα μετανεωτερικότητας . Με βάση ευρήματα και συμπεράσματα της παρούσας εργασίας κρίθηκε θετικά η συμβολή, μεταξύ άλλων, των ΤΠΕ και της Εκπαίδευσης για την Αειφορία (ΕΑ) αναφορικά με το ανωτέρω ζητούμενο. Άρα η ανάγκη για εκπαίδευση και συνεχή επιμόρφωση των εκπαιδευτικών, δεν πρέπει να περιορίζεται σε πεδία που σχετίζονται με τις επιστημονικές, τεχνολογικές και κοινωνικές εξελίξεις, αλλά είναι απαραίτητο να συμπεριλαμβάνει και θέματα ανάπτυξης πρωτοβουλιών επιστημονικού πειραματισμού και λειτουργίας με νέους ρόλους και πρότυπα διδασκαλίας. Η ανάγκη αυτή απορρέει μέσα από το ρόλο που διαδραματίζει ο εκπαιδευτικός ως ένας από τους βασικότερους κοινωνικοποιητικούς φορείς, αλλά και ως σημαντικότατος διαμεσολαβητής, τόσο για τη μάθηση και την ανάπτυξη των νέων, όσο και για τη διαμόρφωση του αυριανού δυναμικού μιας χώρας (Ράπτης & Ράπτη, 2001).
Είναι συνήθης πρακτική ο σχεδιασμός προγραμμάτων επιμόρφωσης εκπαιδευτικών να προσπερνά τις επιμορφωτικές ανάγκες, όπως τις αντιλαμβάνονται οι ίδιοι οι επιμορφούμενοι/ες, με αποτέλεσμα η διαμόρφωση της σχετικής κατάρτισης/επιμόρφωσης να επιβάλλεται από «επάνω» (Βεργίδης, 1998). Όμως οι ανθρώπινες οργανωτικές δομές δεν είναι μηχανισμοί και οι άνθρωποι δεν είναι εξαρτήματά τους. Οι άνθρωποι διαθέτουν αξίες και αισθήματα, αντιλήψεις, γνώσεις, κίνητρα και βιογραφικά στοιχεία, ενώ τα γρανάζια και τα εξαρτήματα όχι (Robinson, 2011). Σε αναντιστοιχία με τις αρχές του εποικοδομισμού και της μετανεωτερικότητας, στο σχεδιασμό πάγια αγνοούνται οι προσωπικές αντιλήψεις και πρακτικές εμπειρίες των εκπαιδευτικών, λειτουργώντας αναποτελεσματικά ως προς την επίτευξη της σκοποθεσίας της επιμόρφωσης. Η αποτελεσματική επιμόρφωση των εκπαιδευτικών απαιτεί: α) πρακτικό και βιωματικό εκτός από θεωρητικό χαρακτήρα και β) την δημιουργία διαρκών υποστηρικτικών δομών με τη μορφή επαγγελματικών κοινοτήτων μάθησης και επαγγελματικής πρακτικής, που θα εργάζονται ομαδικά, θα ανταλλάσσουν και θα επεξεργάζονται εμπειρίες, θα πειραματίζονται με διδακτικές μεθόδους, με τελικό στόχο έναν διαρκώς εξελισσόμενο αποτελεσματικό δάσκαλο (Φεσάκης, Καράκιζα 2010). Επιπρόσθετα κατά την άποψη της ερευνήτριας, για μια αποτελεσματική επιμόρφωση απαιτείται η ενεργή εμπλοκή των επιμορφούμενων και κατά το σχεδιασμό της και μετά το πέρας της. Δηλαδή μέσα από τη συμμετοχή τους σε κοινότητες μάθησης, πριν την επιμόρφωση (διαγνωστικά) να τους δίνεται η δυνατότητα έκφρασης των επιμορφωτικών αναγκών τους, οι οποίες και θα λαμβάνονται υπόψη κατά τη σύνταξη του επιμορφωτικού προγράμματος –ενδιαφέρουσα διαφαίνεται η περίπτωση της εξ ολοκλήρου διαμόρφωσης του προγράμματος της επιμόρφωσης από τους επιμορφούμενους-, και μετά την ολοκλήρωσή της (μεταγνωστικά) να τους δίνεται η δυνατότητα κατάθεσης κριτικής για τον τρόπο πραγματοποίησής της και την αποτελεσματικότητά της.
Οι υπάρχουσες σχολικές δομές δεν σχεδιάστηκαν για να ανταποκριθούν στις σύγχρονες προκλήσεις. Ανήκουν στο χθες. Φωτεινό παράδειγμα εξαίρεσης αποτελούν τα ΚΠΕ των οποίων το εκπαιδευτικό/επιμορφωτικό έργο και η λειτουργία διέπονται από ένα μεταμοντέρνο πνεύμα ανατροπής των παραδοσιακών παιδαγωγικών αντιλήψεων του σύγχρονου σχολείου στο πλαίσιο της Εκπαίδευσης για την Αειφορία. Το πνεύμα αυτό τα κατευθύνει, μέσα από εποικοδομική προσέγγιση της γνώσης, καλλιέργεια της συνεργατικής μάθησης, των αξιών, της κριτικής και της συστημικής σκέψης, να αναπτύσσουν δράσεις με δημοκρατικές διαδικασίες εμπλοκής και

ενεργητική συμμετοχή των μαθητών/εκπαιδευτικών στη διαδικασία διδασκαλίας/κατάρτισης - μάθησης και αξιολόγησης, δίνοντας συγχρόνως - ως κινητροδότηση για την επίτευξή των ανωτέρω- ιδιαίτερη έμφαση στην επιβράβευση και την ενθάρρυνση και όχι στην κριτική και την απόρριψη (δημιουργική προσέγγιση της μάθησης). Η αποτελεσματικό δομή των ΚΠΕ προσφέρεται να αξιοποιηθεί με τρόπο καινοτόμο και δημιουργικό για την αλλαγή των παιδαγωγικών αντιλήψεων των εκπαιδευτικών, για τον ταχύ εκσυγχρονισμό του σύγχρονου σχολείου μέσα από την ενίσχυση του εκπαιδευτικού/επιμορφωτικού έργου τους (επιμορφώσεις στον εκπαιδευτικό σχεδιασμό με νέα εκπαιδευτικά σχεδιαστικά μοντέλα και χρήση ΤΠΕ στο πλαίσιο της ΕΑ, εκπαιδεύσεις/δικτυώσεις μαθητών και σχολείων της ημεδαπής και αλλοδαπής στο πλαίσιο της ΕΑ, λειτουργία κοινοτήτων μάθησης με χρήση ΤΠΕ στο πλαίσιο της ΕΑ κ. ά.).

Προτάσεις για άλλες έρευνες

Αξιοποίηση των ευρημάτων και των συμπερασμάτων της προκείμενης μελέτης θα μπορούσε να πραγματοποιηθεί με περαιτέρω μελέτη ή και έρευνα, τόσο σε θεωρητικά όσο και σε πρακτικά πεδία:
Οι παιδαγωγικές αντιλήψεις των εκπαιδευτικών αποτελούν ισχυρές ενδείξεις των παιδαγωγικών σχεδιασμών, των διδακτικών επιλογών και των πρακτικών τους στην τάξη» Pajares (1992), Φεσάκη, Καράκιζα (2010). Στην παρούσα εργασία ανιχνεύτηκαν α)παιδαγωγικές αντιλήψεις κατά Becker, εκπαιδευτικών Α/θμιας και Β/θμιας εκπαίδευσης, μέσα από **δηλωμένη θέση/άποψή τους** ως απαντήσεις σε ερωτηματολόγια και στη συνέχεια β) παιδαγωγικές αντιλήψεις κατά Becker αυτών των εκπαιδευτικών, που απέρρεαν μέσα από ΜΣ που δημιούργησαν οι ίδιοι, **ως πρόθεση εκπαιδευτικής πρακτικής**. Επιστημονικό ενδιαφέρον παρουσιάζει η περαιτέρω διερεύνηση και ανίχνευση των παιδαγωγικών αντιλήψεών τους κατά Becker, μέσα από την **εκπαιδευτική πρακτική που εντέλει εφάρμοσαν**, με μνεία στις παιδαγωγικές αντιλήψεις των ενηλίκων, θέτοντας ως θεωρητικό υπόβαθρο την εκπαίδευση ενηλίκων.
Η αποτελεσματικότητα της επιμορφωτικής παρέμβασης που πραγματοποιήθηκε για τις διερευνητικές ανάγκες αυτής της εργασίας, σχετικά με τη μεταστροφή ή και ενίσχυση των παιδαγωγικών αντιλήψεων των συμμετεχόντων εκπαιδευτικών -με απόρριψη της παραδοσιακής και με προσέγγιση υπέρ της κονστρουκτιβιστικής θεώρησης-, κατά την παιδαγωγική πρακτική που σχεδίασαν να ακολουθήσουν, οδηγεί στην ανάγκη διερεύνησης των παραμέτρων που συνέβαλαν σε αυτό. Δηλαδή, σε περαιτέρω μελέτες σχετικά με την παιδαγωγική αξιοποίηση των ΤΠΕ και της ΕΑ στην παιδαγωγική κατάρτιση και στον εκπαιδευτικό σχεδιασμό, με τους εκπαιδευτικούς να έχουν ενεργό ρόλο σε αυτό. Σκοπός παραμένει η καλλιέργεια νέων αντιλήψεων και στάσεων στους εκπαιδευτικούς, κάτω από το ιδεολόγημα της μετανεωτερικότητας, καθώς η γνώση θα αποκτά χρηστική αξία υπακούοντας στην αρχή της αποδοτικότητας, σύμφωνα με την οποία οφείλεται η τήρηση της βέλτιστης δυνατής σχέσης μεταξύ των χρησιμοποιούμενων μέσων και των επιτυγχανόμενων αποτελεσμάτων (Λυοτάρ, 1998).

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ΝΟΜΟΙ – ΔΙΑΤΑΓΜΑΤΑ - ΕΓΚΥΚΛΙΟΙ-ΕΡΕΥΝΕΣ

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Η Διδασκαλία Φυσικών Επιστημών και Τεχνολογίας για μια Βιώσιμη Κοινωνία. Οι Αντιλήψεις των Εκπαιδευτικών για τέτοια Προγράμματα

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Περίληψη

Στην παρούσα εργασία γίνεται μια βιβλιογραφική επισκόπηση για θέματα που αφορούν στη διδασκαλία Φυσικών Επιστημών και Τεχνολογίας προς την κατεύθυνση της βιώσιμης ανάπτυξης και μια ποιοτική έρευνα που διεξήχθη το ακαδημαϊκό έτος 2010-2011 και αφορά στις αντιλήψεις των εκπαιδευτικών της δευτεροβάθμιας εκπαίδευσης για την ενσωμάτωση τέτοιων προγραμμάτων στο υπάρχον πρόγραμμα σπουδών.

Abstract

This paper includes a literature review focused in the necessity for emphasizing of social issues and subjects in Science and Technology Education and a qualitative research that was carried out in academic year 2010-11 concerning teachers' perceptions for incorporating such issues in the existing curriculum in secondary education in Greece.

Εισαγωγή

Στη σημερινή εποχή ερχόμαστε αντιμέτωποι με πολλά θέματα που αφορούν στο τρίπτυχο Επιστήμη – Τεχνολογία - Κοινωνία, όπως το φαινόμενο του θερμοκηπίου, η τρύπα του όζοντος, η διαχείριση των απορριμμάτων, η ποιότητα και η επάρκεια του πόσιμου νερού στον πλανήτη, ο υπερπληθυσμός, η πείνα στον κόσμο κ. ά. (Rubba, 1991). Η καλύτερη ελπίδα για την επίλυση τέτοιων θεμάτων είναι ο σημερινός μαθητής και αυριανός πολίτης να είναι ενημερωμένος και καταρτισμένος σε τέτοια θέματα, έτσι ώστε να είναι ικανός να πάρει σωστές αποφάσεις και να αναλάβει υπεύθυνη δράση προς την κατεύθυνση της βιώσιμης ανάπτυξης.

Έτσι λοιπόν, κατά τη διάρκεια της δεκαετίας του 1980 πολλοί ερευνητές (Aikenhead, 1988b; Bybee, 1987; Hickmann & Bybee, 1987; Layton, 1991; Rubba, 1991, Rubba & Wiesenmayer, 1985a) πρότειναν την ενσωμάτωση θεμάτων Φυσικών Επιστημών- Τεχνολογίας-Κοινωνίας (Science – Technology - Society, STS) στο πρόγραμμα σπουδών των Φυσικών Επιστημών. Στο πλαίσιο αυτών των προγραμμάτων τέθηκαν στο επίκεντρο κοινωνικά ζητήματα και θέματα με σημαντικές επιστημονικές και τεχνολογικές διαστάσεις.

Ο Bybee (1987), υποστηρίζει ότι η εκπαίδευση και συνεπώς και η εκπαίδευση στις Φυσικές Επιστήμες είναι ένας κοινωνικός θεσμός και ως τέτοιος θα πρέπει να ακολουθεί τις οδηγίες όλων των κοινωνικών θεσμών καλύπτοντας τις ανάγκες και τη συνεχή ανάπτυξη των ατόμων και ικανοποιώντας τις απαιτήσεις μιας δημοκρατικής και βιώσιμης κοινωνίας. Βιώσιμη είναι η κοινωνία που μπορεί να υπάρχει για γενεές και γενεές, που μπορεί να βλέπει αρκετά μακριά, που είναι αρκετά ευέλικτη και σοφή, ώστε να μην υπονομεύει ούτε τα φυσικά, ούτε τα κοινωνικά της υποστηρικτικά συστήματα (Meadows et al., 1995).

Προκειμένου λοιπόν να επιτευχθεί αυτό ίσως θα πρέπει να επαναδιατυπωθούν οι στόχοι των προγραμμάτων Φυσικών Επιστημών και Τεχνολογίας έτσι ώστε να συμπεριληφθούν και προσωπικές και κοινωνικές διαστάσεις.

Στόχοι των προγραμμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας προς μια βιώσιμη ανάπτυξη

Ο Bybee (1985b), για την εκπαίδευση σε θέματα Επιστήμης – Τεχνολογίας – Κοινωνίας αναφέρει τρεις βασικούς στόχους :
– Απόκτηση γνώσεων (για έννοιες που σχετίζονται με την Επιστήμη και την Τεχνολογία) δίνοντας έμφαση σε προσωπικά ζητήματα, πολιτικά προβλήματα, ή πολιτισμικά.
– Ανάπτυξη των μαθησιακών δεξιοτήτων (διαδικασίες της επιστημονικής και τεχνολογικής έρευνας), για τη συγκέντρωση πληροφοριών, την επίλυση προβλημάτων και τη λήψη αποφάσεων και
– Ανάπτυξη των αξιών και των ιδεών (που σχετίζονται με τις αλληλεπιδράσεις μεταξύ Επιστήμης, Τεχνολογίας, και Κοινωνίας) μέσω της μελέτης τοπικών θεμάτων, της κυβερνητικής πολιτικής και παγκόσμιων ζητημάτων .
Μιλώντας σε ένα πιο πρακτικό επίπεδο η κατεύθυνση των αναλυτικών προγραμμάτων θα πρέπει να επικεντρωθεί στα ακόλουθα :
– παρουσίαση της γνώσης και των δεξιοτήτων των Φυσικών Επιστημών σε ένα προσωπικό και κοινωνικό πλαίσιο.
– ένταξη στο πρόγραμμα σπουδών γνώσεων, δεξιοτήτων, και αντιλήψεων που σχετίζονται με την Τεχνολογία.
– επέκταση του στόχου της διερεύνησης έτσι ώστε να συμπεριλαμβάνει και τη λήψη αποφάσεων.
– διασαφήνιση των γνώσεων, των δεξιοτήτων και των αντιλήψεων σχετικά με τα θέματα Επιστήμης – Τεχνολογίας – Κοινωνίας που είναι κατάλληλα για διαφορετικές ηλικίες και στάδια ανάπτυξης.
– προσδιορισμός των πιο κατάλληλων θεμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας για την ενσωμάτωση στα υφιστάμενα προγράμματα Φυσικών Επιστημών
– εφαρμογή των προγραμμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας σε σχολικά συστήματα.

Περιεχόμενο διδασκαλίας θεμάτων Επιστήμης – Τεχνολογίας προς μια βιώσιμη κοινωνία.

Ο Merryfield (1991), διασταυρώνοντας ερευνητικές εργασίες εκπαιδευτικών Φυσικών Επιστημών (Barman, Harshman,& Rusch, 1982; Bybee, 1984; Bybee &Bonnstetter, 1986; Bybee & Mau, 1986; Hickman,1982), κοινωνικών επιστημών (Alger & Harf, 1986;Anderson, 1979; Becker, 1979; Hanvey, 1976; Kniep, 1986, 1989; Muessig & Gilliom, 1981;Woyach & Remy, 1989), και της τεχνολογικής εκπαίδευσης (Waks, 1987) προτείνει μια σειρά θεμάτων που απασχολούν ολόκληρο τον πλανήτη και τον τρόπο με τον οποίον μπορούν να ενσωματωθούν αυτά στη διδασκαλία των Φυσικών Επιστημών, των Κοινωνικών και της Τεχνολογίας. Αν και μερικά παγκόσμια ζητήματα ταιριάζουν ιδιαίτερα σε διαφορετικά μαθήματα όπως η αποψίλωση των δασών στη βιολογία, τα μέσα μεταφοράς στην εκπαίδευση της Τεχνολογίας και το διεθνές εμπόριο σε οικονομικά μαθήματα, εντούτοις υπάρχει και ένας αριθμός θεμάτων που είναι ιδιαίτερα κατάλληλα και για μια ενοποιημένη μελέτη θεμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας.
Τέτοια θέματα μπορεί να είναι:

Ενέργεια
Οι τεχνολογίες του 20ού αιώνα απαιτούν τεράστια ποσά ενέργειας. Υπάρχει μια συνεχής αναζήτηση για αξιόπιστες, οικονομικά αποδοτικές πηγές ενέργειας που δεν υποβαθμίζουν το περιβάλλον.
Παραδείγματα παγκόσμιων ενεργειακών ζητημάτων στη διδασκαλία των μαθημάτων της Φυσικής και της Τεχνολογίας μπορεί να περιλαμβάνουν τα εξής: πηγές ενέργειας, τις βραχυπρόθεσμες και μακροπρόθεσμες επιπτώσεις από τη χρήση διαφορετικών πηγών ενέργειας (ξύλου, άνθρακα,

υδρογόνου, φυσικού αερίου, πετρελαίου, πυρηνικής ενέργειας, ηλιακής ενέργειας, γεωθερμικής ενέργειας, ενεργειακών φυτών), σύγκριση ανανεώσιμων και μη ανανεώσιμων πηγών ενέργειας, περιβαλλοντικά προβλήματα ή προβλήματα υγείας που σχετίζονται με τις επιπτώσεις που μπορεί να έχει στην υγεία των ατόμων οι εγκαταστάσεις παραγωγής ηλεκτρικής ενέργειας ή και τα δίκτυα διανομής του. Οι μαθητές μπορούν να μελετήσουν την αιολική ενέργεια και να κατασκευάσουν σε μακέτα ένα αιολικό πάρκο ή την ηλιακή ενέργεια και να ασχοληθούν με την κατασκευή ενός αυτοκινήτου που κινείται με φωτοβολταϊκά.

Περιβαλλοντικά θέματα

Παραδείγματα παγκόσμιων περιβαλλοντικών θεμάτων μπορεί να είναι τα εξής:
χρήση γης / υποβάθμιση, αποψίλωση των δασών, ρύπανση του αέρα, του νερού , του εδάφους, το φαινόμενο του θερμοκηπίου, η υπερθέρμανση του πλανήτη, η καταστροφή του όζοντος, η όξινη βροχή, τα φυτοφάρμακα, η διάθεση των αποβλήτων (πυρηνικών, τοξικών και επικίνδυνων ουσιών), η διαχείριση των φυσικών πόρων, η εξαφάνιση ορισμένων φυτών ή ζώων, η εξαγωγή τοξικών αποβλήτων.

Παραδείγματα για την ενσωμάτωση περιβαλλοντικών ζητημάτων στη διδασκαλία των Φυσικών Επιστημών και της Τεχνολογίας :

 Στη διδασκαλία της Χημείας κατά τη μελέτη αντιδράσεων οξέων –βάσεων μπορούν να μελετήσουν τη σχέση που υπάρχει μεταξύ της καύσης άνθρακα στους σταθμούς παραγωγής ηλεκτρικής ενέργειας και την όξινη βροχή.

Στο μάθημα της Τεχνολογίας μπορούν να ασχοληθούν με θέματα που αφορούν στη διαχείριση των απορριμμάτων στην πόλη τους και μελέτη και σύγκριση για τη διάθεση απορριμμάτων σε άλλες περιοχές και σε άλλες χώρες.

Η ποιότητα του πόσιμου νερού και πως συσχετίζεται με τον τρόπο χρήσης γης στη γύρω περιοχή, προβλήματα υγείας του πληθυσμού της περιοχής είναι επίσης ένα θέμα με το οποίο μπορούν να ασχοληθούν οι μαθητές και να εμπλέξουν γνώσεις Φυσικών Επιστημών και Τεχνολογίας για μια βιώσιμη κοινωνία.

Θέματα Υγείας και Πληθυσμού

Δύο από τις πιο σημαντικές τάσεις του 20ού αιώνα είναι η επιταχυνόμενη ανάπτυξη της Τεχνολογίας και η απότομη αύξηση του παγκόσμιου πληθυσμού. Παρά το γεγονός ότι και οι δύο αυτές τάσεις θέτουν σε κίνδυνο τα οικοσυστήματα του πλανήτη, η βελτιωμένη υγειονομική περίθαλψη αποτελεί ένα από τα μεγαλύτερα τεχνολογικά επιτεύγματα της εποχής μας.

Παραδείγματα τέτοιων θεμάτων περιλαμβάνουν τα εξής:
μεταδοτικές ασθένειες, τον υποσιτισμό, το AIDS, την αποχέτευση / διάθεση λυμάτων, το πόσιμο νερό, τη φθορίωση του νερού, την τοξικότητα του νερού, τα πρόσθετα τροφίμων, τη γενετική συμβουλευτική και την έρευνα, τα ναρκωτικά, τη γήρανση , την αύξηση του πληθυσμού, τον έλεγχο των γεννήσεων, κινδύνους για την υγεία από οικοδομικά υλικά, όπως ο αμίαντος, οι κυβερνητικές πολιτικές για τον οικογενειακό προγραμματισμό κ.ά.

Παραδείγματα για την ενσωμάτωση της παγκόσμιας υγείας και δημογραφικών ζητημάτων στην εκπαίδευση :

Στο μάθημα της Βιολογίας μαθαίνουν για γενετικές μεταλλάξεις, για τις επιπτώσεις της βιοτεχνολογίας.

Στο πλαίσιο του μαθήματος της Τεχνολογίας οι μαθητές μπορούν να μελετήσουν μονάδες διάθεσης αστικών ή και βιομηχανικών λυμάτων.

Οικονομικά θέματα

Τα οικονομικά ζητήματα είναι σημαντικά αναφορικά με τη βελτίωση του βιοτικού επιπέδου του ανθρώπου. Παραδείγματα παγκόσμιων οικονομικών θεμάτων περιλαμβάνουν τα εξής: οικονομική ανάπτυξη, ζητήματα σχετικά με το περιβάλλον και τους φυσικούς πόρους , το δικαίωμα πρόσβασης σε πόσιμο νερό, η φτώχεια και έλλειψη στέγης, η αστικοποίηση, το χρέος, η παραγωγικότητα, η παγκόσμια κατανομή του πλούτου, οι επενδύσεις, εμπόδια στο εμπόριο, Βορρά-Νότου οικονομικό χάσμα, την ευρωπαϊκή οικονομική ένωση, διεθνείς αγορές, νεοαποικιοκρατία, επιλογές για την επιστημονική και τεχνολογική έρευνα, και αμφισβητήσιμες

εμπορικές πρακτικές (με την πώληση ληγμένων φαρμακευτικών προϊόντων στις αναπτυσσόμενες χώρες).

Άλλα θέματα με τα οποία μπορούν να ασχοληθούν οι μαθητές και να ενσωματωθούν στη διδασκαλία των Φυσικών Επιστημών και Τεχνολογίας για μια βιώσιμη κοινωνία είναι οι μεταφορές και επικοινωνίες, τρόφιμα και πείνα, στρατιωτικά θέματα.

Στρατηγικές διδασκαλίας θεμάτων Επιστήμης -Τεχνολογίας – Κοινωνίας

Οι παραδοσιακές μέθοδοι διδασκαλίας Φυσικών επιστημών τείνουν να χαρακτηριστούν από τη συγκλίνουσα σκέψη και την παρουσίαση διαλέξεων. Η διδασκαλία θεμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας, από την άλλη πλευρά, απαιτεί ένα ευρύτερο ρεπερτόριο στρατηγικών διδασκαλίας όπως η αποκλίνουσα σκέψη, η εργασία σε μικρές ομάδες, η μαθητοκεντρική διδασκαλία, τεχνικές επίλυσης προβλήματος, οι προσομοιώσεις, διαδικασίες λήψεις αποφάσεων, αντιπαραθέσεις, συζητήσεις, και χρήση των μέσων μαζικής ενημέρωσης και άλλων κοινοτικών πόρων (Aikenhead, 1988b; Solomon & Aikenhead, 1994).

Οι προσεγγίσεις διαδραστικής διδασκαλίας θεωρούνται συχνά ως ουσιαστικής σημασίας για την διδασκαλία της Επιστήμης – Τεχνολογίας – Κοινωνίας (Solomon, 1987,1993 όπ. αναφ. στο Solomon & Aikenhead, 1994).

Όπως αναφέρεται στο κεφ.16 του Aikenhead (1994), οι ερευνητές Byrne και Johnstone (1988) συμπέραιναν τα εξής :

– Όσον αφορά το περιεχόμενο μάθησης των Φυσικών επιστημών, προσομοιώσεις και εκπαιδευτικά παιχνίδια μπορεί να είναι εξίσου αποτελεσματικά με τις παραδοσιακές μεθόδους διδασκαλίας.

– Όσον αφορά την ανάπτυξη θετικών στάσεων, οι στρατηγικές προσομοίωσης, τα παιχνίδια ρόλων, οι συζητήσεις και οι διαδικασίες λήψης αποφάσεων μπορεί να είναι πολύ πιο αποτελεσματικές από τις παραδοσιακές μεθόδους διδασκαλίας.

– Οι ομαδικές συζητήσεις μπορεί να τονώσουν την κριτική σκέψη και το ενδιαφέρον των μαθητών.

– Όσον αφορά την προώθηση της κατανόησης των διαδικασιών της Επιστήμης, η ανάλυση και αξιολόγηση των ιστορικών μελετών περίπτωσης μπορεί να είναι πιο αποτελεσματική.

– Αναφορικά με τους μαθητές που εμπλέκονται σε προσομοιώσεις, η σύνδεση της ακαδημαϊκής Επιστήμης με την καθημερινή ζωή του μαθητή κάνει την ακαδημαϊκή Επιστήμη πιο ενδιαφέρουσα για πάνω από το 80% των μαθητών σε σύγκριση με το 8% που βρίσκουν τις προσομοιώσεις μικρής ή ασήμαντης σημασίας.

Ο Rubba (1991), προτείνει το ακόλουθο εκπαιδευτικό μοντέλο για τη διδασκαλία θεμάτων Επιστήμης –Τεχνολογίας -Κοινωνίας. Ένα σχέδιο εργασίας (project), που θα ασχολείται με τη μελέτη τέτοιων θεμάτων και θα δίνει προτάσεις για δράση. Αυτή η προσέγγιση αποτελείται από 4 - 6 εβδομαδιαίες ενότητες που μπορούν να διδαχθούν είτε ως μέρος των μαθημάτων Φυσικών Επιστημών ή με συντονισμό μεταξύ των μαθημάτων Φυσικών Επιστημών και Κοινωνικών σπουδών ή ακόμα και ως ενοποιημένο πεδίο. Μια τέτοια διδακτική ενότητα μπορεί να ξεκινήσει με δραστηριότητες στις οποίες οι μαθητές εξετάζουν τη φύση της Επιστήμης και της Τεχνολογίας και τις χαρακτηριστικές αλληλεπιδράσεις μεταξύ Επιστήμης – Τεχνολογίας – Κοινωνίας. Στη συνέχεια κρίσιμα θέματα μπορούν να ταυτοποιηθούν και να αναλυθούν για να προσδιορίσουν τι κάνει αυτά τα θέματα να αποκαλύψουν έννοιες σχετικές με τις Φυσικές επιστήμες και τις κοινωνικές επιστήμες και να προσδιορίσουν εξέχουσες θέσεις αξιών που σχετίζονται με διαφορετικές πλευρές του θέματος. Μελέτες περίπτωσης μπορούν να χρησιμοποιηθούν για να δείξουν ότι τέτοια θέματα μπορούν να επιλυθούν μόνο με υπεύθυνη δράση των πολιτών.

Έτσι λοιπόν ένα θέμα που είναι οικείο για την κοινότητα και τους μαθητές μπορεί να επιλεγεί από ολόκληρη την τάξη (ή διαφορετικά θέματα από διαφορετικές ομάδες μαθητών μέσα στην τάξη). Μέσω της μελέτης του συγκεκριμένου θέματος οι μαθητές μαθαίνουν δεξιότητες για τη διερεύνηση και άλλων θεμάτων. Μέσα από αυτό το θέμα δίνεται η δυνατότητα στους μαθητές να μελετήσουν έννοιες Φυσικών και Κοινωνικών επιστημών, να μάθουν να αναζητούν πληροφορίες μέσω βιβλιοθηκών, να απευθύνονται σε οργανισμούς και υπηρεσίες για να συλλέξουν

πληροφορίες, να συγκεντρώνουν και να αναλύουν δεδομένα Φυσικών Επιστημών και να χρησιμοποιούν τεχνικές κοινωνικής έρευνας για να καταστρώσουν ερωτηματολόγια και να τα επεξεργασθούν μέσα στη σχολική κοινότητα. Οι μαθητές κατόπιν αναλύουν τις πληροφορίες τους και προτείνουν λύσεις για το συγκεκριμένο θέμα. Ζυγίζουν τα υπέρ και τα κατά της κάθε ανάλυσης και υιοθετώντας μια στάση αποφασίζουν για έναν τρόπο δράσης. Τέλος οι μαθητές αποφασίζουν ποιες δράσεις θα λάβουν ως μεμονωμένα άτομα και ως μέλη μιας ομάδας και τέλος θα αξιολογήσουν τα αποτελέσματα. Μέσα από μια τέτοια μελέτη σε διάφορες βαθμίδες της εκπαίδευσης, δίνεται η δυνατότητα στους μαθητές να διδαχθούν πιο αποτελεσματικά έννοιες Φυσικών Επιστημών.

Αξιολόγηση προγραμμάτων

Σύμφωνα με τον (Aikenhead, 1988b) ενδιαφέροντα αποτελέσματα προκύπτουν από ένα εκτεταμένο ερευνητικό πρόγραμμα για τις επιπτώσεις της διδασκαλίας Επιστήμης-Τεχνολογίας-Κοινωνίας σε μαθητές ηλικίας 8-14 χρονών που συμμετείχαν στο πρόγραμμα Iowa Chautauqua project (Yager, Blunck, Binadja, McComas and Penick, 1988).

Η διδασκαλία θεμάτων Επιστήμης – Τεχνολογίας – Κοινωνίας φαίνεται να έχει μια σημαντική επίπτωση στους μαθητές με τους παρακάτω τρόπους:

– Οι μαθητές γίνονται πιο ικανοί στην εφαρμογή εννοιών της Επιστήμης σε νέες καταστάσεις (Varrella, 1992).

– Οι μαθητές είναι σε καλύτερη θέση να εφαρμόσουν τις πληροφορίες, να συσχετίσουν τις πληροφορίες και σε άλλες περιπτώσεις, να ενεργούν ανεξάρτητα, και να λαμβάνουν αποφάσεις (Yager, Blunck et al., 1988).

– Οι στάσεις ως προς τα μαθήματα Φυσικών Επιστημών, ως προς την αντιληπτή χρησιμότητα αυτών των μαθημάτων, καθώς και ως προς τις σταδιοδρομίες Επιστήμης ήταν πολύ πιο θετική (Banerjee και Yager, 1992).

– Οι μαθητές εμφανίζουν πολύ υψηλότερα ποσοστά δημιουργικότητας (Penick, 1992).

– Δεξιότητες σχετικά με την επιστημονική διαδικασία ήταν δύο φορές και τρεις φορές μεγαλύτερη σε τάξεις Επιστήμης- Τεχνολογίας –Κοινωνίας (Binadja, 1992).

– Παράλληλα η απόκτηση γνώσης του παραδοσιακού περιεχομένου των Φυσικών Επιστημών ήταν η ίδια ή σημαντικά καλύτερη για τους μαθητές των τάξεων Επιστήμης- Τεχνολογίας – Κοινωνίας (Meyers, 1992).

«Η συγκεκριμένη διδασκαλία μπορεί να είναι αποτελεσματική όπου οι παραδοσιακές προσεγγίσεις αποτυγχάνουν επειδή οι μαθητές ξεκινούν με τα δικά τους προβλήματα, συλλέγουν δικά τους δεδομένα, τα εφαρμόζουν στα δικά τους προβλήματά, και λαμβάνουν αποφάσεις σχετικά με τη δράση τους » (Binadja, 1992).

Συμπερασματικά θα λέγαμε ότι αυτή η διδασκαλία μπορεί να κάνει μια σημαντική διαφορά

– ως προς την κατανόηση από τους μαθητές του περιεχομένου της Επιστήμης – Τεχνολογίας – Κοινωνίας ,

– ως προς την ικανότητα ανάπτυξης κριτικής σκέψης, καθώς

– και ως προς τη στάση των μαθητών ως προς τις Φυσικές Επιστήμες.

Σε τέτοιες τάξεις οι μαθητές δείχνουν υψηλού βαθμού ενδιαφέρον και ενθουσιασμό.

Βέβαια η ευνοϊκή ανταπόκριση των μαθητών είναι η μια πλευρά του ζητήματος, η αντίδραση όμως των παραδοσιακών καθηγητών θετικών επιστημών είναι ένα τελείως άλλο ζήτημα. Σε αυτούς επικρατεί ο φόβος ότι στους μαθητές τους θα λείπουν γνώσεις ουσιώδεις ως προς το περιεχόμενο των Φυσικών Επιστημών, υποστηρίζοντας ότι ο χρόνος που δαπανάται σε τέτοια μαθήματα ελαχιστοποιεί τον χρόνο προετοιμασίας για το πανεπιστήμιο (Aikenhead, 1988).

Οι αντιλήψεις των εκπαιδευτικών της δευτεροβάθμιας εκπαίδευσης για προγράμματα Φυσικών Επιστημών – Τεχνολογίας – Κοινωνίας.

Σε έρευνα που σχεδιάσθηκε και πραγματοποιήθηκε το ακαδημαϊκό έτος 2010-2011(Τεστέμπαση, 2012) για να διερευνηθούν οι αντιλήψεις των εκπαιδευτικών Φυσικών επιστημών και Τεχνολογίας της Δευτεροβάθμιας εκπαίδευσης, για τη σχέση Φυσικών Επιστημών και Τεχνολογίας προέκυψαν τα ακόλουθα συμπεράσματα για τα προγράμματα Φυσικών Επιστημών – Τεχνολογίας – Κοινωνίας στην εκπαίδευση:

Η πλειοψηφία των εκπαιδευτικών άσχετα από το θεωρητικό τους υπόβαθρο θεωρεί απαραίτητη την εμπλοκή τέτοιων θεμάτων στην εκπαίδευση.

Αν και οι εκπαιδευτικοί δεν ήταν προετοιμασμένοι για να απαντήσουν με σαφήνεια για το πώς μπορεί να πραγματοποιηθεί μια τέτοια διδασκαλία στα σχολικά προγράμματα, εντούτοις η συζήτηση στο συγκεκριμένο ερώτημα ανέδειξε τα παρακάτω επιμέρους ζητήματα:

- **Τρόπος διδασκαλίας** όπου ακούστηκε η άποψη ότι μια τέτοια διδασκαλία δεν μπορεί να αντικαταστήσει ούτε τα μαθήματα Φυσικών Επιστημών ούτε την Τεχνολογία. Κάποιες ώρες στο σχολείο θα πρέπει να είναι αφιερωμένες και σε μια τέτοια προσέγγιση. Η διδασκαλία ενός τέτοιου προγράμματος που θα περιλαμβάνει θέματα Φυσικών Επιστημών – Τεχνολογίας – Κοινωνίας είναι ιδιαίτερα απαιτητική ως προς τον χρόνο και την οργάνωση της διδασκαλίας
- Απαιτείται **ωριμότητα από τους μαθητές** και θα πρέπει να διδάσκεται σε μεγαλύτερες ηλικιακές βαθμίδες.
- Μέσα από μια τέτοια προσέγγιση **κεντρίζεται το ενδιαφέρον των μαθητών**
- Αναγνώριση ότι υπάρχει **έλλειψη τέτοιων θεμάτων στα υπάρχοντα προγράμματα σπουδών** και τέλος
- Τι είδους **θεματολογία** θα έχει ένα τέτοιο πρόγραμμα**.**

Στην έρευνα συμμετείχαν έξι εκπαιδευτικοί δευτεροβάθμιας εκπαίδευσης που διδάσκουν τα μαθήματα Φυσικών Επιστημών και έξι εκπαιδευτικοί που διδάσκουν το μάθημα της Τεχνολογίας στο Γυμνάσιο ή στο Λύκειο. Το θεωρητικό υπόβαθρό τους είναι απόφοιτοι σχολών Φυσικών Επιστημών και Πολυτεχνικών Σχολών. Επιλέχθηκαν αυτές οι ειδικότητες λόγω της συνάφειας των σπουδών τους και του αντικειμένου διδασκαλίας τους με την παρούσα έρευνα.

Τα αποτελέσματα της παρούσης έρευνας δεν είναι γενικεύσιμα λόγω του μικρού και μη αντιπροσωπευτικού δείγματος.

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Διδάσκοντας το Μάθημα των Θρησκευτικών με τα Νέα Προγράμματα Σπουδών. Επισκόπηση Ενδεικτικών Προτάσεων για Εμπλουτισμό της Μορφής Διδασκαλίας του Μαθήματος με Αναφορά στις Νέες Τεχνολογίες

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Περίληψη

Μέσα από αυτή τη σύντομη επισκόπηση επιχειρείται ουσιαστικά μία παρουσίαση προτάσεων για εμπλουτισμό της μορφής διδασκαλίας του μαθήματος καθώς και δημιουργία νέων ρόλων και περιβαλλόντων μάθησης. Κάποιες από αυτές τις προτάσεις συνδέονται με την τεχνολογία όχι όμως καταναγκαστικά αλλά συμπληρωματικά και ενισχυτικά. Η επιλογή έγινε βάση της ευχρηστίας που τα χαρακτηρίζει αλλά και της προσωπικής ενασχόλησης εφόσον ο ίδιος ο εκπαιδευτικός είναι αυτός που επιλέγει τον τρόπο με τον οποίο θα αναπλαισιώσει τη διδασκαλία του για να μη πελαγοδρομεί.

Abstract

From this brief overview is essential a presentation of proposals for the enrichment of the teaching process of Religious Studies as well as creating new roles and learning environments. Some of these proposals are linked with technology not in an obligatory but complementary and reinforcing way. The choice became according to the usability that characterizes them and the personal engagement of the educator since he is the one who chooses the methods in order to reframe and synthesise his teaching and not to get tangled and lost.

Εισαγωγή

Ο σχεδιασμός κάθε μαθήματος στη σχολική τάξη απασχολεί έντονα τον εκπαιδευτικό. Σήμερα στη διάθεση του θεολόγου υπάρχει ένα πλήθος υλικού και τεχνικών που μπορεί να αξιοποιηθεί και να αναδιαμορφωθεί ανάλογα με τις ανάγκες και τα ενδιαφέροντα του ίδιου και των μαθητών.

Για μένα υπήρξε πραγματική πρόκληση στη σχολική τάξη ώστε να συνδυασθούν ο λόγος και οι θεωρίες της μάθησης με άλλες τεχνικές και τις Νέες Τεχνολογίες, όχι όμως για να αγνοηθεί η θεωρία και η κλασσική διδασκαλία, των οποίων η συνεισφορά είναι αδιαφισβήτητη και να γίνει απλά στροφή στον εμπειρισμό αλλά για να ανιχνευθούν δίοδοι με τις οποίες η θεωρία θα συνδεθεί με τη διδακτική πράξη (Hartley, 2010) ώστε να υπάρξει κριτικός στοχασμός (Ματσαγγούρας, 2006, Κατσαρού-Δεδούλη, 2008).

Άλλωστε και με τα νέα Προγράμματα Σπουδών προτείνεται η μάθηση να μετατρέπεται σε μία ενεργητική διεργασία οικοδόμησης γνώσης που εμπλέκει ενεργά και αλληλεπιδραστικά τους μαθητές.

Στις απαραίτητες προϋποθέσεις συγκαταλέγονται τα εξής:

- ✓ Η γνώση και η σκέψη να συγκροτούνται μέσα από την επαφή του ατόμου με τον κόσμο και το κοινωνικό πλαίσιο (Vygotsky)
- ✓ Να αναδεικνύονται και να υπηρετούνται οι θεμελιώδεις αρχές προσέγγισης του θρησκευτικού γνωστικού αντικειμένου
- ✓ Οι δραστηριότητες να επιλέγονται και να οργανώνονται αποκλειστικά από τον ίδιο τον εκπαιδευτικό

Κάθε νέο μέσο έτσι και τα ΠΣ δεν μπορούν να είναι από μόνα τους θαυματουργά αν δεν αναπλαισιωθούν μέσα στην εκπαιδευτική διαδικασία. Αυτό που χρειάζεται είναι ίσως να προσπαθήσουμε να αναπλαισιώσουμε τον τρόπο που διδάσκουμε και να ξανασκεφτούμε τι είναι σημαντικό και τι όχι και έτσι σταδιακά να αλλάξουμε τον τρόπο δουλειάς μας.

Εναλλακτικές προσεγγίσεις της διδασκαλίας του μαθήματος των θρησκευτικών

Μέσα από αυτή τη σύντομη επισκόπηση επιχειρείται ουσιαστικά μία παρουσίαση ενδεικτικών προτάσεων για εμπλουτισμό της μορφής διδασκαλίας του μαθήματος καθώς και δημιουργία νέων ρόλων και περιβαλλόντων μάθησης. Κάποιες από αυτές συνδέονται με την τεχνολογία, όχι όμως καταναγκαστικά αλλά συμπληρωματικά και ενισχυτικά. Η επιλογή έγινε βάση την ευχρηστία που τις χαρακτηρίζει αλλά και της προσωπικής ενασχόλησης εφόσον ο ίδιος ο εκπαιδευτικός είναι αυτός που τελικά επιλέγει τον τρόπο με τον οποίο θα αναπλαισιώσει τη διδασκαλία του για να μη πελαγοδρομεί.

Διδάσκοντας μέσω της Τέχνης. Μοτίβα έντεχνου συλλογισμού- (Artful Thinking)

Κάθε θρησκεία εκφράζει την αλήθεια της μέσα από τη γλώσσα της Τέχνης επικοινωνώντας τόσο με τη θρησκευτική κοινότητά της όσο και με τους έξω από αυτήν. Η οπτικοποίηση όμως αυτή μπορεί να γίνει τώρα κομιστής της ίδιας μάθησης και όχι απλά μία υφαρπαγή του βλέμματος.

Η τεχνική του **Artful Thinking** αναπτύχθηκε από το Harvard Project Zero (http://pzweb.harvard.edu/research/ArtThink.htm), ο οποίος ανέπτυξε ένα μοντέλο προσέγγισης για την ένταξη της Τέχνης στη διδασκαλία με τακτική χρήση εικαστικών και μουσικών έργων, οργανικά ενταγμένα στο πρόγραμμα σπουδών με σκοπό την ενίσχυση της σκέψης και τη μάθησης. Άλλωστε η μουσική και ο πολιτισμός δεν πρέπει να περιορίζονται σε συγκεκριμένες διδακτικές ώρες αλλά να διαπνέουν όλη την εκπαιδευτική διαδικασία και οι μαθητές να συνειδητοποιούν την αξία της τέχνης και την εμπλοκή της σε πολλές εκφάνσεις της ζωής. Ο Goodman παρουσιάζει τα «παραγωγικά εμπόδια» εφόσον η τέχνη δεν αποκαλύπτει το προφανές αλλά καλεί τον θεατή σε μία αναζήτηση, όπως παρουσιάζει το σχήμα 1.
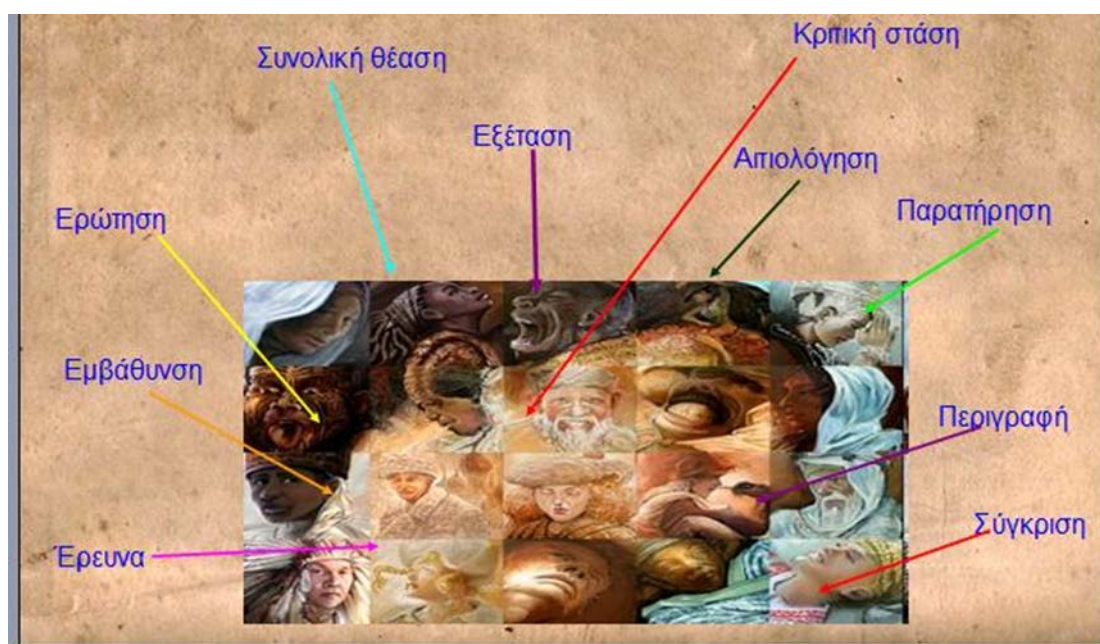
Σχήμα 1: Ο Αδάμ του Michelangelo δημιουργήθηκε από τον Lewis Lavoie.
Πηγή: http://www.psaxtiria.com/2009/03/blog-post_22.html#ixzz1cTqbddT0

Ο θεολόγος και όχι μόνο ζητάει από τους μαθητές να παρατηρήσουν ή να ακούσουν ένα έργο τέχνης (Α.Π Σπουδών Θρησκευτικών, 2011). Η τάξη χωρίζεται σε ομάδες και κάθε μία πρέπει να περιγράψει τις επιμέρους ενότητες. Σε άλλες εκδοχές οι μαθητές βάζουν τίτλους (Headlines) συλλαμβάνοντας την ουσία ή τον πυρήνα ενός θέματος ή εξετάζουν ένα έργο τέχνης από διαφορετικές γωνίες θέασης (Κοιτάζοντας ή ακούγοντας: Δέκα επί Δύο»).

Ο εσωτερικός διάλογος που αναπτύσσεται στον κάθε μαθητή βοηθάει να αναδυθούν όχι μόνο οι φανερές αλλά και οι κρυμμένες πλευρές και δημιουργεί προϋποθέσεις για σύνθεση σε ένα άλλο επίπεδο.

Η εμπλοκή θρησκευτικών και μουσικής γίνεται τόσο αβίαστα και φυσικά από τη στιγμή που ο ίδιος ο Χριστιανισμός είναι τόσο άρρηκτα συνδεδεμένος με τη Βυζαντινή και την παραδοσιακή μουσική. Η μουσική δεν αποτελεί απλά ένα εργαλείο για την υποβοήθηση της διδασκαλίας ή την ενίσχυση της έννοιας σε ένα άλλο γνωστικό αντικείμενο. Οι μαθητές μπορούν να φέρουν στην τάξη ένα αγαπημένο μουσικό

κομμάτι (σύνδεση με το θέμα του ΜτΘ που επεξεργάζονται), να συνθέτουν δική τους μουσική και να την παρουσιάζουν στην τάξη, να δημιουργούν ένα Hip-Hop (μουσική υπόκρουση Hip-Hop σύνθεση κειμένου), να ζωγραφίζουν τη μουσική που ακούν, να επεξεργαστούν και να εντοπίσουν στοιχεία (π. Ύμνος της Αγάπης) Κείμενο και ύμνος.

Λογισμικά εννοιολογικής χαρτογράφησης

Είναι βέβαιο ότι η συνεχής ανάπτυξη των Τεχνολογιών της Πληροφορίας και των Επικοινωνιών (ΤΠΕ) εισάγει συνεχώς καινούργιες εφαρμογές σε όλους τους τομείς της ζωής και φυσικά στην εκπαίδευση. Αν σε όλες τις εποχές γίνονται επαναστάσεις η μεγαλύτερη ίσως επανάσταση των τελευταίων ετών είναι αυτή που έχει να κάνει με την επικοινωνία και αφορά όλους μας. Στην αρχή εμφανίστηκε το e-mail και διευκόλυνε τη ζωή όλων μας, μετά ήρθε η επανάσταση του SMS από το κινητό, τα blog και οι ιστοσελίδες, που δίνουν ευκολότερη πρόσβαση στην επικοινωνία, τη δημοσιότητα και τον πλουραλισμό των ιδεών και των απόψεων.

Η επιλογή των διαδικτυακών εφαρμογών ακολούθησε προτάσεις από βραβευμένες ιστοσελίδες, όπως Web2: Cool Tools for Schools και Top 100 Tools for Learning. Οι διαδικτυακές εφαρμογές που παρουσιάζονται παρέχουν τη δυνατότητα σε εγγεγραμμένους χρήστες να δημοσιεύσουν τις δημιουργίες τους στην ιστοσελίδα της εφαρμογής, να τις αποθηκεύσουν ως αρχείο pdf, είτε να τις ενσωματώσουν σε ιστολόγιο / ιστοσελίδα. Όλες οι εφαρμογές απαιτούν την εγγραφή του χρήστη στην υπηρεσία αλλά παρέχεται η ευκολία σύνδεσης μέσω υπάρχοντος λογαριασμού σε κοινωνικά δίκτυα. Επίσης, στις περισσότερες εφαρμογές έχει αναπτυχθεί ηλεκτρονική κοινότητα χρηστών. Πολλοί χρήστες δημιουργούν με βάση θέματα της επικαιρότητας ή υπάρχουν διαθέσιμες σειρές.

Η δημιουργία και αξιοποίηση νοητικού ή εννοιολογικού χάρτη αποτελεί μία πολυμεσική εφαρμογή, η οποία μπορεί να βοηθήσει τους μαθητές να αποκτήσουν μια ολική αντίληψη για σύνθετες και πολύπλευρες έννοιες. Οι νοητικοί χάρτες είναι εικονογραφικοί τρόποι αποτύπωσης ιδεών στο χαρτί. Δημιουργήθηκαν στα τέλη του 1960 από τον Tony Buzan ως ένας τρόπος βοήθειας των μαθητών στο να κρατούν σημειώσεις, χρησιμοποιώντας μόνο λέξεις κλειδιά και εικόνες.

Βασικά αποτελούνται από μία κεντρική λέξη (έννοια) γύρω από την οποία συνδέονται διάφορες κύριες ιδέες και σχετικές έννοιες. Η διαφορά μεταξύ εννοιολογικής και νοητικής χαρτογράφησης, είναι ότι ένας νοητικός χάρτης έχει μόνο μια κύρια έννοια, ενώ ένας εννοιολογικός χάρτης μπορεί να έχει αρκετές. Έτσι ένας νοητικός χάρτης μπορεί να παρασταθεί ως ένα δέντρο, ενώ ένας χάρτης εννοιών αναπαρίσταται με μορφή δικτύων.

Λογισμικά που μπορούν να χρησιμοποιηθούν εύχρηστα για τη δημιουργία νοητικών χαρτών τα οποία παρέχονται online και δωρεάν στην απλή του έκδοση τους είναι το mapmyself, το https://bubbl.us/, το http://www.text2mindmap.com/, το http://www.mywebspiration.com/. Οι χάρτες αυτοί μπορούν βέβαια να γίνουν και χωρίς υπολογιστή κάτι που είναι όμως πολύ πιο χρονοβόρο. Οι χάρτες μπορούν να αποτελέσουν μέσο οργάνωσης και παρουσίασης του μαθήματος για το θεολόγο και να καλλιεργήσουν υψηλού επιπέδου γνωστικές ικανότητες (επίλυση προβλήματος, συνεργατική εργασία). Αποτελούν επίσης διαγνωστικό εργαλείο για την ανίχνευση πρότερων γνώσεων ενώ από έναν ελλιπή εννοιολογικό χάρτη μπορεί να ζητηθεί να συμπληρωθούν κενά (αναθεώρηση χάρτη, τελική οργάνωση και συμπλήρωση χάρτη, τελική αξιολόγηση), όπως φαίνεται σε ένα τυπικό αποτέλεσμα/ διάγραμμα στο Σχήμα 2.

Σχήμα 2: https://bubbl.us/
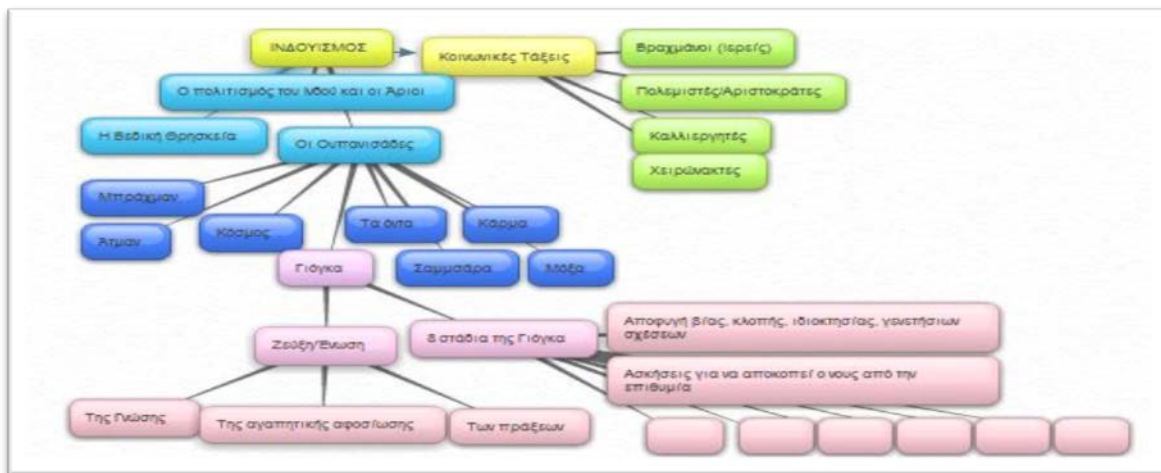
Με αυτόν τον τρόπο καλλιεργούνται μεταγνωστικές ικανότητες και επιτυγχάνεται ο έλεγχος μάθησης από τον ίδιο το μαθητή (Δημητρακοπούλου, 2001). Επίσης ένας χάρτης μπορεί να εμπλουτιστεί με πολυμεσικό υλικό, όπως παρουσιάζεται στο Σχήμα 3 και να αποτελέσει ένα ζωντανό πολυτροπικό κείμενο.

Σχήμα 3: http://popplet.com/
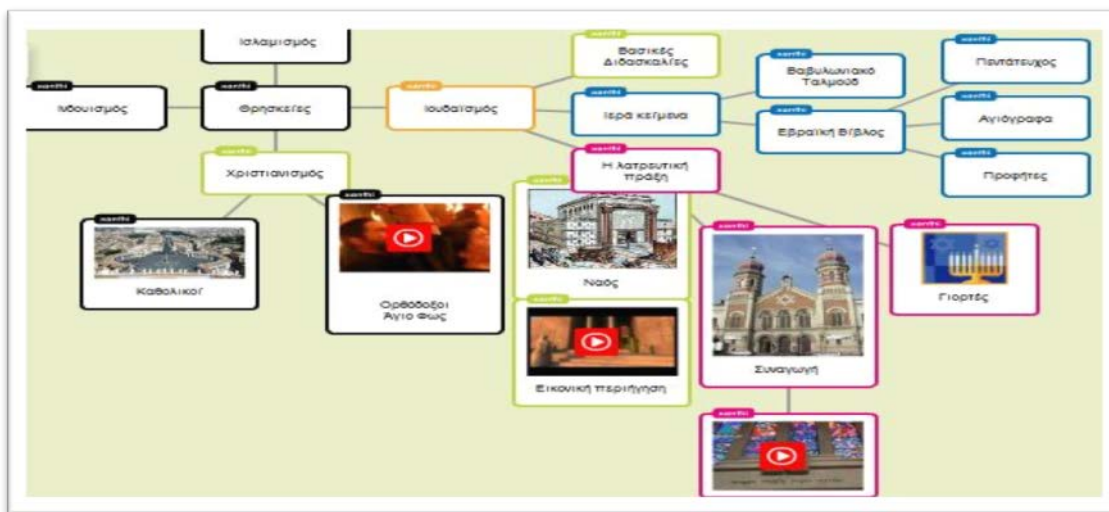
Ιστοεξερεύνηση

Η ιστοεξερεύνηση (WebQuest) αποτελεί ουσιαστικά ένα online εργαλείο στη διάθεση του εκπαιδευτικού. Οι περισσότερες ή όλες οι πληροφορίες προέρχονται από το διαδίκτυο, που έχει εντοπίσει ο εκπαιδευτικός. Οι μαθητές εστιάζουν στη χρήση της πληροφορίας και όχι στην απλή αναζήτησή της και παρακινούνται να καλλιεργήσουν την αναλυτική, συνθετική σκέψη και κριτική τους ικανότητα (Dodge, 1999, Brown Yoder, 1999). Το webquest (http://webquest.org/) συνδυάζει αποτελεσματικά την ομαδοσυνεργατικότητα και τη δραστηριότητα μέσω μιας κατευθυνόμενης διερεύνησης (Ματσαγγούρας, 2001) αφού οι μαθητές αναλαμβάνουν να λύσουν ένα πρόβλημα και αξιοποιούν το διαδίκτυο ως βασική πηγή πληροφορίας (Δέλλας & Κέκκερης 2008). Η μεθοδολογία μίας ιστοεξερεύμησης μπορεί να συμπεριληφθεί στα παρακάτω:
  ✓ Ο διδάσκων οργανώνει μια συλλογική εργασία
  ✓ Τα παιδιά περιηγούνται στις αρχικές σελίδες του Webquest, όπου βλέπουν τους στόχους, τη διαδικασία, τις πηγές και τις βασικές οδηγίες.
  ✓ Ο ρόλος του εκπαιδευτικού είναι κεντρικός και προσανατολιστικός (Βοσνιάδου, 2005).
  ✓ Μια αρκετά εύκολη και δωρεάν λύση για δημιουργία και φιλοξενία μιας ιστοεξερεύνησης μπορεί να είναι το Zunal WebQuest Maker.http://www.zunal.com/webquest.php?w=94888
Templates για να κατεβάσετε και να δημιουργήσετε άμεσα το δικό σας webquest.
Ένα Webquest (http://webquest.org/), όπως και το συγκεκριμένο, αποτελείται από κάποια κοινά δομικά στοιχεία. Το παρόν Webquest με τίτλο «Θρησκεύματα» κατασκευάστηκε μέσω του ισότοπου zunal (www.zunal.com/webquest.php?w=94888) και ο χρήστης μπορεί να ανεβάσει το υλικό του δωρεάν σε ένα ήδη διαμορφωμένο περιβάλλον, όπως παρουσιάζεται στο Σχήμα 4.

Σχήμα 4: Πλατφόρμα zunal.

Κατά την υλοποίηση ο διδάσκων οργανώνει μια συλλογική εργασία. Τα παιδιά περιηγούνται στις αρχικές σελίδες του Webquest, όπου βλέπουν τους στόχους, τη διαδικασία, τις πηγές και τις βασικές οδηγίες. Ο ρόλος του εκπαιδευτικού είναι κεντρικός και προσανατολιστικός (Βοσνιάδου, 2005).

Η ιστοεξερεύνηση μπορεί να αξιοποιηθεί ως έσο για την οργάνωση του περιεχομένου κάποιου μαθήματος, μέσο παρουσίασης υλικού στους μαθητές και εργαλείο αξιολόγησης. Αυτό που επιτυγχάνεται είναι αποτελεσματική μάθηση, καλλιέργεια μεταγνώσης και επίγνωση των διαδικασιών της μάθησης και καλλιέργεια κριτικής σκέψης.

Συμπεράσματα

Οι συγκεκριμένες δράσεις συμβάλουν στην προσωπική, κοινωνική, πολιτιστική ανάπτυξη των μαθητών καθώς επιχειρείται επικοινωνιακή προσέγγιση σε διάφορα γλωσσικά και πολιτισμικά περιβάλλοντα. Οι μαθητές τροποποιούν απόψεις και υπερβαίνουν στερεότυπα ενώ οδηγούνται και σε προσωπικές συνθέσεις με απώτερο στόχο την καλλιέργεια μεταγνωστικών δεξιοτήτων και την κατάστρωση σχέδιου δράσης για την επίλυση προβλημάτων (Kayashima, M., & Inaba, A. (2003),.

Η χρήση σύγχρονης τεχνολογίας (Η/Υ) ενισχύει τη φυσική περιέργεια του μαθητή, ενθαρρύνοντας την ανάπτυξη ερευνητικού πνεύματος ενώ παράλληλα εξοικειώνεται σε ένα καινούργιο τρόπο προσέγγισης (κειμένων, πηγών, τέχνης).

Κύριο μέλημα πρέπει να είναι πάντα η αξιοποίηση απόψεων ή διδασκαλιών της Εκκλησίας για εφαρμογή τους στη ζωή. Με βιωματικές και διαθεματικές προσεγγίσεις τα παιδιά οδηγούνται σε επεκτάσεις και αναπροσαρμογές απόψεων επειδή ακριβώς στόχος είναι η αξιολόγηση των ευρύτερων γνώσεων και όχι η στείρα απομνημόνευση.

Η Αγία Γραφή μέσα στη σχολική τάξη μπορεί να βρει πρόσφορο έδαφος όχι μόνο στο μάθημα των θρησκευτικών αλλά και στα υπόλοιπα μαθήματα. Οι θεολόγοι μπορούν να αξιοποιήσουν την Αγία Γραφή στη διδασκαλία τους, προκειμένου να προσελκύσουν το ενδιαφέρον και την προσοχή των μαθητών, μέσω της οπτικοποίησης της πληροφορίας και της βιωματικής προσέγγισης.

Η θεολογική γνώση συνδέεται αβίαστα με τη ζωή και καλλιεργείται η μεταγνώση με επίγνωση των διαδικασιών της μάθησης. Η διδακτική διαδικασία είναι αρχικά περισσότερο απαιτητική επιτυγχάνεται όμως μία σταδιακή μετατροπή της τάξης σε κοινότητα δημιουργικής μάθησης. Ο διδάσκων δεν ανοίγει απλώς την κάμαρα με τα μυστικά αλλά καλεί τον μαθητή να βρει μόνος του το δρόμο και να ξετυλίξει το μίτο της Αριάδνης για να εμπλακεί στην αναζήτηση μίας σύγχρονης ερμηνευτικής εκδοχής των κειμένων. Η μάθηση άλλωστε αποτελεί μία «*μόνιμη μεταβολή της συμπεριφοράς, που προκύπτει ως αποτέλεσμα εμπειρίας και μάθησης*» (Καψάλης, 2006).

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Η Μέθοδος Project στην Εκπαίδευση για την Αειφόρο Ανάπτυξη

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Περίληψη

Με την παρούσα εισήγηση παρουσιάζονται δυο πρότζεκτ που υλοποιήθηκαν στο Σχολείο Δεύτερης Ευκαιρίας Χανίων, στα παραρτήματα Κισσάμου και Κολυμβαρίου τη χρονιά 2010 και 2011.

Τα θέματα τους ήταν στην Κίσσαμο **«Φαράγγια και παραλίες της Κισσάμου»** και στο Κολυμβάρι **«Τα βότανα του τόπου μας».**

Στο μεν πρώτο θα παρουσιαστεί η προσέγγιση η οποία έγινε από την εκπαιδεύτρια της Πολιτιστικής και Αισθητικής Αγωγής, στο δεύτερο θα τονιστεί η συνεργασία των εκπαιδευομένων με τους φορείς της τοπικής κοινωνίας και η αξιοποίηση των πηγών γνώσης που υπάρχουν στην ευρύτερη περιοχή του σχολείου. Οι εκπαιδευόμενοι μέσα από την υλοποίηση τους είχαν τη δυνατότητα να κατανοήσουν την επίδραση που μπορεί να έχει η συμπεριφορά τους στα περιβαλλοντικά θέματα, να γνωρίσουν την έννοια και την αξία της Αειφόρου Ανάπτυξης και να εξασκηθούν σε τρόπους υλοποίησης δράσεων που να την προωθούν.

Και τα δύο θέματα επελέγησαν με γνώμονα αφενός την σύνδεση της εκπαιδευτικής διαδικασίας με πρακτικές που προάγουν την βιώσιμη ανάπτυξη, αλλά παράλληλα εισάγουν εκπαιδευτές και εκπαιδευόμενους σε μια παιδαγωγική πρακτική όπου μέσα από καταστάσεις της πραγματικής ζωής και της χρήσης Νέων Τεχνολογιών ακολουθούν μια νέα πορεία για την γνώση. Μια πορεία στην οποία η γνώση γίνεται κτήμα τους μέσα από ενεργητικές εκπαιδευτικές μεθόδους και ανταλλαγές απόψεων και εμπειριών. Μια πορεία στην οποία ο εκπαιδευόμενος και οι ανάγκες του γίνεται το κέντρο της εκπαιδευτικής διαδικασίας.

Abstract

With this specific introduction two projects which were materialized by the Second Chance School of Chania, are placed on screen, one by its Kissamos branch and the other by its Kolymbari branch between the years of 2010 and 2011.

The projects were constructed around a different basis as far as the subjects or topics concerned, the one in Kissamos being the "Gorges and beaches of Kissamos" theme and the other one in Kolymbari being the "Distinguishing local herbs".

As far as the first project is concerned it will be presented in a way pin-pointing the exact approach used by the cultural and aesthetics instructor whilst the second will define the importance of the collaboration between trainees and local authorities with all the above being wrapped up with the perspective of exploiting all form of knowledge acquired in and out and around the school area.

Trainees took full advantage of the project's materialization in being able to comprehend how one's attitude as a whole affects the environment as well as environmental issues, in getting to know the meaning and true value of sustainable development, and to practice in managing different actions in an attempt to promote the latter.

Both project subjects were chosen having in mind to focus on the existing attachment of educational procedure with methods that promote sustained growth, where simultaneously both instructors as well as trainees were submitted to an educational pedagogics experience, where true life situations and the using of new technologies have established alternatives routes to knowledge. A route in which knowledge becomes part of oneself through active educational methods and the interchange of aspects, notions, and empirical data. An ongoing procedure in which the trainee and his needs become the center of educational tactics.

Εκπαίδευση για την Αειφόρο Ανάπτυξη

Η ανάπτυξη μιας αειφορικής κοινωνίας πρέπει να θεωρηθεί ως μια συνεχής διαδικασία μμάθησης, που εξερευνά θέματα και διλήμματα όπου οι σωστές απαντήσεις και λύσεις μπορεί να αλλάξουν όσο η εμπειρία μας αυξάνεται. Οι μαθησιακοί στόχοι για την Εκπαίδευση για την Αειφόρο Ανάπτυξη πρέπει να περιλαμβάνουν γνώσεις, δεξιότητες, κατανόηση, συμπεριφορές και αξίες (UNECE, 2005). Η εκπαίδευση για την Αειφόρο Ανάπτυξη αναπτύσσεται ως μια ευρεία και ολοκληρωμένη έννοια η οποία περιλαμβάνει αλληλοσχετιζόμενα περιβαλλοντικά, οικονομικά και κοινωνικά θέματα.

Η εκπαίδευση για το Περιβάλλον και την Αειφορία ευδοκιμεί μέσα σε ένα Αειφόρο Σχολείο. Το Αειφόρο Σχολείο είναι αυτό που ενδιαφέρεται για το ίδιο, για τους άλλους, για το περιβάλλον του κοντινό και μακρινό, αναλαμβάνει Δράσεις, αναστοχάζεται και αυτοαξιολογείται.

Οι στόχοι του είναι:

• η μείωση του Οικολογικού του Αποτυπώματος με κατάλληλη χρήση πόρων,

• η βελτίωση της εκπαιδευτικής κοινότητας σε περιβαλλοντικό, κοινωνικό, οικονομικό και εκπαιδευτικό επίπεδο,

• η βελτίωση του συναισθηματικού και ψυχολογικού σχολικού κλίματος,

• η ανάπτυξη κοινών Δράσεων με την τοπική κοινωνία (Κούσουλας, Παπαζήση).

Κοινός τόπος της εκπαίδευσης για την Αειφόρο Ανάπτυξη και της Εκπαίδευσης Ενηλίκων αποτελεί το γεγονός ότι αρκετοί μελετητές στο χώρο της Εκπαίδευσης Ενηλίκων έχουν υπογραμμίσει το βασικό ρόλο που παίζουν οι εμπειρίες και τα βιώματα στη διεργασία της μάθησης.

Οι δομικές αλλαγές της κοινωνίας και οι σύγχρονες απαιτήσεις της εκπαίδευσης ενηλίκων προϋποθέτουν την εφαρμογή εκπαιδευτικών μεθόδων, συνεργατικής και διερευνητικής μάθησης, που στοχεύουν στην ανάπτυξη του κριτικού στοχασμού και συμβάλλουν στη δημιουργική διαχείριση των εμπειριών (Mezirow 2007, Κόκκος 2005).

Τα Σχολεία Δεύτερης Ευκαιρίας

Το Σχολείο Δεύτερης Ευκαιρίας είναι ένα σχολείο για ενήλικες που δεν έχουν ολοκληρώσει την υποχρεωτική εκπαίδευση (επίπεδο γυμνασίου). Έχει ως κύριο στόχο τον εγγραμματισμό των εκπαιδευομένων, θέτοντας τις ανάγκες τους στο επίκεντρο της εκπαιδευτικής διαδικασίας και αξιοποιώντας ταυτόχρονα όλη την προϋπάρχουσα γνώση και εμπειρία τους, ώστε να επιτευχθεί η επανένταξή τους στη μέση και ανώτερη εκπαίδευση και στην αγορά εργασίας. Τα ΣΔΕ απευθύνονται τόσο στον γενικό πληθυσμό, όσο και σε ειδικές πληθυσμιακές ομάδες με ιδιαίτερα χαρακτηριστικά, διότι μεταξύ των εκπαιδευομένων υπάρχουν μακροχρόνια άνεργοι, παλιννοστούντες οι οποίοι εγκατέλειψαν το σχολείο λόγω των γλωσσικών τους ιδιαιτεροτήτων, μετανάστες, άτομα με ειδικές ανάγκες, κακοποιημένες γυναίκες, αρχηγοί μονογονεϊκών οικογενειών (κυρίως γυναίκες) χωρίς να αποκλείεται η φοίτηση στα ΣΔΕ χρηστών ή πρώην χρηστών ουσιών ή αποφυλακισμένων.

Μία από τις καινοτομίες που εισάγονται στην εκπαίδευση ενηλίκων στα ΣΔΕ είναι η αναζήτηση εναλλακτικών τρόπων και δεξιοτήτων σχετικά με τους τρόπους αναζήτησης και άντλησης πληροφορίας, της επιστημονικής γνώσης και την εφαρμογή της στην καθημερινή ζωή (Cope, Kalantzis στο Αρχοντίδης και συνεργάτες, 2008). Λαμβάνοντας υπόψη τα ιδιαίτερα χαρακτηριστικά, όπως επίσης και την ηλικία των εκπαιδευομένων τα ΣΔΕ υιοθετούν διδακτικές μεθόδους με στόχο να οδηγήσουν τους εκπαιδευόμενους στην άμεση και ενεργό εμπλοκή τους στη διαδικασία της μάθησης.

Με δεδομένο ότι τα Σχολεία Δεύτερης Ευκαιρίας απευθύνονται κατά κύριο λόγο σε ένα πληθυσμό που έχει να αντιμετωπίσει κάποιες μορφές αποκλεισμού, έχει βιώσει σημαντικά εμπόδια στη μάθηση στο παρελθόν και αναζητά την ένταξη, άρα την αλλαγή, καταβάλλεται προσπάθεια να οδηγηθούν οι εκπαιδευόμενοι και οι εκπαιδευτές, μέσα από τη βιωματική μάθηση, σε έναν τρόπο σκέψης περισσότερο κριτικό.

Η εκπαιδευτική διαδικασία στα ΣΔΕ – όπως αυτή έχει σχεδιαστεί και υλοποιείται – έχει ως αποτέλεσμα την προσωπική ανάπτυξη των εκπαιδευομένων, την καλλιέργεια της αυτοπεποίθησης και ως εκ τούτου της υπευθυνότητας, στοιχεία που διακρίνουν τον ενήλικο από τον μη ενήλικο (Rogers A. 1999).

Η εκπαίδευση για το Περιβάλλον και την Αειφορία κατά γενική ομολογία διαμορφώνουν συνειδητοποιημένους και ενεργούς πολίτες απέναντι στο φυσικό, κοινωνικό και οικονομικό περιβάλλον με στόχο να διασφαλιστεί η ποιότητα ζωής και η οικολογική ισορροπία σε μια βιώσιμη κοινωνία. Σε αυτή την κατεύθυνση στοχεύει και η εκπαιδευτική διαδικασία στα Σχολεία Δεύτερης Ευκαιρίας.

Η μέθοδος Πρότζεκτ

Η μέθοδος Project είναι μια εκπαιδευτική διαδικασία που οδηγεί στη μόρφωση μέσω μιας συγκεκριμένης διαδικασίας μάθησης. Είναι ένας τρόπος ομαδικής διδασκαλίας στην οποία συμμετέχουν αποφασιστικά όλοι, ενώ η ίδια η διδασκαλία διαμορφώνεται και διεξάγεται από όλους όσους συμμετέχουν. Είναι μια ευέλικτη διαδικασία μάθησης, που αναφέρεται στο σχεδιασμό και στην ολοκλήρωση ενός συγκεκριμένου έργου (Frey 1985).

Συνδέεται με τη βιωματική επικοινωνιακή διδασκαλία. Βιωματική διότι αφορά σε διδασκαλίες που ξεκινούν από βιώματα μαθητών και με τη λέξη βιώματα εννοούμε ζητήματα που απασχολούν τον μαθητή και συνδέονται με τη ζωή του και με την κοινωνία στην οποία ανήκει, με λίγα λόγια πρόκειται για καταστάσεις που ενδιαφέρουν το μαθητή. Επικοινωνιακή διότι η μετάλλαξη των εμπειριών σε διδακτικές διεργασίες που οδηγούν στη γνώση, γίνεται στο πλαίσιο μιας επικοινωνιακής σχέσης που αναπτύσσεται στο εσωτερικό μιας ομάδας η οποία συγκροτείται από τον εκπαιδευτικό και τους μαθητές.

Η λέξη Project προέρχεται από τη λατινική λέξη projicio που σημαίνει :σχεδιάζω, σκοπεύω, βάζω κάτι στο μυαλό μου. Ο Αγγλικός όρος είναι Project που σημαίνει προβολή, σχέδιο , πλάνο. Από ψυχολογική άποψη σημαίνει: προβάλλω τον εαυτό μου, τις ανάγκες και τα ενδιαφέροντα μου προς τα έξω. Από αντικειμενική άποψη σημαίνει ότι η προβολή μου συμπυκνώνεται σε ένα έργο.

Οι αρχές της μεθόδου είναι:

1. **Η αρχή της σκοπιμότητας**. Το αντικείμενο του Project πρέπει να ενδιαφέρει τους μαθητές και το Project οφείλει να έχει κάποιο σκοπό. Ο σκοπός πρέπει να ενθουσιάζει τους μαθητές, διαφορετικά δύσκολα θα εργαστούν για την ολοκλήρωση του.

2. **Η αρχή της χρησιμότητας.** Το Project πρέπει να έχει αξία, να είναι χρήσιμο στους μαθητές και στην κοινωνία, τόσο οι μαθητές όσο και η κοινωνία πρέπει να ωφελούνται από αυτό.

3. **Η αρχή της ελευθερίας.** Οι μαθητές πρέπει να επιλέξουν ελεύθερα το θέμα και να ολοκληρώσουν την εργασία σύμφωνα με τη θέληση, την επιθυμία, τα ενδιαφέροντα, τις απόψεις και τις ικανότητες τους. Ο εκπαιδευτικός δίνει μόνο κατευθυντήριες γραμμές.

4. **Η αρχή της πραγματικότητας/ βιωματικής προσέγγισης της μάθησης.** Το Project πρέπει να είναι ρεαλιστικό, να έχει σχέση με τα βιώματα και την πραγματική ζωή των μαθητών και της κοινωνίας. Ιδεατά προβλήματα δεν θα πρέπει να συνιστούν θέμα ενός Project.

5. **Η αρχή του σχεδιασμού και της διερευνητικής προσέγγισης της μάθησης**. Οι μαθητές σχεδιάζουν εκ των προτέρων το Project. Συμμετέχουν ενεργά στις δραστηριότητες και ο κάθε μαθητής διαμορφώνει την προσωπική του πορεία για την κατάκτηση της γνώσης. Το Project βασίζεται στις παιδαγωγικές αρχές **<μαθαίνω πώς να μαθαίνω>** και **<μαθαίνω πράττοντας >.** Οι μαθητές βρίσκουν λύσεις για το: **πώς; πότε; Τι; που; γιατί;** Έτσι το Project αναπτύσσει την ικανότητα επίλυσης προβλημάτων και την ικανότητα του εκ των προτέρων σχεδιασμού για τη διεξαγωγή του.

6. **Η αρχή της διαθεματικής προσέγγισης της μάθησης.** Η γνώση κατακτάται μέσω θεμάτων και όχι γνωστικών αντικειμένων. Ο σχεδιασμός πραγματοποιείται χωρίς να παίρνει υπόψη τις διαχωριστικές γραμμές των μαθημάτων.

7. **Η αρχή της ομαδικής συνεργασίας των μαθητών.** Οι μαθητές συνεργάζονται σε μικρές ομάδες, συζητούν, συμφωνούν, αποφασίζουν, εκτελούν τις εργασίες και προσπαθούν να πετύχουν τους κοινούς στόχους.

8. Η αρχή της διεπιστημονικής συνεργασίας των εκπαιδευτικών. Οι εκπαιδευτικοί συνεργάζονται, συμμετέχοντας σε διεπιστημονικές ομάδες διδασκαλίας και μάθησης.

Κατά τη διάρκεια διεξαγωγής του σχεδίου, τα άτομα συλλέγουν, συνδέουν, συσχετίζουν, αξιολογούν, γενικεύουν και εφαρμόζουν πληροφορίες και γνώσεις τόσο μέσα στο χώρο του σχολείου όσο και έξω από τη σχολική μονάδα (Τερεζάκη, 2009).

Για την σωστή χρήση της μεθόδου απαιτείται η ενεργοποίηση όλων των «ταλέντων» των υποκειμένων μιας τάξης, αναφέρει η Χοντολίδου (2002) που θεωρεί ότι η μέθοδος λειτουργεί ως μικρογραφία της κοινωνίας αναδεικνύοντας «…αυτούς που γράφουν και μιλούν ορθά, αλλά και αυτούς που εκφράζονται αμήχανα ή και ποιητικά, αυτούς που είναι οργανωμένοι αλλά και τους αφηρημένους ονειροπόλους, τους χειρωνακτικά ικανούς αλλά και τους λιγότερο ικανούς, τους κοινωνικούς αλλά και τους στοχαστικούς μαθητές, τους έξυπνους αλλά και τους λιγότερο έξυπνους, τους επιδέξιους αλλά και τους αδέξιους…».

Φαράγγια και Παραλίες της Κισσάμου

Υλοποιήθηκε στο παράρτημα Κισσάμου του Σχολείου Δεύτερης Ευκαιρίας Χανίων το σχολικό έτος 2011-1012. Στη παρούσα εργασία παρουσιάζεται η προσέγγιση που έγινε στο πρότζεκτ από την εκπαιδεύτρια της Αισθητικής-Πολιτισμικής Αγωγής, η οποία αξιοποίησε τα ενδιαφέροντα και τις γνώσεις των εκπαιδευομένων και συνέδεσε την διάσταση της Αειφόρου Ανάπτυξης με τη παράδοση και τον σεβασμό στα μνημεία της φύσης.

Σε αυτό το Σχέδιο Εργασίας έγινε προσπάθεια να καταγραφούν και να περιγραφούν τα φαράγγια και οι παραλίες της Κισσάμου. Μέσα από τις δράσεις και τις δραστηριότητες που σχεδιάστηκαν αναζητήθηκε η καλλιέργεια της κριτικής και δημιουργικής σκέψης των μαθητών, προάγοντας τα προσωπικά βιώματα, τις εμπειρίες και τις γνώσεις τους.

Κύριος σκοπός είναι η απόκτηση μιας βαθύτερης γνώσης της φυσιογνωμίας του τόπου για την κατανόηση της πολιτισμικής διάστασης του, προκειμένου οι εκπαιδευόμενοι να εμβαθύνουν στην ταυτότητά τους. Ουσιαστικά μέσα από την προβολή της λαϊκής-τοπικής παράδοσης της Κισάμου (μουσική, χορός, μύθοι και θρύλοι της υπό εξέταση περιοχής) επιδιώκεται να αναδειχθούν τα διαχρονικά στοιχεία της κοινωνικής ζωής, που είναι χαρακτηριστικά της εδραίωσης του αισθητικού και πολιτισμικού στοιχείου και γενικότερα να προβληθεί η κοινότητα.

Συγκεκριμένα συγκεντρώθηκε το υλικό που αφορά μαντινάδες, μύθους και θρύλους για τα φαράγγια και ριζίτικα για την Κίσσαμο γενικότερα. Έπειτα επεξεργάστηκε βιωματικά. Ειδικότεροι στόχοι είναι:

1. Οι εκπαιδευόμενοι να αναπτύξουν και να αξιοποιούν τη μουσική-ρυθμική νοημοσύνη, μέσα από τη βιωματική πρόσληψη της μουσικής του τόπου τους.

2. Να αποκτήσουν μέσα από την εικόνα την οπτική/νοημοσύνη του χώρου αλλά και την φυσιογνωστική/νατουραλιστική νοημοσύνη.

3. Από τις μουσικοχορευτικές διαδικασίες έχουν τη δυνατότητα να αναπτύξουν επιπλέον και τη σωματική/κιναισθητική νοημοσύνη.

4. Να συνειδητοποιήσουν, εν κατακλείδι, μέσα από τις παραπάνω δραστηριότητες την άρρηκτη σχέση τους με τον πολιτισμό τους (υπαρξιακή νοημοσύνη) και να άρουν με αυτόν τον τρόπο τις ελλείψεις τους.

Σε επίπεδο γνώσεων:

1. Να συσχετίσουν το τοπίο με τις παραδόσεις και τα έθιμά τους.

2. Να κατανοήσουν και να συνειδητοποιήσουν την αλληλένδετη σχέση λόγου και μουσικής και λόγου και κίνησης. Να αντιληφθούν την έννοια των Καλών Τεχνών και να καταρτιστούν γενικότερα σε όποια θεματολογία της τέχνης προσεγγίζεται κάθε φορά.

Σε επίπεδο ικανοτήτων-δεξιοτήτων:

Ανάπτυξη των κοινωνικών δεξιοτήτων και των μαθησιακών δεξιοτήτων (να ψυχαγωγηθούν, να συνεργαστούν και να μάθουν ότι το σχολείο είναι ένα ανοιχτό παράθυρο στην κοινωνία).

Σε επίπεδο στάσεων-αξιών:

Ευαισθητοποίηση μέσω του ευρύτερου πεδίου των τεχνών για την αντιμετώπιση φαινομένων κοινωνικής παθογένειας. Κατ' επέκταση μετασχηματισμός πιθανών λανθασμένων αντιλήψεων και στερεοτύπων.

Οι μαθητές είχαν τη δυνατότητα όχι μόνο να μάθουν, αλλά και να διδάξουν μέσα από την εμπειρία τους. Το σημαντικό της εκπαιδευτικής διαδικασίας είναι ότι κάποιοι μαθητές όταν ρωτήθηκαν τι τους άρεσε από το μάθημα αυθόρμητα είπαν: «Ελάτε να πούμε μία μαντινάδα ο καθένας μας», και η παρέα άρχισε. Εκείνη τη στιγμή έδειξαν την περηφάνια και τη σιγουριά του χαρακτήρα τους, αποδεικνύοντας μου ότι η πολιτισμική προσέγγιση του θέματος είναι πάντοτε ο καλύτερος τρόπος να γνωρίσεις τον εαυτό σου. Τους άρεσε επίσης και η ιστορία του κρητικού κισσαμίτικου συρτού που αφορά τις μελωδίες του ανάλογα με τα τοπωνύμια της Κισσάμου, όπου όπως σημείωσαν χάρηκαν που την γνώρισαν πιο αναλυτικά.

Μερικές από τις μαντινάδες και τα τραγούδια που παρουσιάστηκαν:

Μαντινάδες:
➢ Στου φαραγγιού τη μια μεριά στέκω και του φωνάζω και τ' όνομα πολλές φορές γροικώ κι αναστενάζω...
➢ Ούλοι οι τόποι ειν' όμορφοι κάθε γωνιά τσι Κρήτης μα 'ναι μεγάλη υπόθεση να είσαι Κισσαμίτης.
➢ Κρήτη με τα ψηλά βουνά, τα ξακουστά φαράγγια τσι ρίμες τα ριζίτικα και τα μαντιναδάκια.
➢ Γραμβούσα μαύρα να ντυθείς άμα ποθάνει ο Τζέκας, αυτός απού σε ψάρευγε κι αυτός απού σε γλέντα.
➢ Ήθελα να μουν καστανιά, στο μέσα Σηρικάρι. Και εσύ νερό στις ρίζες μου, δεν ήθελα άλλη χάρη.
➢ Φαράγγι πο τη μια μεριά φαράγγι πο την άλλη….αέρας κισσαμίτικος με δροσερεύγει πάλι

Ριζίτικο
Πάρσιμο της Γραμπούσας
Τρεις αντριωμένοι πορπατούν στην Κρήτη την καημένη
Σαν αξαδέρφοι κι αδερφοί σα φίλοι μπιστεμένοι
Σα να σαν από μια κοιλιά να φάγαν ένα γάλα
Έτσι δ αγαπηθήκανε περίσσια και μεγάλα
Τον έναν λέγαν Ξέπαπα τον άλλο Μπουζομάρκο
και ο καημένος Παναγής απού φυλά το κάστρο
μ αυτοί αποφασίσασι Γραμπούσα να πατήσουν
κι απ τση Γραμπούσας την Τουρκιά ένα να μην αφήσουν
ο Μπούζος πρωτανέβηκε απάνω στο μπεντένι
κι εφτά νομάτους έκοψε μόνο με το μαχαίρι
μα ελάστε απάνω μπρε παιδιά στις Τούρκους να γιουργιάρω
γιατί δε βγαίνω γω πο πα όξω και ν αποθάνω
πρώτος άπου σκοτώθηκε ήταν ο Μπουζομάρκος
κι ύστερις σκοτωθήκανε οι τρείς καπεταναίοι
παιδιά κι ήντα νε οι μπαλωτές, όθεν τον άγιο Δίκιο
κατ από τον Φτερόλακκο μέσα σε μια χαράδρα
πόλεμο κάνει ο Κουμής με Τούρκους γενιτσάρους
με τσουρμουτζήδες τα σκυλιά και πριχού να βραδιάσει
κιανείς τους δεν απόμεινε

Το δεύτερο μέρος του θέματος, οι παραλίες, εξετάστηκαν με κύριο σημείο αναφοράς το Νικολή Τζέγκα.
Παρακάτω παρουσιάζεται ένα μικρό δείγμα του υλικού που συγκέντρωσαν και επεξεργάστηκαν οι ομάδες των εκπαιδευομένων και αναφέρεται στον Ν. Τζέγκα.

Εικόνα 1: Ο Τσεγκονικολής με την Μαρία του και την βάρκα του (τον ΚΥΡΙΑΚΟ).

«ΣΑΡΑΝΤΑ ΜΕΤΡΑ ΘΑΛΑΣΣΑ ΠΑΛΕΥΩ ΜΕΣ ΣΤΑ ΒΑΘΗ
ΤΟ ΜΟΝΟ ΠΟΥ ΑΠΕΚΤΗΣΑ ΗΝΤΟΝ ΚΑΗΜΟΥΣ ΚΑΙ ΠΑΘΗ»

Ο πολυτάλαντος αυτός άνθρωπος ποτέ δεν άφησε το επάγγελμα του. Ίσως γιατί του έδινε ζωή, ίσως γιατί ένοιωθε ένα με το πέλαγος, ίσως γιατί μόνο έτσι θα μπορούσε να εμπνευστεί τις μελωδίες και τις μαντινάδες. Ίσως γιατί είχε προφητεύσει την πορεία της ζωής του. Μιας ζωής γεμάτης από αλμύρα, ιδρώτα, τραγούδια και γλέντια. Μιας ζωής πάνω στον «Κυριάκο» στο καΐκι του που αρμένιζε στο κρητικό πέλαγος. Το 1966, την αποφράδα εκείνη περίοδο για την Κρήτη με το ναυάγιο του πλοίου «Ηράκλειο», στον κόλπο της Κισσάμου άλλος ένας χαμός σφράγισε τις μνήμες του κόσμου. Ο Νικολής Τσέγκας πνίγηκε στον τόπο που αγάπησε πιο πολύ από κάθε τι σε αυτό τον κόσμο. Η γυναίκα του η Μαρία δεν μπόρεσε να τον κρατήσει πάνω στο καΐκι από την τρομερή θαλασσοταραχή. Μόνη της, αβοήθητη κατάφερε να βγει στην στεριά, μα ο Τσέγκας έμεινε στο πέλαγος για πάντα. Εκεί, στην Γραμπούσα, στο κάστρο ακόμα και σήμερα ακούγονται τα τραγούδια του Τσέγκα.

Εικόνα 2

Σήμερα στο νησί αυτό, ο επισκέπτης κάθεται και κοιτάει την αναμνηστική πλάκα που ύψωσε ο Σύλλογος Προβολής Κισσάμου «Η Γραμβούσα» και αναρωτιέται, πόσο σημαντικός θα ήταν άραγε αυτός ο άνθρωπος ώστε να δέσει την παρουσία του με έναν ολόκληρο τόπο. Και όμως, ο Τσέγκας έμεινε στην ιστορία και στις καρδιές όλων όσων τον γνώρισαν αλλά και των μετέπειτα γενεών. Ένας αυθεντικός άνθρωπος, μια κρητική παρουσία και ψυχή.

Τα Βότανα της Κρήτης

Η Κρήτη θεωρείται ως μία από τις πλουσιότερες περιοχές του κόσμου σε ενδημικά φυτά με βάση πάντα τη γεωγραφική της έκταση. Για να αντιληφθούμε το μέγεθος του πλούτου αυτού θα πρέπει να αναφέρουμε ότι άλλες περιοχές πολλαπλάσιας έκτασης από την Κρήτη έχουν κατά πολύ μικρότερο αριθμό ενδημικών. Από τα φυτά της Κρήτης, 276 έχουν χαρακτηρισθεί ως απειλούμενα με εξαφάνιση, τα περισσότερα από τα οποία είναι ενδημικά του νησιού μας. Βέβαια, η απώλεια ενός ενδημικού είδους από την Κρήτη σημαίνει και απώλεια του από τον κόσμο ολόκληρο και αυτό μεγαλώνει τις ευθύνες μας απέναντι σε όλη την ανθρωπότητα, αφού οι παραλείψεις ή τα έργα μας είναι που θα έχουν προκαλέσει την καταστροφή.

Το θέμα της προστασίας του περιβάλλοντος και της ανάδειξης και αξιοποίησης των τοπικών προϊόντων είναι ιδιαίτερα επίκαιρο. Μέσα από το προτζεκτ που παρουσιάζεται υλοποιήθηκε η

συνεργασία του Σχολείου Δεύτερης Ευκαιρίας Κολυμβαρίου με την Ορθόδοξη Ακαδημία Κρήτης μέσα από μια βιωματική-επικοινωνιακή διάσταση τόσο για τους εκπαιδευόμενους όσο και για τους ίδιους του εκπαιδευτές, μέσα από διαδικασίες ουσιαστικής εμπλοκής και επικοινωνίας στην πράξη.

Η Ορθόδοξη Ακαδημία Κρήτης κάθε χρόνο διοργανώνει Διεθνές Σεμινάριο Γαστρονομίας και Βοτανικής – Πρόγραμμα γνωριμίας με την Κρητική γαστρονομία και βοτανική. Για το έτος 2011 το πρόγραμμα παρακολούθησαν οι φοιτητές του τμήματος επιστημονικής γαστρονομίας του Πανεπιστημίου της Ιταλίας Universita degli Studi di Scienze Gastronomiche.

Τον Νοέμβριο του 2011 σε συνεργασία με τους επιστημονικούς συνεργάτες και την Διοίκηση της Ορθόδοξης Ακαδημίας το Σχολείο Δεύτερης Ευκαιρίας Χανίων, παράρτημα Κολυμβαρίου αποφάσισε να συμμετέχει στο εν λόγω Διεθνές Σεμινάριο. Η σημασία της ανάδειξης της τοπικής κουζίνας και των ιδιαίτερων χαρακτηριστικών της θεωρείται ο καλύτερος τρόπος για την διάδοση και την διατήρηση της παραδοσιακής διατροφής.

Σκοπός της δράσης ήταν μέσα από μια βιωματική-επικοινωνιακή διάσταση να έρθουν σε επαφή οι εκπαιδευόμενοι με τον τρόπο οργάνωσης ενός διεθνούς συνεδρίου, να συνεργαστούν με τους συντελεστές της διοργάνωσης και να αξιοποιήσουν τις γνώσεις και τις εμπειρίες τους, μεταδίδοντας τις ουσιαστικά στους συμμετέχοντες. Για την πραγμάτωση αυτών των στόχων επελέγησαν δύο τρόποι.

Ο πρώτος τρόπος αφορούσε την αναζήτηση πληροφοριών και τη παρουσίαση τους στους συμμετέχοντες στο Σεμινάριο. Για την οργάνωση και την παρουσίαση του υλικού που συγκέντρωσαν οι εκπαιδευόμενοι αξιοποιήθηκαν οι δυνατότητες που δίνει το διαδίκτυο και τα εργαλεία ελεύθερου λογισμικού (Παυλάκης, 2012). Το υλικό συγκεντρώθηκε από βιβλία, ιστορίες που συγκέντρωσαν οι εκπαιδευόμενοι στα χωριά τους, από τα προσωπικά βιώματα και τις συνήθειες τους με την καθοδήγηση και την σημαντική βοήθεια των εκπαιδευτών τους. Πολύτιμη αποδείχτηκε και η βοήθεια που μας παρείχε με την παρουσία και τις γνώσεις της η μεταδιδακτορική ερευνήτρια του Μεσογειακού Αγρονομικού Ινστιτούτου Χανίων, η οποία συνέβαλε ουσιαστικά και στην καταγραφή και παρουσίαση του υλικού που είχε συγκεντρωθεί.

Σχεδιάστηκε μια παρουσίαση σε powerpoint στην οποία υπήρχαν φωτογραφίες από τα ενδημικά μας φυτά που η παρουσία τους ομορφαίνει το Κρητικό τοπίο, βοηθάει στις αρρώστιες μας και δίνει άρωμα στη ζωή μας. Ο δίκταμος, το φλισκούνι, το φασκόμηλο μέσα από φωτογραφίες, ιστορικά στοιχεία, οδηγίες για την καλλιέργεια και την χρήση τους συγκέντρωσαν το ενδιαφέρον των παρευρισκομένων, οι οποίοι αναγνώρισαν συγγένειες με φυτά της δικής τους πατρίδας και μοιράστηκαν με τους μαθητές μας ιστορίες και εμπειρίες.

ΣΧΟΛΕΙΟ ΔΕΥΤΕΡΗΣ ΕΥΚΑΙΡΙΑΣ ΧΑΝΙΩΝ
ΠΑΡΑΡΤΗΜΑ ΚΟΛΥΜΒΑΡΙΟΥ

ΣΥΜΜΕΤΟΧΗ ΣΤΟ ΣΕΜΙΝΑΡΙΟ ΓΑΣΤΡΟΝΟΜΙΑΣ ΚΑΙ

ΒΟΤΑΝΙΚΗΣ ΤΗΣ ΟΡΘΟΔΟΞΗΣ ΑΚΑΔΗΜΙΑΣ ΚΡΗΤΗΣ

ΚΟΛΥΜΒΑΡΙ, 30 ΜΑΡΤΙΟΥ 2011
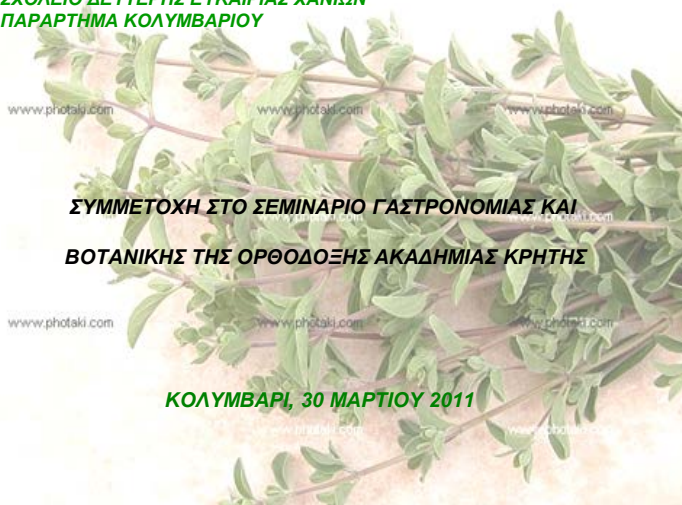
Εικόνα 3

Ο δεύτερος τρόπος ήταν η οργάνωση στο χώρο της Ορθόδοξης Ακαδημίας Κρήτης ενός εργαστηρίου παρασκευής αφεψημάτων με τη χρήση των παραδοσιακών βοτάνων της περιοχής. Στο εν λόγω εργαστήριο οι εκπαιδευόμενοι του ΣΔΕ με τους εκπαιδευτές τους έκαναν επίδειξη παρασκευής στους Ιταλούς φοιτητές οι οποίοι παρακολουθούσαν το Σεμινάριο.

Οι στόχοι του πρότζεκτ ήταν:

➢ Να μοιραστούν οι εκπαιδευόμενοι τις γνώσεις τους για το συγκεκριμένο θέμα και να αποκτήσουν γνώσεις στα θέματα της βιοποικιλότητας, να αξιολογήσουν την χρησιμότητα της και να καταλάβουν την ανάγκη της προστασίας και ανάδειξης των τοπικών προϊόντων.

➢ Να αξιοποιήσουν τις γνώσεις τους πάνω στην συλλογή και παρασκευή αφεψημάτων από τοπικά προϊόντα.

➢ Να συνειδητοποιήσουν την αξία των βοτάνων της Κρήτης (ενδημικών και μη) και στην ανάδειξη τους σε βασικό συστατικό της Κρητικής διατροφής.

➢ Να συνειδητοποιήσουν την ευθύνη τους για την προστασία των ειδών και την αειφόρο διαχείριση τους.

➢ Να περιγράψουν τις ανθρώπινες παρεμβάσεις που οδηγούν ώστε κάποια είδη να γίνουν απειλούμενα.

➢ Να αναζητήσουν πληροφορίες για το θέμα έξω από το χώρο του σχολείου, στην κοινότητα, και να εξασκηθούν στη συλλογή και καταγραφή αυτών

➢ Να αναπτύξουν δεξιότητες συνεργασίας, τόσο μεταξύ τους όσο και με τους συντελεστές του Σεμιναρίου.

➢ Να καλλιεργήσουν θετική στάση απέναντι στην ομαδική λήψη αποφάσεων και στην παραγωγή κοινωνικού έργου, να αναπτύξουν οικολογική συνείδηση και να συμβάλλουν στην καλύτερη ποιότητα ζωής.

➢ Να έχουν ενεργή συμμετοχή στο σχεδιασμό των επιμέρους δράσεων και στη λήψη αποφάσεων

➢ Να κατανοήσουν την έννοια της σύμπραξης με την τοπική κοινωνία για την επίτευξη ενός στόχου

➢ Να έρθει σε επαφή το σχολείο μας με ένα Εκπαιδευτικό ίδρυμα - Ινστιτούτο το οποίο δραστηριοποιείται και προσφέρει υψηλού επιπέδου εκπαιδευτικές δράσεις (Διεθνή Συνέδρια - Ημερίδες - Σεμινάρια).

➢ Να έρθουν σε επαφή οι εκπαιδευόμενοι με τους συμμετέχοντες στο συνέδριο και να ανταλλάξουν μαζί τους απόψεις και εμπειρίες.

➢ Να ενημερωθούν για τις δράσεις και την προσφορά της Ορθόδοξης Ακαδημίας Κρήτης

Επίλογος

Φιλοσοφία και στα δύο η διατήρηση και ανάδειξη των προϊόντων και της φυσικής ομορφιάς της περιοχής με τρόπο φιλικό προς το περιβάλλον και τον άνθρωπο με γνώμονα την κρητική παράδοση και ιστορία του τόπου.

Μέσα από την υλοποίηση και παρουσίαση συνειδητοποιούν οι εκπαιδευόμενοι την ευθύνη τους για την προστασία των ειδών και την αειφόρο διαχείριση τους αλλά και τους κινδύνους που αναδύονται από τις ανθρώπινες παρεμβάσεις που οδηγούν ώστε κάποια είδη να γίνουν απειλούμενα.

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Κριτική Προσέγγιση του Μοντέλου των Εκπαιδευτικών Μεταρρυθμίσεων και του Ρόλου της Ένταξης των Νέων Τεχνολογιών στην Εκπαιδευτική Διαδικασία

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Περίληψη

Στο άρθρο γίνεται μια προσπάθεια κριτικής διερεύνησης ζητημάτων, σχετικά με τη διαδικασία ένταξης των νέων τεχνολογιών στην εκπαιδευτική πραγματικότητα, ως μέρος ευρύτερων εκπαιδευτικών μεταρρυθμίσεων. Αναπτύσσονται ζητήματα συσχέτισης της ένταξης των νέων τεχνολογιών στην εκπαίδευση, με τη διάθεση των οικονομικών πόρων, τη στοχοθεσία της εκπαιδευτικής πολιτικής, τις επιπτώσεις τους στη μαθησιακή διαδικασία, τις αλλαγές που επιβάλλουν στο ρόλο του εκπαιδευτικού καθώς και θέματα δημοκρατικότητας και ίσων ευκαιριών στη νέα διεθνή και εγχώρια σχολική πραγματικότητα. Διερευνώνται συνοπτικά, οι καταβολές, οι διαδικασίες υλοποίησης και τα αποτελέσματα εφαρμογής των νέων εκπαιδευτικών πολιτικών με έμφαση στα ζητήματα των νέων τεχνολογιών.

Abstract

In this paper we attempt a critical investigation on subjects that are relevant to the procedure of new technologies' integration in the educational reality as part of wider changes. Firstly, we discuss some correlation issues between the integration of new technologies in education and components such as: the distribution of financial resources, the educational policy goals, the effects on learning procedures, the changes caused in the teacher's role and democracy and equal opportunities issues in a new international and domestic school reality. Moreover, we briefly investigate the origins, the procedures of implementation and the results of the application of new educational policies, with emphasis given to issues of new technologies.

Εισαγωγή

Στο παρόν κείμενο επιδιώκεται μια κριτική προσέγγιση σε ζητήματα σχετικά με την ένταξη των νέων τεχνολογιών στην εκπαίδευση ως μέρος ευρύτερων εκπαιδευτικών αλλαγών, επικεντρώνοντας στην ελληνική σχολική πραγματικότητα. Στην προσπάθεια αυτή αξιοποιείται το θεωρητικό σχήμα του Levin (2001) που αναπτύσσεται σχετικά με τις διαδικασίες που απαρτίζουν τις εκπαιδευτικές μεταρρυθμίσεις: καταβολές, υιοθέτηση, εφαρμογή και αποτελέσματα. Στόχος είναι η κριτική ανάδειξη ζητημάτων που αφορούν στο πλαίσιο ένταξης των ΤΠΕ (Τεχνολογίες της Πληροφορίας και Επικοινωνίας) στην εκπαίδευση γενικότερα και στην ελληνική σχολική πραγματικότητα ειδικότερα. Επικεντρώνουμε σε ζητήματα που αφορούν: στη διάθεση των οικονομικών πόρων, στην ένταξη των ΤΠΕ στη στοχοθεσία της κυρίαρχης εκπαιδευτικής πολιτικής, στις επιπτώσεις τους στη μαθησιακή διαδικασία και στην παιδαγωγική τους αξία, στις αλλαγές που επιβάλλουν στο ρόλο του εκπαιδευτικού καθώς και σε θέματα δημοκρατικότητας και ίσων ευκαιριών στη νέα πραγματικότητα.

Δεν φιλοδοξούμε την πλήρη περιγραφή της πολυπλοκότητας των εκπαιδευτικών αλλαγών. Περιοριζόμαστε στη χρησιμοποίηση του θεωρητικού σχήματος του Levin σε μια προσπάθεια ταξινόμησης και ερμηνείας βασικών πλευρών των εκπαιδευτικών αλλαγών αυτών γενικότερα, όσο και πλευρών της εφαρμογής τους στην ελληνική εκπαίδευση. Το συγκεκριμένο σχήμα περιλαμβάνει τις ακόλουθες τέσσερις κατηγορίες και τα αντίστοιχα ερευνητικά ερωτήματα:

1. Καταβολές: Από πού προήλθαν οι συγκεκριμένες μεταρρυθμιστικές προτάσεις; Πώς έγιναν μέρος του κυβερνητικού πλαισίου;
2. Υιοθέτηση: Πώς υιοθετήθηκαν οι προτάσεις αυτές και πού διαφέρουν από τις αρχικές; Ποιοι ήταν οι παράγοντες που οδήγησαν στις διαφοροποιήσεις μεταξύ των αρχικών προτάσεων και της τελικής εφαρμογής.
3. Εφαρμογή: Με βάση το δεδομένο των δυσκολιών στην προώθηση και την εφαρμογή μεταρρυθμιστικών προτάσεων, εξετάζονται τα μοντέλα που χρησιμοποίησε η κυβέρνηση για να μετατρέψει σε πρακτικούς στόχους και βήματα τις αρχικές προτάσεις. Ποια εργαλεία άσκησης πολιτικής εφάρμοσε; Πώς αντέδρασαν οι σχολικές μονάδες;
4. Αποτελέσματα: Ποια τα τεκμηριωμένα αποτελέσματα των συγκεκριμένων μεταρρυθμίσεων. Ποια απ' αυτά δημιουργήθηκαν εκούσια και ποια ακούσια;

Καταβολές

Με αφορμή την ανάγκη πολλών κρατών του 'αναπτυσσόμενου κόσμου' και όχι μόνο, για οικονομική βοήθεια, αλλά και ενός βιώσιμου εκπαιδευτικού συστήματος, περιφερειακοί οργανισμοί όπως η Ευρωπαϊκή Ένωση, αλλά και ευρύτεροι όπως η Παγκόσμια τράπεζα και ο ΟΟΣΑ, έχουν την τάση να ενθαρρύνουν και σε μερικές περιπτώσεις να επιβάλλουν λύσεις συγκεκριμένης κατεύθυνσης (Ball, 1998). Ο Jones (1998) επισημαίνει ότι 'οι απαιτήσεις της Παγκόσμιας Τράπεζας για την εκπαίδευση μπορούν να κατανοηθούν ως μια καθαρά ιδεολογική στάση, όσο αφορά στην προώθηση ενός παγκόσμιου συστήματος βασισμένου στην Αγορά' (σ. 152). Οι Canen & Grant (1999) άσκησαν κριτική στην αποδοχή των προτεινόμενων λύσεων από τους πολυεθνικούς οργανισμούς επειδή υιοθετούνται ομοιόμορφα συστήματα αξιολόγησης, επικεντρώνονται σε παράγοντες 'βελτίωσης' των εκπαιδευτικών συστημάτων με έμφαση σε χρησιμοθηρικούς στόχους (ανταγωνιστικότητα, οικονομική αποτελεσματικότητα κ.λπ.) εξαιρώντας κοινωνικο-πολιτισμικά ζητήματα.

Σε Ευρωπαϊκό επίπεδο τα τελευταία τριάντα χρόνια γίνεται μια διαρκής μετατόπιση των εκπαιδευτικών στόχων κάτω από την πίεση του οικονομικού ανταγωνισμού και των νόμων της αγοράς. Μέχρι τα τέλη της δεκαετίας του ΄70 η εκπαιδευτική πολιτική θεωρούνταν καθαρά εθνική υπόθεση και φαινόταν ανάρμοστη οποιαδήποτε υπερεθνική επέμβαση. Στα πλαίσια αυτά προωθείται μια «λιγότερο εθνική και περισσότερο Ευρωπαϊκή παιδεία» με στόχο «... να αρχίσουμε με την εκπαίδευση, ελπίζοντας να τελειώσουμε με έναν ευρωπαϊκό πολιτισμό» (από ομιλία της Ε. Αρβελέρ, στο Bergedorf, 2003: 26).

Ο Lyotard (1984) προβλέπει ότι η γνώση θα αποτελεί κύρια παραγωγική δύναμη στις κοινωνίες της πληροφορίας και της επικοινωνίας συνδεδεμένη με την έννοια της αποδοτικότητας και μεταμορφώνοντας όλο το πεδίο της εκπαιδευτικής διαδικασίας. Θεωρεί επίσης ότι η γνώση θα συμβάλλει ιδιαίτερα στον ανταγωνισμό για την εξουσία και την ισχύ στα πλαίσια του πληροφορικοποιημένου οικονομικού και πολιτικού σχηματισμού.

Στα μέσα της δεκαετίας του ΄80 η Ευρωπαϊκή Κοινότητα προτάσσει την εκπαίδευση στη διαμόρφωση κατάλληλου ανθρώπινου δυναμικού ως προϋπόθεση για τη βελτίωση του οικονομικού και τεχνολογικού μέλλοντος της Ευρώπης. «Οι πρωτοβουλίες της εκπαίδευσης στοχεύουν πρώτιστα στη δημιουργία ενός ιδιαίτερα καταρτισμένου εργατικού δυναμικού για να συμβάλλει στην οικονομική ανάπτυξη και να αυξήσει την ανταγωνιστική δύναμη της Ευρώπης, ιδιαίτερα απέναντι στην Ιαπωνία και τις Η.Π.Α» (Λευκή Βίβλος για την εκπαίδευση, 1985). Με την συνθήκη του Μάαστριχ, το 1992 και τη σύνταξη της Λευκής Βίβλου το 1995, από την αρμόδια Ευρωπαϊκή επιτροπή για την εκπαίδευση και την κατάρτιση, επικυρώνεται αρχικά η νομιμότητα επέμβασης της Κοινότητας σε θέματα εκπαίδευσης που αφορούν τα κράτη - μέλη και στη συνέχεια, στη συνθήκη της Λισσαβόνας προωθείται το τετράπτυχο; ευελιξία - προσαρμοστικότητα - ανταγωνιστικότητα - στήριξη της Δια Βίου Μάθησης.

Η αρμόδια Ευρωπαϊκή επιτροπή αναγνώρισε ότι «η επιστημονική και τεχνολογική ανάπτυξη είναι θεμελιώδης για μια ανταγωνιστική κοινωνία της γνώσης και η εξειδικευμένη επιστημονική και τεχνολογική γνώση ζητείται όλο και περισσότερο στην επαγγελματική και καθημερινή ζωή, στις δημόσιες συζητήσεις, τη λήψη αποφάσεων και τη νομοθεσία» (Commission, 2003, 3). Στα

πλαίσια αυτά αναδεικνύεται ως ιδιαίτερα σημαντικός ο ρόλος της πληροφορίας καθιερώνοντας, το όρο: «Κοινωνία της Πληροφορίας». Ανακύπτουν όμως ζητήματα πρόσβασης στην πληροφορία, διαχείρισης και ταξινόμησής της αλλά και αξιολόγησής της. Έτσι, στο Υπουργικό στρογγυλό τραπέζι του Παρισιού το 2003 από την «Κοινωνία της Πληροφορίας» που θεωρείται βασισμένη στην τεχνολογία, περνάμε «Προς τις Κοινωνίες της Γνώσης» που θεωρείται ότι βασίζονται στον άνθρωπο. «Εντούτοις το πραγματικό νόημα της 'Κοινωνίας της Γνώσης' που απορρέει από το σύνολο του κειμένου, συνδέεται με την κατανόηση της γνώσης ως παράγοντα της παραγωγής, του οποίου η σημασία ξεπερνάει ακόμα και εκείνη του χρηματιστικού κεφαλαίου. Η γνώση, ως παράγοντας βελτίωσης της οικονομίας, πολύ μικρή σχέση έχει με τη γνώση από την άποψη της ανθρωπιστικής παιδείας. Σχετίζεται κυρίως με τεχνικές και δεξιότητες απαραίτητες για τη γρήγορα εξελισσόμενη νέα οικονομία.» (Κολέζα 2006, 341).

Οι πολιτικές που αναπτύσσονται και εφαρμόζονται για την καθιέρωση της «Κοινωνίας της Πληροφορίας» τεκμηριώνονται στη βάση μιας σειράς παραδοχών για τους μετασχηματισμούς που συμβαίνουν στην κοινωνία και το ρόλο των τεχνολογιών της πληροφορίας και των επικοινωνιών στους μετασχηματισμούς αυτούς. Αντίστοιχα σε μια κυκλική επιχειρηματολογία θεμελιώδη χαρακτηριστικά των μετασχηματισμών αυτών αποδίδονται στην ανάπτυξη και στην εφαρμογή συγκεκριμένων κοινωνικών και οικονομικών πολιτικών (Χασάπης, 2002).

Στην κατεύθυνσης ανάπτυξης της «Κοινωνίας της Πληροφορίας» και της «Κοινωνίας της Γνώσης» δημιουργήθηκαν ανάγκες ανάπτυξης δεξιοτήτων χειρισμού, προγραμματισμού και εξέλιξης των νέων τεχνολογιών. Οι ανάγκες αυτές οδήγησαν στην εισαγωγή της πληροφορικής στην εκπαίδευση, σαν ένα ακόμα γνωστικό αντικείμενο (τεχνικό πρότυπο). Έτσι η υπολογιστική τεχνολογία δεν 'γεννήθηκε' μέσα στην εκπαιδευτική κοινότητα, αλλά εισήχθη σ' αυτήν προκειμένου να ικανοποιήσει συγκεκριμένες ανάγκες όχι της εκπαιδευτικής, αλλά της παραγωγικής διαδικασίας στα δεδομένα της οποίας, η εκπαίδευση καλείται να προσαρμοσθεί (Self 1985).

Διάθεση οικονομικών πόρων και εισαγωγή των ΤΠΕ στην εκπαίδευση

Η εισαγωγή των ΤΠΕ στην εκπαίδευση απαιτεί αγορά, εγκατάσταση, συντήρηση και υποστήριξη των προϊόντων. Οι εταιρείες που εμπλέκονται με την παραγωγή, διακίνηση και προώθηση προϊόντων νέας τεχνολογίας αποτελούν οικονομικούς οργανισμούς παγκόσμιου βεληνεκούς με τεράστια συμφέροντα. Έτσι η εισαγωγή νέων τεχνολογιών στην εκπαιδευτική πράξη εντάσσεται αναγκαστικά σ' έναν αδυσώπητο οικονομικό ανταγωνισμό, με συνέπεια τα παιδαγωγικά κριτήρια για την επιλογή προϊόντων νέας τεχνολογίας από τη μεριά των κέντρων άσκησης εκπαιδευτικής πολιτικής, να μην είναι τα πρώτα στη λίστα των επιλογών.

Στα ζητήματα της διάθεσης των οικονομικών πόρων οφείλουμε να επισημάνουμε δυο παρατηρήσεις σχετικά με την αλλαγή του ρόλου του σύγχρονου κράτους. Ιδιαίτερα στις Αγγλοσαξονικές χώρες, το κράτος υποχωρεί συνεχώς από την υπευθυνότητά του σε σχέση με τα άτομα. Τα άτομα ανεξάρτητα από την οικονομική, την κοινωνική ή τη μορφωτική τους κατάσταση, θεωρούνται υπεύθυνα και «ελεύθερα» για τη βελτίωση της ποιότητας της ζωής τους. Το κράτος περιορίζεται στην παροχή ίσων εκπαιδευτικών ευκαιριών, μετατοπίζοντας την ευθύνη της αποτυχίας στο μαθητή ή στο δάσκαλο. Με τον τρόπο αυτό η ευθύνη των αποτυχιών μετατοπίζεται από το κράτος προς τα άτομα.

Έτσι φαίνεται να παραμερίζεται μια προσέγγιση σύμφωνα με την οποία τα συμφέροντα του ατόμου είναι και συμφέροντα της κοινωνίας και να προωθείται μια θεώρηση σύμφωνα με την οποία η στήριξη του ατόμου οδηγεί σε οφέλη για το άτομο και γι' αυτό η μόρφωση πρέπει να είναι και ατομική του υπόθεση και ατομική του ευθύνη. Στην κατεύθυνση αυτή προβάλλεται η «Δια Βίου Μάθηση» που πρόσφατα προστέθηκε στον τίτλο του Υπουργείου Παιδείας στην Ελλάδα. Στα πλαίσια της Δια Βίου Μάθησης η πολιτεία περιορίζεται να προσφέρει στους μαθητές ένα βασικό πυρήνα εκπαιδευτικών εφοδίων, στα πλαίσια της υποχρεωτικής εκπαίδευσης και τα υπόλοιπα το κάθε άτομο οφείλει να τα αναζητήσει για τον εαυτό του στην αγορά εργασίας.

Μια δεύτερη παρατήρηση, για τη διάθεση των οικονομικών πόρων, η οποία σχετίζεται με την πρώτη, αφορά στον περιορισμό του κράτους στο να θέτει τις προδιαγραφές για τις εκπαιδευτικές λειτουργίες. Με τον τρόπο αυτό, από τη μια προκρίνεται μια διαδικασία διακυβέρνησης χωρίς να φαίνεται ποιος κυβερνάει (Olssen, 1996), και από την άλλη προωθούνται οι επιδιωκόμενες

εκπαιδευτικές κατευθύνεις. Με τον τρόπο αυτό υλοποιούνται για παράδειγμα, τεχνοκρατικές επιλογές αξιολόγησης του εκπαιδευτικού έργου οι οποίες χρησιμοποιούν ως βάση 'δείκτες ποιότητας', που παραπέμπουν στα διεθνή εμποροβιομηχανικά πρότυπα (ISO 9000). Σύμφωνα με τους δείκτες αυτούς η ποιότητα θεωρείται σαν «αυτό που πληροί τις προδιαγραφές». Τέτοια πρότυπα χρησιμοποιήθηκαν για την έκδοση πιστοποιητικών ποιότητας σε σχολεία του Ηνωμένου Βασιλείου (Ball, 1998), και τα οποία φαίνεται να αντιμετωπίζουν γονείς και μαθητές σαν 'καταναλωτές' και 'πελάτες' (Γουβιάς 2002). Αυτές οι επιλογές αξιολόγησης του εκπαιδευτικού έργου με βάση 'δείκτες ποιότητας' υιοθετούνται και στην ελληνική πραγματικότητα. Με το νόμο για την αξιολόγηση του εκπαιδευτικού έργου (Ν. 2986/2002) στο άρθρο 4, προωθείται 'η ανάπτυξη και η προτυποποίηση δεικτών και κριτηρίων για […] τον έλεγχο της αξιοπιστίας του συστήματος αποτύπωσης και παρακολούθησης του εκπαιδευτικού έργου'.

Οι ΤΠΕ και η ισότητα των ευκαιριών

Σε ανακοίνωση της η Επιτροπή των Ευρωπαϊκών Κοινοτήτων (2001) για τη Δια Βίου Μάθηση αναφέρει: '...η δια βίου μάθηση έχει να παίξει έναν βασικό ρόλο όσον αφορά στην απομάκρυνση των φραγμών που εμποδίζουν τους ανθρώπους να εισέλθουν στην αγορά εργασίας και περιορίζουν την πρόοδο μέσα σε αυτήν. Μέρος αυτού είναι η αντιμετώπιση της ανισότητας και του κοινωνικού αποκλεισμού'. Και παρακάτω: 'Τα υψηλότερα επίπεδα εκπαίδευσης και η συνεχής μάθηση, όταν είναι προσβάσιμα σε όλους, συμβάλλουν σημαντικά στη μείωση των ανισοτήτων και στην αποτροπή της περιθωριοποίησης'.

Η ρητορική περί ελεύθερης και ισότιμης πρόσβασης στη μάθηση και η σύνδεση που έχει προκύψει με τις νέες τεχνολογίες της πληροφορίας και της επικοινωνίας, αγνοεί σημαντικά ζητήματα που σχετίζονται με προβλήματα προσβασιμότητας, ποιότητας της σύνδεσης, υπολογιστικής ισχύος και πόρων υποστήριξης. Στα ζητήματα αυτά επικρατούν ευρείες ανισότητες σε τοπικό, εθνικό και διεθνές επίπεδο, που σχετίζονται με οικονομικές, πολιτικές, πολιτιστικές και γλωσσικές διαφοροποιήσεις (Castells, 1996, Selwyn, 1999). Έτσι η κουλτούρα των ΤΠΕ παραμένει σταθερά νέα, μεσοαστική και ανδροκρατούμενη συντηρώντας εκείνο το στερεότυπο εκπαίδευσης το οποίο υποτίθεται ότι καλείται να καταπολεμήσει, ενώ είναι κατά βάση αγγλοσαξωνική στο γλωσσικό της προσανατολισμό και τις καταναλωτικές αξίες (Spender, 1997, Holderness, 1998).

Θα επισημάνουμε ότι ο τρόπος που γίνονται αντιληπτές, η ισότητα και η δικαιοσύνη στα εκπαιδευτικά θέματα δεν είναι και τόσο σαφής. Υπάρχει διαφορά ανάμεσα στην παροχή του ίδιου υλικού σε όλους τους μαθητές και στην ικανότητα χρησιμοποίησής του από όλους τους μαθητές. Έτσι δικαιοσύνη στην εκπαίδευση δεν σημαίνει απλά έλλειψη διαφοράς σε κάποιο μετρήσιμο δείκτη, όπως για παράδειγμα στο κλάσμα μαθητών ανά υπολογιστή, αλλά διαφορετική μεταχείριση με επιλεκτική ενίσχυση προκειμένου να επιτευχθεί δικαιοσύνη. Με την έννοια αυτή το ίδιο το εκπαιδευτικό σύστημα μπορεί να θεωρηθεί ότι συμβάλλει στην όξυνση ήδη υπαρκτών ανισοτήτων (Κολέζα 2006).

Υιοθέτηση – Εφαρμογή

Δύο από τα βασικά χαρακτηριστικά του σύγχρονου πολιτικού λόγου σε σχέση με θέματα της εκπαίδευσης είναι η ρευστότητα των όρων που χρησιμοποιούνται και η ασυμβατότητα μεταξύ ιδεολογικών τοποθετήσεων και πρακτικών αποφάσεων. Την ίδια στιγμή που το λογότυπο του «Νέου σχολείου» είναι «Πρώτα ο μαθητής», στην Ελλάδα έχουμε από τα μικρότερα ποσοστά του προϋπολογισμού για την παιδεία σε ευρωπαϊκό επίπεδο. Την ίδια στιγμή που προτάσσονται τρόποι διδασκαλίας περισσότερο συμμετοχικοί και βιωματικοί, καταργείται η ενισχυτική διδασκαλία, το «Ψηφιακό Σχολείο» χρησιμοποιείται για να προσφέρει «βιντεομαθήματα» όπου καθηγητές κάνουν διάλεξη χωρίς να απευθύνονται άμεσα σε ακροατήριο. Την ίδια στιγμή που μειώνονται δραστικά οι πόροι για τις λειτουργικές δαπάνες των σχολείων, αυτά προμηθεύονται διαδραστικούς πίνακες οι οποίοι συχνά χρησιμοποιούνται για να προβάλλονται τα σχολικά βιβλία σε ψηφιακή μορφή γιατί σε έντυπη καθυστέρησαν χαρακτηριστικά να έρθουν στα σχολεία.

Στα ίδια πλαίσια, χρησιμοποίησης κοινωνικών αναγκών προς όφελος των οικονομικά ισχυρών, ο νόμος της Εκπαιδευτικής Μεταρρύθμισης 2525/97, δυο χρόνια μετά τη δημοσιοποίηση της 'Λευκής Βίβλου', στο πρώτο του άρθρο αναφέρει ότι ένας από τους βασικούς σκοπούς του Ενιαίου Λυκείου είναι: 'η καλλιέργεια στους μαθητές δεξιοτήτων που θα τους διευκολύνουν την πρόσβαση, ύστερα από περαιτέρω εξειδίκευση ή κατάρτιση, στην αγορά εργασίας'.

Πώς θεωρείται όμως ότι διευκολύνεται η πρόσβαση στην αγορά εργασίας; Θα αναφέρουμε ένα παράδειγμα από την ελληνική πραγματικότητα. Από το 2000 δρομολογείται και το 2005 εκδίδεται μια σειρά βιβλίων με γενικό τίτλο «Επιχειρηματικότητα Νέων» (εννοώντας ακόμα και μαθητές Γυμνασίου), με στόχο όπως αναφέρεται στην εισαγωγή, να αποτελέσει υποστηρικτικό υλικό για το πιλοτικό πρόγραμμα «Επιχειρηματικότητα Νέων» το οποίο υλοποιείται «με αμοιβαία συμφωνία του Παιδαγωγικού Ινστιτούτου και του Συνδέσμου Ελλήνων Βιομηχάνων για την υποστήριξη, την καλλιέργεια και την ενίσχυση του πνεύματος της επιχειρηματικότητας των νέων». Έτσι η σύνδεση του εκπαιδευτικού συστήματος με τις κοινωνικές ανάγκες μετασχηματίζεται σε σταδιακή σύνδεση της ακαδημαϊκής προετοιμασίας με τις ανάγκες των εργοδοτών.

Ποιες είναι όμως οι προϋποθέσεις για να εφαρμοστεί μια εκπαιδευτική αλλαγή; Σύμφωνα με το Fullan (2001) υπάρχουν τουλάχιστον τρεις διαστάσεις στην εφαρμογή εκπαιδευτικών μεταρρυθμιστικών προγραμμάτων: α) η πιθανή χρήση νέων ή αναθεωρημένων υλικών, β) η πιθανή υιοθέτηση νέων διδακτικών προσεγγίσεων και γ) η πιθανή μεταβολή πεποιθήσεων. Οι τρεις αυτές πλευρές είναι απαραίτητο να αντιμετωπίζονται από κοινού για να μπορεί να επέλθει αποτέλεσμα. Στη συνέχεια θα περιοριστούμε σε δυο χαρακτηριστικά παραδείγματα εισαγωγής νέων τεχνολογιών στο ελληνικό σχολείο, που ο συντονισμός των τριών αυτών παραγόντων δε φαίνεται να επιδιώχθηκε και φυσικά δεν επιτεύχθηκε.

Το πρώτο παράδειγμα σχετίζεται με την προσφορά για το σχολικό έτος 2009-2010 σε κάθε μαθητή της Α' Γυμνασίου ενός φορητού υπολογιστή στο πλαίσιο του Επιχειρησιακού Προγράμματος 'Ψηφιακή σύγκλιση' του ΕΣΠΑ 2007-2013. Το δεύτερο παράδειγμα σχετίζεται με την ένταξη των Γυμνασίων της χώρας το σχολικό έτος 2010-11, στο 'Πρόγραμμα πιλοτικής εφαρμογής διαδραστικών συστημάτων και συναφούς εξοπλισμού στην τάξη για μια ψηφιακά υποστηριζόμενη διαδικασία'. Και στις δυο περιπτώσεις σχετική επιμόρφωση των εκπαιδευτικών δεν υπήρξε. Τα παιδαγωγικά κριτήρια δεν ήταν εμφανή ή δεν έγιναν κατανοητά. Για τις συγκεκριμένες επιλογές δεν διερευνήθηκαν οι ανάγκες των εμπλεκόμενων. Και στις δυο περιπτώσεις διατέθηκαν τεράστια ποσά, επιτρέποντας στην πολιτική ηγεσία να ισχυρίζεται ότι επενδύει στην εκπαίδευση, την ίδια στιγμή που περικόπτονται οι δαπάνες για την παιδεία. Αυτό που τελικά φάνηκε σαν το βασικό κριτήριο για τις συγκεκριμένες επιλογές είναι η μέγιστη απορρόφηση των κοινοτικών κονδυλίων.

Οι ΤΠΕ και ο ρόλος του εκπαιδευτικού

Σημαντικά ζητήματα σχετικά με την εισαγωγή των ΤΠΕ στην εκπαιδευτική διαδικασία σε σχέση με τους εκπαιδευτικούς είναι: η έλλειψη χρόνου (στη διδακτική πράξη, για επιμόρφωση και για προετοιμασία του υλικού), η μειωμένη αυτοπεποίθηση λόγω έλλειψης εμπειρίας και επιμόρφωσης, τόσο στη χρήση όσο και στην παιδαγωγική αξιοποίηση των νέων τεχνολογιών, και τέλος η έλλειψη υποστήριξης τόσο τεχνικής όσο γενικότερα παιδαγωγικής (Beta ICT Reasearch, 2003).

Δεν θα πρέπει επίσης να ξεχνάμε ότι το υφιστάμενο παραδοσιακό εκπαιδευτικό σύστημα στο οποίο επιδιώκεται να ενταχθούν οι νέες τεχνολογίες, στηρίζεται κυρίως στη μετάδοση πληροφοριών και στον έλεγχο της δυνατότητας του ατόμου να αναπαράγει συγκεκριμένες γνώσεις, σε συγκεκριμένες συνθήκες - εξετάσεις (Γκοτοβός, 1990). Ο εκπαιδευτικός, προσπαθεί να ισορροπήσει ανάμεσα στο ρόλο του διεκπεραιωτή του αναλυτικού προγράμματος, που του ανατίθεται από το παραδοσιακό μοντέλο και στο νέο του ρόλο που του επιφυλάσσουν οι νέες τεχνολογίες. Στο πλαίσιο αυτό, η χρησιμοποίηση των ΤΠΕ σε αρκετές περιπτώσεις εκλαμβάνεται ως χαμένος χρόνος αφού δεν φαίνεται να προκαλεί θετικά αποτελέσματα στην επίδοση των μαθητών στις εξετάσεις.

Κάποιες φορές ο εκπαιδευτικός προσπαθεί να συνδιαλαγεί με το νέο στοιχείο, διατηρώντας αναλλοίωτη την υφιστάμενη πρακτική του (Watson, 2001). Έτσι σε κάποιες περιπτώσεις, οι νέες

τεχνολογίες χρησιμοποιούνται επειδή παρουσιάζουν γρήγορα και εντυπωσιακά στοιχεία του μαθήματος, μετατρέποντας το μαθητή σε εισαγωγέα στοιχείων στον Η/Υ και στην καλύτερη περίπτωση ερμηνευτή των αποτελεσμάτων. Για παράδειγμα σε μια έρευνα (Δουκάκης, Χιονίδου – Μοσκοφόγλου, Ζυμπίδης, 2010) σχετικά με τη χρήση νέων τεχνολογιών σε εν ενεργεία εκπαιδευτικούς, αναφέρεται η εξής δήλωση ενός από τους συμμετέχοντες στην έρευνα: 'Μαζέψανε στοιχεία ... τα δώσανε στο κομπιούτερ τόσο απλά και τόσο εύκολα δίνοντας μετά βέβαια με τη σειρά του το κομπιούτερ έτοιμα τα ραβδογράμματα, έτοιμους τους πίνακες, είχαν μπροστά τους μια ολοκληρωμένη εικόνα αυτών που είχαν κάνει πολύ εύκολα και πολύ γρήγορα'. Το σημαντικό ζήτημα της διερεύνησης του τρόπου που ο υπολογιστής διαχειρίζεται τα δεδομένα παρουσιάζεται σαν ζήτημα που είτε υπερβαίνει τη διδακτική διαδικασία είτε την επιβαρύνει.

Αποτελέσματα

Σε ερευνητικό επίπεδο (ETS, 1997, Μαρκάκης – Πολυδωρίδη, 1996, Hersh W., Meg-Fen, L., Georgette M. 2003) οι αξιολογήσεις αποτελεσματικότητας της διδασκαλίας και μάθησης με νέες τεχνολογίες δεν έχουν καταλήξει με σαφήνεια σε θετικό πρόσημο για αυτές. Επίσης το θεμελιώδες δίλλημα της σύγκρισης της αποτελεσματικότητας των διδασκαλιών που βασίζονται σε νέες εκπαιδευτικές τεχνολογίες, με άλλες επιλογές με αντίστοιχο κόστος – για παράδειγμα, λιγότεροι μαθητές στην τάξη, πρόσθετη διδακτική υποστήριξη, αναμορφωμένα αναλυτικά προγράμματα – δεν έχει απαντηθεί με σαφήνεια (Cordes, Colleen & Miller, Edward, 1999). Έτσι παρά τις εξαγγελίες για βελτίωση των μαθησιακών αποτελεσμάτων που οφείλονται αποκλειστικά στη διδασκαλία με τη χρήση των νέων τεχνολογιών, αυτές δε φαίνεται να τεκμηριώνονται με σαφήνεια ερευνητικά. Το ζήτημα της συγκεκριμένης ερευνητικής τεκμηρίωσης γίνεται ακόμα πιο πολύπλοκο αν λάβουμε υπόψη, ότι η στοχοθεσία της διδασκαλίας με χρήση νέων τεχνολογιών πολλές φορές είναι σαφώς διαφορετική από τους στόχους μιας συμβατικής διδασκαλίας και έτσι η αποτελεσματικότητα δεν μπορεί να αποτιμηθεί με τα ίδια κριτήρια.
Ο Cuban (1986) υπενθυμίζοντας ότι η προσπάθεια εισαγωγής τεχνολογικών καινοτομιών στην τάξη είναι μια υπόθεση με ιστορία αρκετών δεκαετιών, διακρίνει δυο ομάδες ανθρώπων σ' αυτήν την προσπάθεια: τους μεταρρυθμιστές και τους εκπαιδευτικούς. Ως μεταρρυθμιστές εννοεί τους πολιτικούς, τους ερευνητές και τα στελέχη του μηχανισμού της διοίκησης, που εισηγούνται τις αλλαγές. Όταν μια τεχνολογία αποτυγχάνει να πραγματοποιήσει τις εξαγγελίες που έγιναν στο όνομά της, οι ίδιες προσδοκίες μεταφέρονται στην επόμενη τεχνολογία και ταυτόχρονα ρίχνονται τα βάρη της αποτυχίας στους εκπαιδευτικούς και στον ελλιπή εξοπλισμό. Πιο προσεκτικά, ο Κυνηγός (2006) επισημαίνει την απαραίτητη υποστήριξη της Πολιτείας στο ρόλο του εκπαιδευτικού, στην προοπτική της εκπαιδευτικής καινοτομίας, αναγνωρίζοντας ότι απαιτείται ιδιαίτερα μεγάλη προσπάθεια σε μέγεθος και διάρκεια, τα αποτελέσματα της οποίας είναι δυσδιάκριτα και χρειάζεται πολύς χρόνος για να γίνουν ορατά.

Επιπτώσεις της ένταξης των ΤΠΕ στη μαθησιακή διαδικασία
Γενικότεροι προβληματισμοί εγείρονται με τον έντονο και ολοκληρωτικό τρόπο με τον οποίο εισέρχονται οι νέες τεχνολογίες στη ζωή της νεολαίας. Στο βιβλίο της η J.M. Healy (2006) 'Μυαλά που κινδυνεύουν, Γιατί τα παιδιά μας δεν σκέφτονται' καταγράφει τις επιθετικές μεθόδους που χρησιμοποιούν οι διαφημιστές για να προωθήσουν τα μυνήματά τους, προκειμένου να αντιμετωπίσουν τον ανταγωνισμό του 'ζάπινγκ'. Ο σημερινός μαθητής έχει πλέον τη δυνατότητα πρόσβασης σε πλήθος πληροφοριών με απίστευτες ταχύτητες και ελάχιστους περιορισμούς. Πολλές φορές φαίνεται να δρα στο περιβάλλον του υπολογιστή με ενστικτώδη τρόπο, χωρίς κάποιο ιδιαίτερο λόγο, παρά μόνο για την ικανοποίηση ποικιλίας οπτικών ερεθισμάτων. Μέσα σ' αυτό το πλαίσιο η υπομονή, μια ικανότητα βασική για την ανάπτυξη της αναλυτικής σκέψης, φαίνεται να αδρανεί. Η ικανότητα των μαθητών να παρακολουθήσουν το συλλογισμό των άλλων ή να εκφράσουν το δικό τους συλλογισμό ατονεί επίσης. Από το βιβλίο της Healy βγαίνει το συμπέρασμα ότι ο εγκέφαλος των σημερινών παιδιών έχει δομηθεί πάνω σε γλωσσικά πρότυπα που ανταγωνίζονται τις αξίες και τους σκοπούς της τυπικής εκπαίδευσης. Οι κλασικές μέθοδοι δεν επιτυγχάνουν επειδή ο νεαρός εγκέφαλος δεν έχει διαμορφωθεί γλωσσικά

ως το βασικό εργαλείο για την αναλυτική σκέψη. Τα παιδιά εθισμένα να ανταποκρίνονται πλέον σε ιδιαίτερα ερεθιστικά μηνύματα, χάνουν βαθμιαία τη δυνατότητα συγκέντρωσης στο κλασικό μετωπικό μάθημα.

Ο Σπύρου (2006), εκφράζοντας την υποστήριξή του στις νέες διδακτικές μεθόδους, που περιλαμβάνουν νέους τρόπους παρουσίασης της γνώσης, πιο συμμετοχικούς, αναπαραστατικούς, βιωματικούς και διαπραγματευτικούς, μέσω της χρήσης νέων τεχνολογιών, εκφράζει την επιφύλαξή του αναφέροντας: 'Σε μια εποχή που οι συμπεριφορές αντλούν τη γοητεία και την εγκυρότητά τους από την καταναλωτική - επικοινωνιακή δομή της κοινωνίας, όταν αυτές αξιοποιηθούν ως εργαλείο διδασκαλίας, ελλοχεύουν τον κίνδυνο να αναδείξουν την αξία της εικασίας του Mc Luhan που ισχυρίζεται ότι *το μέσον είναι το μύνημα* και να ευνοήσουν μεν την ανθρώπινη συνύπαρξη, να αποκενώσουν όμως το νόημα της μάθησης με τεράστιες επιπτώσεις για τον πολιτισμό.

Ο μαθητής καλείται περισσότερο απ' ότι παλιότερα να διαχειρίζεται πληροφορίες, να παρατηρεί, να συγκρίνει φαινόμενα, και να τα ερμηνεύει. Η κατανόηση σε βάθος υποχωρεί ή μετατίθεται σε επόμενο επίπεδο διερεύνησης, δίνοντας τη θέση της στη γνώση σε εύρος και στη χρηστικότητα. Λόγω της υπερβολικής συμπύκνωσης και της ταχύτητας μετάδοσης της πληροφορίας, μέσω των ΤΠΕ, ο μαθητής αδυνατεί να κατανοήσει ουσιαστικά, τον τρόπο λειτουργίας του Η/Υ και των μεθόδων, μέσω των οποίων προκύπτουν τα όποια αποτελέσματα και περιορίζεται σε μια περισσότερο επιφανειακή ερμηνεία των παρατηρούμενων αποτελεσμάτων. Αυτό φαίνεται να έχει επίδραση στην ανάπτυξη μιας περισσότερο επιφανειακής στάσης των μαθητών απέναντι στην γνώση.

Επίλογος

Στη παρούσα μελέτη καταβλήθηκε μια προσπάθεια κριτικής διερεύνησης των ζητημάτων που σχετίζονται με την ένταξη των ΤΠΕ στην εκπαιδευτική πραγματικότητα. Στην ανάλυσή μας χρησιμοποιήσαμε το θεωρητικό σχήμα του Levin για τη διερεύνηση των αλλαγών που επιφέρει η ένταξη των ΤΠΕ στην εκπαίδευση και για τον τρόπο που αυτές υιοθετήθηκαν και εφαρμόστηκαν στην ελληνική πραγματικότητα.

Αναδείχθηκαν ζητήματα προβληματισμού σχετικά τις ανάγκες φορέων και δομών που έρχεται να υπηρετήσει μια τέτοια ένταξη, καθώς και ζητήματα που σχετίζονται με τη διάθεση των οικονομικών πόρων και τις εκάστοτε εκπαιδευτικές – πολιτικές επιλογές. Επιδιώχθηκε η επισήμανση θεμάτων που συσχετίζουν τη χρήση των νέων τεχνολογιών στην εκπαιδευτική διαδικασία με τις συνέπειες που αυτές καθορίζουν στο νέο μαθησιακό περιβάλλον, καθώς και ζητήματα δημοκρατικότητας και ίσων ευκαιριών στη μάθηση.

Σε αρκετές περιπτώσεις φαίνεται πως η χρήση των ΤΠΕ στην εκπαιδευτική διαδικασία υποστηρίζεται από ισχυρά οικονομικά συμφέροντα, αποτελεί μια οικονομικά δαπανηρή επιλογή για την πολιτεία, ανεπιβεβαίωτης προς το παρόν αποτελεσματικότητας, προς εκπλήρωση συγκεκριμένων στόχων στους οποίους δεν επικρατούν απαραίτητα τα παιδαγωγικά κριτήρια, αφού σημαντικό μέρος των εκπαιδευτικών παρεμβάσεων καθορίζονται από την απορροφητικότητα των κοινοτικών κονδυλίων, και συνοδεύεται ή προκαλεί ταυτόχρονη αλλαγή των ίδιων των στόχων της εκπαίδευσης.

Στην επιδίωξη μιας κριτικής προσέγγισης της κυρίαρχης αντίληψης σχετικά την ένταξη των ΤΠΕ στην εκπαιδευτική διαδικασία, ας μην θεωρηθεί ότι η αποφυγή ανάπτυξης θετικών συνεπειών μιας τέτοιας ένταξης, σημαίνει την υιοθέτηση της επιστροφής στις 'παλιές - καλές' αξίες της παραδοσιακής εκπαίδευσης. Η αξιοποίηση της νέας τεχνολογίας στην εκπαιδευτική διαδικασία μπορεί να προσφέρει ιδιαίτερα όταν διαθέτει πρόσθετη παιδαγωγική αξία (Κυνηγός, 2006). Θα πρέπει να είμαστε, περισσότερο διεισδυτικοί σε ερευνητικό επίπεδο, προκειμένου να επιλέξουμε τους τρόπους και τις μορφές εκείνες, που μια τέτοια αξιοποίηση μπορεί να συμβάλλει ουσιαστικά. Άλλωστε όπως επισημαίνει ο Fullan (2001) 'αλλαγή δεν συνεπάγεται απαραίτητα πρόοδο'. Αναπτύσσοντας την κριτική αποφεύγουμε να αντιμετωπίζουμε την υιοθέτηση της χρήσης των νέων τεχνολογιών σαν ένα φυσικό γεγονός, παρασυρμένοι σ' ένα κλίμα μοντερνισμού, σύμφωνα με το οποίο, υπάρχουν οπωσδήποτε θετικά στοιχεία σε οτιδήποτε επιτελείται με αυτές στην

εκπαιδευτική διαδικασία. Έτσι, θεωρούμε ότι συμβάλλουμε στην προσπάθεια αναζήτησης των τρόπων που οι νέες τεχνολογίες μπορούν να συνεισφέρουν ουσιαστικά και παιδαγωγικά στην εκπαιδευτική διαδικασία.

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Το Παραγόμενο από Υπολογιστή Ολόγραμμα (CGH) στην Εκπαίδευση. Παιδαγωγικά Οφέλη από τη Χρήση Εκπαιδευτικού Λογισμικού για τη Βιώσιμη/Αειφόρο Ανάπτυξη

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Περίληψη

Η παραγωγή και η χρήση ολογραμμάτων με τη βοήθεια υπολογιστή και του κατάλληλου συνοδευτικού εξοπλισμού βρίσκεται σήμερα σε ένα σημείο ορόσημο που ενδεχομένως - σε μερικά χρόνια και με χαμηλό κόστος - θα μπορέσει να αποτελέσει μέρος του βασικού εξοπλισμού των σχολικών εργαστηρίων ΤΠΕ. Η εργασία αυτή στοχεύει στη διερεύνηση της παιδαγωγικής και διδακτικής επίδρασης που μπορεί να έχει ένα Παραγόμενο από Υπολογιστή Ολόγραμμα (CGH) στην πρωτοβάθμια και δευτεροβάθμια εκπαίδευση, μελετώντας την εφαρμογή του στο πλαίσιο χρήσης λογισμικών που στοχεύουν στην προαγωγή της εκπαίδευσης για τη Βιώσιμη/Αειφόρο Ανάπτυξη. Επιπλέον διερευνάται η συμβολή του πιο πάνω – «διαδραστικού» - εγχειρήματος στην ενσωμάτωση της κριτικής παιδαγωγικής στην εκπαίδευση. Ευρύτερο στόχο αποτελεί η εισαγωγή και ενσωμάτωση καινοτόμων εφαρμογών ΤΠΕ στη σχολική πραγματικότητα με σκοπό την υιοθέτηση καλών πρακτικών και θετικής στάσης απέναντι στο περιβάλλον.

Abstract

The production and usage of holograms via computers assisted by the appropriate equipment is now at a turning point which will likely – in a few years and at low cost - make it part of the basic equipment of school ICT laboratories. This paper aims to investigate the pedagogical and didactic effects a computer-generated hologram (CGH) could have in primary and secondary education, studying the hologram application in the context of software applications which aim at promoting education for Sustainable Development. Moreover, we investigate the contribution of the aforementioned "interactive" scheme to the integration of critical pedagogy in education. Our broader objective is the introduction and integration of innovative ICT applications in school reality with a view to adopting good practices and positive attitudes towards the environment.

Εισαγωγή

Οι Τεχνολογίες της Πληροφορίας και των Επικοινωνιών (ΤΠΕ) έχουν εξελιχθεί ραγδαία τα τελευταία χρόνια και συνιστούν ένα από τα βασικά τεχνολογικά επιτεύγματα που έχουν συντελεστεί σε όλη την ιστορία της ανθρωπότητας. Τις τελευταίες δεκαετίες έχουν διαπεράσει την Πρωτοβάθμια και Δευτεροβάθμια Εκπαίδευση αλλάζοντας, με θετικό τρόπο, τη διαδικασία μάθησης, τις διδακτικές πρακτικές και το τελικό προσδοκώμενο παιδαγωγικό αποτέλεσμα (Κόμης Β., 2004).

Πέρα όμως από τις ΤΠΕ στην εκπαίδευση, έτσι όπως τις γνωρίζουμε σήμερα, υπάρχουν συγκεκριμένες ερευνητικές προσπάθειες και πρωτότυπα συστήματα χαμηλού κόστους που -με την ορθή αξιοποίησή τους- έχουν τη δυναμική να εμπλουτίσουν με νέα παιδαγωγικά εργαλεία τις προσπάθειες των εκπαιδευτικών, δημιουργώντας νέα μονοπάτια απόκτησης της γνώσης.

Τέτοια παραδείγματα αποτελούν τα συστήματα επαυξημένης πραγματικότητας [Augmented Reality (AR)], τα συστήματα αμφίδρομης αλληλεπίδρασης με τρισδιάστατες εικόνες και τα παραγόμενα από υπολογιστή ολογράμματα (HoloDesk - Direct 3D Interactions with a Situated

See-Through Display, 2012).

Στο πλαίσιο της εργασίας αυτής, εστιάζουμε κυρίως σε έτοιμα συστήματα ολογραμμάτων που, αν και σε στάδιο πρωτοτύπου, έχουν τη δυναμική να βγουν σε μαζική παραγωγή σε εύλογο χρονικό διάστημα και κυρίως σε χαμηλό κόστος.

Με αφορμή λοιπόν ένα τέτοιο «πραγματικό» και «λειτουργικό» σύστημα μελετούμε τη δυνατότητα πιθανής εισαγωγής και εφαρμογής του στη σχολική πραγματικότητα και ενσωμάτωσης αυτής της παιδαγωγικής διαδικασίας στις σχολικές μονάδες Πρωτοβάθμιας και Δευτεροβάθμιας εκπαίδευσης (Βέρρα Μ., Φατούρος Σ., 2012).

Πρόσφατη μάλιστα έρευνα που έγινε σε ένα μεγάλο δείγμα εκπαιδευτικών στο Ηνωμένο Βασίλειο έδειξε ότι σε ποσοστό 45.5% οι εκπαιδευτικοί επιβεβαίωσαν τη σημασία της τεχνολογίας των τρισδιάστατων ολογραμμάτων ως αποτελεσματικού εργαλείου μάθησης για το μέλλον, ενώ σε ποσοστό 60.8% επιβεβαίωσαν τη σημασία του ως αποδοτικού εργαλείου για τον εκπαιδευτικό (Ghuloum H., 2010).

Ερευνητικοί άξονες

Είναι αναμφισβήτητο γεγονός ότι τα παιδιά πλέον ζουν και αναπτύσσονται σε ένα περιβάλλον, όπου ο ψηφιακός – τεχνολογικός γραμματισμός είναι μείζονος σημασίας. Είναι «περικυκλωμένα» από τα επιτεύγματα της τεχνολογίας και είναι – είτε το θέλουν, είτε όχι – δέκτες των ραγδαίων τεχνολογικών εξελίξεων.

Πρωτίστως στοχεύουμε στο να πραγματοποιήσουμε μία διερευνητική προσέγγιση μιας υποθετικής εκπαιδευτικής εφαρμογής, από το Νηπιαγωγείο έως το Λύκειο, για να εκτιμήσουμε ποιες είναι οι πιθανές παιδαγωγικές και διδακτικές της επιδράσεις και προεκτάσεις. Σκόπιμα επιλέγουμε αυτό το εύρος τύπων σχολείων – τόσο της πρωτοβάθμιας όσο και της δευτεροβάθμιας εκπαίδευσης – για να μελετήσουμε τη συμβολή της εκπαίδευσης στη Βιώσιμη / Αειφόρο ανάπτυξη, καθώς η διαμόρφωση οικολογικής συνείδησης είναι ή οφείλουμε όλοι μας να είναι μία δια βίου προσπάθεια.

Επιθυμούμε λοιπόν να διερευνήσουμε τη δυνατότητα δημιουργίας και εφαρμογής λογισμικών που θα αποσκοπούν στη διάπλαση μαθητών με περιβαλλοντικές ανησυχίες - ήδη από πολύ μικρή ηλικία – και στην πλήρη κατανόηση από μέρους τους της σημασίας και της αναγκαιότητας της Αειφόρου Ανάπτυξης.

Είναι σημαντικό επομένως τα παιδιά να καταλάβουν από πολύ νωρίς ότι αειφόρος ή πράσινη ανάπτυξη σημαίνει ότι η οικονομική ανάπτυξη πρέπει να συντελείται λαμβάνοντας υπόψη την προστασία του περιβάλλοντος και τη βιωσιμότητα· και για να υπάρχει βιωσιμότητα πρέπει οι φυσικοί πόροι να υφίστανται εκμετάλλευση με ρυθμό μικρότερο από αυτόν που ανανεώνονται. Όταν αυτή η αντίληψη γίνει «κτήμα» των μαθητών, τότε αυτή η στάση ζωής θα υιοθετηθεί σε μόνιμη βάση.

Μέσα από αυτή τη διαδικασία μπορεί να δημιουργηθεί ένα ακόμα εργαλείο στα χέρια του εκπαιδευτικού, προκειμένου να οικοδομήσει ένα νέο τρόπο παροχής της γνώσης μέσα από δημοκρατικές διαδικασίες προσέγγισής της εντός και εκτός εκπαίδευσης, μέσα από νέους δρόμους κοινωνικής ανάπτυξης της επιστήμης και της γνώσης, προσεγγίζοντας έτσι κάποιες αρχές της κριτικής παιδαγωγικής.

Η κριτική παιδαγωγική είναι ένα παιδαγωγικό ρεύμα των τελευταίων δεκαετιών το οποίο προτείνει την παραγωγή γνώσης μέσα στη σχολική τάξη από κοινού από τον εκπαιδευτικό και το μαθητή, αντί μόνο της απλής διδασκαλίας της αντικειμενικής γνώσης από τον εκπαιδευτικό. Πρωταρχικός στόχος δηλαδή του ρεύματος αυτού είναι να καθίσταται ο μαθητής «συν-παραγωγός» της γνώσης.

Το Παραγόμενο από Υπολογιστή Ολόγραμμα

Επιχειρώντας να περιγράψουμε πιο αναλυτικά την έννοια του ολογράμματος θα λέγαμε ότι τα συστήματα τρισδιάστατης απεικόνισης έχουν, εδώ και πολλά χρόνια, ευρεία χρήση στα γραφικά

υπολογιστών. Το Ολόγραμμα είναι μία δημοφιλής πρακτική για την αναπαράσταση τρισδιάστατων γραφικών (Hologram – Wikipedia, 2012). Ένα παραγόμενο από υπολογιστή ολόγραμμα αντιπροσωπεύει ένα τρισδιάστατο αντικείμενο του πραγματικού κόσμου το οποίο αποθηκεύεται, επεξεργάζεται και αναπαριστάται αλγοριθμικά μέσα από ένα τέτοιο σύστημα. Το αποθηκευμένο ολόγραμμα συνεργάζεται με ένα οπτικό σύστημα απεικόνισης μαζί με ένα πλήθος κατάλληλων αισθητήρων για την επίτευξη της αλληλεπίδρασης του ολογράμματος με τον τελικό χρήστη (Computer Generated Holography – Wikipedia, 2012).

Ανάμεσα στο παραγόμενο από υπολογιστή ολόγραμμα και το κλασικό ολόγραμμα υπάρχει μία διαφοροποίηση που συνιστά και καινοτομία. Στο CGH προσφέρεται ελευθερία στην επιλογή των τρισδιάστατων αντικειμένων τα οποία ο χρήστης έχει τη δυνατότητα να κωδικοποιήσει μέσα από το κατάλληλο προγραμματιστικό περιβάλλον. Επιπλέον μέσα από τα κατάλληλα εργαλεία λογισμικού ορίζεται και το σύνολο των αλληλεπιδράσεων που θα έχει το αντικείμενο – ολόγραμμα με τον τελικό χρήστη (Computer Generated Holography – Wikipedia, 2012).

Συνεπώς το παραγόμενο από υπολογιστή ολόγραμμα κάνει τη χρήση του δυναμική και ευέλικτη. Εάν, δε, συνδυαστεί με ένα καλά ανεπτυγμένο προγραμματιστικό περιβάλλον τότε έχουμε την ιδανική πλατφόρμα για την ανάπτυξη διαδραστικών ολογραμμάτων με αλληλεπίδραση με τον τελικό χρήστη.

Φωτογραφία 1: Microsoft HoloDesk.

Το πρωτότυπο σύστημα χαμηλού κόστους το οποίο χρησιμοποιείται ως το βασικό εκπαιδευτικό εργαλείο για την εργασία αυτή είναι το HoloDesk της Microsoft (φωτογραφία 1), σύστημα που έκανε για πρώτη φορά την εμφάνισή του πολύ πρόσφατα, μόλις τον Οκτώβριο του 2011.

Είναι ένα αλληλεπιδραστικό σύστημα ανθρώπου – υπολογιστή το οποίο συνδυάζει ένα οπτικό διαπερατό σύστημα απεικόνισης και μία κάμερα Kinetic. Το HoloDesk δημιουργεί την «ψευδαίσθηση» στους χρήστες ότι έχουν άμεση αλληλεπίδραση με τις τρισδιάστατες εικόνες (ολογράμματα). Επιτρέπει ουσιαστικά στους χρήστες να έχουν άμεση επαφή με το εικονικό σύστημα απεικόνισης. Επιπρόσθετα η χρήση αλγορίθμων πραγματικού χρόνου για την αναπαράσταση των φυσικών αντικειμένων σε συνδυασμό με την σε πραγματικό χρόνο καταγραφή των κινήσεων των χεριών του χρήστη επιτρέπει τη ρεαλιστική αλληλεπίδραση μεταξύ

πραγματικών και τρισδιάστατων αντικειμένων (HoloDesk - Direct 3D Interactions with a Situated See-Through Display, 2012) .

Το ουσιαστικό στο καινοτόμο αυτό σύστημα είναι πως έχει υλοποιηθεί με χαμηλού κόστους περιφερειακές συσκευές μαζικής παραγωγής. Αυτό καθιστά την εγκατάσταση ενός παρόμοιου συστήματος στο άμεσο μέλλον εφικτή και οικονομοτεχνικά βιώσιμη στο σχολικό περιβάλλον της πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης (Βέρρα Μ., Φατούρος Σ., 2012).

Προτάσεις Λογισμικού Εφαρμογών για τη Βιώσιμη/Αειφόρο Ανάπτυξη

Επιχειρούμε να διαπιστώσουμε κατά πόσο μπορεί να ενταχθεί στην εκπαιδευτική διαδικασία και συγκεκριμένα στην καθημερινή διδακτική πρακτική η έννοια του ολογράμματος. Αυτή η «διαδραστική» μέθοδος που εντάσσεται στις Τεχνολογίες της Πληροφορίας και των Επικοινωνιών μπορεί να δώσει μία πιο ρεαλιστική και «απτή» διάσταση στη μάθηση για τους μαθητές. Είναι όμως κατάλληλο το ολόγραμμα για να ενισχυθεί η διαδικασία της μάθησης και κυρίως μπορεί να προσαρμοσθεί στις ανάγκες της σχολικής τάξης και να ανταποκριθεί στους εκπαιδευτικούς στόχους της κάθε βαθμίδας;

Ανατρέχοντας στα ισχύοντα Διαθεματικά Ενιαία Πλαίσια Προγραμμάτων Σπουδών (Δ.Ε.Π.Π.Σ.) και Αναλυτικά Προγράμματα Σπουδών (Α.Π.Σ.) του ελληνικού σχολείου διαπιστώνουμε ήδη από την πρώτη σχολική ηλικία και το χώρο του Νηπιαγωγείου τη σημασία που αποδίδεται στο περιβάλλον, καθώς υπάρχει ξεχωριστό πεδίο «Παιδί και Περιβάλλον». Στο πλαίσιο αυτής της κατεύθυνσης προγραμμάτων σχεδιασμού και δραστηριοτήτων ανάπτυξης (μίας εκ των πέντε του Δ.Ε.Π.Π.Σ. του Νηπιαγωγείου) προσεγγίζονται διαθεματικά γνώσεις και στοιχεία Περιβαλλοντικής Εκπαίδευσης (ΥΠΕΠΘ, 2003-1).

Στο Αναλυτικό Πρόγραμμα Σπουδών του Δημοτικού Σχολείου, στο γνωστικό αντικείμενο «Μελέτη Περιβάλλοντος», από την Α΄ τάξη αναφέρεται ως διδακτικός στόχος να αναγνωρίζουν τα παιδιά τη σχέση του περιβάλλοντος με την ποιότητα ζωής του ανθρώπου και να ενεργοποιούνται για τη φροντίδα και την προστασία του. Επιπλέον επιδιώκεται οι μαθητές να ευαισθητοποιηθούν για την επίδραση των δραστηριοτήτων του ανθρώπου στο φυσικό περιβάλλον, να γίνουν ικανοί να προτείνουν λύσεις για τη βελτίωση της ποιότητας ζωής και της ανάπτυξης του τόπου τους, χωρίς αυτές να επιβαρύνουν τον πλανήτη στο μέλλον, να αναπτύξουν τρόπους και δεξιότητες παρέμβασης στο άμεσο κοινωνικό περιβάλλον (οικογένεια, σχολείο, γειτονιά, τοπική αυτοδιοίκηση κ.λπ.) για την αντιμετώπιση προβλημάτων του ευρύτερου περιβάλλοντος. Καθίσταται λοιπόν σαφές από τα πρώτα χρόνια της σχολικής ζωής ότι αποτελεί βασικό στόχο του ισχύοντος Α.Π.Σ. η υιοθέτηση από τους μικρούς μαθητές θετικών στάσεων και καλών συμπεριφορών απέναντι στο περιβάλλον, έτσι ώστε αργότερα να συμμετέχουν ενεργά ως υπεύθυνοι πολίτες στην πρόληψη και επίλυση μελλοντικών περιβαλλοντικών προβλημάτων. Δεν είναι τυχαίο εξάλλου ότι από το 1990 η Περιβαλλοντική Εκπαίδευση εντάσσεται με νόμο στην ελληνική εκπαίδευση και αποτελεί τμήμα των προγραμμάτων των σχολείων πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης (ΥΠΕΠΘ, 2003-2).

Από τότε οι εξελίξεις προχώρησαν με γοργούς ρυθμούς, εξελίξεις που δε θα μπορούσαν να αφήσουν ανεπηρέαστο και το νευραλγικό για κάθε χώρα τομέα της εκπαίδευσης. Η Εκπαίδευση για την Αειφόρο Ανάπτυξη είναι μετεξέλιξη της Περιβαλλοντικής Εκπαίδευσης (ΠΕ) αλλά έχει ευρύτερο προσανατολισμό, καθώς συμπεριλαμβάνει και άλλες θεματικές ενότητες όπως για παράδειγμα την εκπαίδευση για την ειρήνη, τα ανθρώπινα δικαιώματα και τη διαφορετικότητα και την εκπαίδευση για την υγεία.

Αξίζει να σημειωθεί ότι στο πλαίσιο του Νέου Σχολείου, στην εφαρμογή του Προγράμματος Σπουδών του οποίου στοχεύει το Υπουργείο Παιδείας από το σχολικό έτος 2012-2013, υπάρχει ξεχωριστό διδακτικό - μαθησιακό πεδίο «Περιβάλλον και Εκπαίδευση για την Αειφόρο Ανάπτυξη», που διατρέχει το σύνολο της υποχρεωτικής εκπαίδευσης. Στο πεδίο αυτό (Π.Ε.Α.Α) η έννοια «αειφορία» με αφορμή διάφορα γεγονότα της παγκόσμιας συγκυρίας επανέρχεται στο προσκήνιο και η Εκπαίδευση για την Αειφόρο Ανάπτυξη θεωρείται ως μία ιδανική απάντηση στο αίτημα της παγκόσμιας κοινότητας για την αντιμετώπιση της περιβαλλοντικής κρίσης και της κρίσης αξιών.

Τα τελευταία χρόνια ενισχύεται η ιδέα για μία Εκπαίδευση για την Αειφόρο Ανάπτυξη. Η εκπαίδευση αυτή, μεταξύ άλλων, προσανατολίζεται προς την υιοθέτηση ενός νέου εκπαιδευτικού παραδείγματος, την ανάπτυξη της συστημικής και κριτικής σκέψης, την ολιστική - διεπιστημονική προσέγγιση των θεμάτων και την ανάπτυξη δράσης υπέρ του περιβάλλοντος και του ανθρώπου. Επιπλέον η δεκαετία 2005-2014 χαρακτηρίζεται από τα Ηνωμένα Έθνη ως «Δεκαετία της Εκπαίδευσης για την Αειφόρο Ανάπτυξη». Η εκπαίδευση για τη βιώσιμη ή αλλιώς πράσινη ανάπτυξη γίνεται η αφετηρία για μία διαφορετική εκπαιδευτική προσέγγιση που θα βοηθήσει τους μαθητές να κατανοήσουν καλύτερα τον κόσμο μέσα στον οποίο ζουν, να αντιληφθούν τη διασύνδεση των προβλημάτων (π.χ. υπερκατανάλωση, εξάντληση φυσικών πόρων, παρακμή των πόλεων, ανισότητα των φύλων και φυλών, παραβίαση των ανθρωπίνων δικαιωμάτων, περιβαλλοντική υποβάθμιση κ.ά.) και τελικά να καταστούν ικανοί να αντιμετωπίσουν την πολυπλοκότητα της πραγματικότητας ως μελλοντικοί υπεύθυνοι, ενεργοί και με οικολογική συνείδηση πολίτες (ΥΠΔΒΜΘ, 2011).

Το ολόγραμμα λοιπόν θεωρούμε ότι θα μπορούσε να προσδώσει κάτι παραπάνω προς την κατεύθυνση που θέλουμε: οι μαθητές να καταλάβουν το πρόβλημα και να μάθουν να βρίσκουν πώς θα αναζητούν τη λύση για την επίλυση προβλημάτων. Η εικονική πραγματικότητα είναι κάτι που από μόνο του προσελκύει το ενδιαφέρον των παιδιών, ειδικά στη σημερινή εποχή, όπου τα παιδιά «βάλλονται» από παντού από υπολογιστές και συσκευές σύγχρονης τεχνολογίας. Μέσα από την τρισδιάστατη αναπαράσταση αντικειμένων ή γεγονότων θα μπορούν να βλέπουν μπροστά τους, να «εκτυλίσσονται ζωντανά», παραδείγματα, πιθανά σενάρια, συνέπειες, εφαρμογή λύσεων, «εικονικά» αλλά ρεαλιστικά αποτελέσματα.

Για παράδειγμα σχεδιάζοντας ή εφαρμόζοντας ένα λογισμικό - λαμβάνοντας πάντα υπόψη την τάξη που απευθυνόμαστε - σχετικά με την αποψίλωση των δασών και τις επιπτώσεις της ενέργειας αυτής, θα μπορούσαμε να συμπεριλάβουμε τα εξής στοιχεία: την αρχική εικόνα ενός δάσους με αναπαριστάμενες «σκηνές» της ζωής εκεί, έπειτα τη διαδικασία της αποψίλωσης και στη συνέχεια την εικόνα του δάσους μετά το γεγονός της κοπής των δέντρων με τη ζωή που υπάρχει στο οικοσύστημα αυτό. Τέλος θα έπρεπε να δοθεί έμφαση στις επιπτώσεις της αποδάσωσης και στα στενά όρια του δάσους, αλλά και ευρύτερα στη ζωή του ανθρώπου. Σαφώς αυτά τα δεδομένα θα μπορούσαν να δοθούν στα παιδιά και με άλλους τρόπους. Όμως εστιάζουμε στο γεγονός ότι σε ένα τέτοιο σύστημα οι μαθητές θα μπορούσαν να λειτουργήσουν διαδραστικά. Να έρθουν σε αλληλεπίδραση με τα προσφερόμενα δεδομένα και να διαπιστώσουν «άμεσα» και ρεαλιστικά, αν και εικονικά, τα αποτελέσματα της όποιας δράσης τους. Έτσι θα είχαν την ευκαιρία να «δημιουργήσουν» διαφορετικές συνθήκες στο πιο πάνω παράδειγμα, να φτιάξουν διάφορα σενάρια με άλλο τέλος κάθε φορά κι με αυτόν τον τρόπο να συγκρίνουν καταστάσεις και να κατανοήσουν ποια είναι η ορθολογική χρήση και διαχείριση του φυσικού πλούτου και του περιβάλλοντος.

Ένα άλλο παράδειγμα που θα μπορούσε να βρει εφαρμογή σε μία σχολική τάξη (από την Ε΄ τάξη του Δημοτικού και πάνω, καθώς σχετίζεται άμεσα με τις Φυσικές Επιστήμες) είναι ένα λογισμικό με την παρουσίαση ενός «οικολογικού χωριού». Δίνεται δηλαδή αρχικά ένας μικρόκοσμος, μία κοινωνία, ένα χωριό, που δραστηριοποιείται χρησιμοποιώντας σε όλες τις εκφάνσεις της καθημερινότητάς του την ηλεκτρική ενέργεια. Το μέρος αυτό στερείται αρχικά χλωρίδας, ενώ στον ουρανό εμφανίζονται μάζες καπνού από τα φουγάρα ενός παρακείμενου εργοστασίου παραγωγής ηλεκτρικής ενέργειας. Ο μαθητής έχει τη δυνατότητα να δει σε ένα άλλο επίπεδο τις επιπτώσεις της υπερκατανάλωσης αυτής της μορφής ενέργειας - επιβάρυνση περιβάλλοντος με την εξάντληση φυσικών πόρων (λιγνίτης), αποψίλωση των δέντρων και έλλειψη πράσινου γύρω, αύξηση κόστους ζωής, δυσκολία συντήρησης και εκμετάλλευσης συστημάτων παραγωγής ηλεκτρικής ενέργειας κλπ. Στη συνέχεια το χωριό αυτό μετατρέπεται σε «οικολογικό χωριό», όπου τοποθετούνται φωτοβολταϊκά συστήματα και αξιοποιούνται οι απεριόριστες δυνατότητες μίας φυσικής πηγής, του ήλιου. Χρησιμοποιώντας συλλέκτες ηλιακής ενέργειας (πάνελ) θα μπορεί να μετατραπεί η ενέργεια αυτή σε ηλεκτρική. Ο μαθητής θα μπορεί προσθέτοντας σταδιακά πάνελ σε κάποιο σπίτι του χωριού ή σε ένα χωράφι να δει ότι ναι μεν καταναλώνεται η ίδια ποσότητα ενέργειας από τους ανθρώπους του χωριού, αλλά πλέον η ενέργεια αυτή παράγεται με φυσικό τρόπο και έτσι σιγά - σιγά εξαλείφονται οι βλαβερές συνέπειες στο περιβάλλον. Το χωριό αρχίζει

να ξαναβρίσκει το πράσινο χρώμα του, καθώς η ατμόσφαιρα καθαρίζει, τα δέντρα ξανακάνουν την εμφάνισή τους και οι κάτοικοι ζουν άνετα μέσα σε έναν πιο υγιή περιβάλλοντα χώρο.

Επομένως αποδίδουμε μεγάλη σημασία στη δυνατότητα παρέμβασης των μαθητών μέσα στο εκτυλισσόμενο «σενάριο», έτσι ώστε να έχουν τη δυνατότητα να βλέπουν άμεσα «μπροστά στα μάτια τους» τα αποτελέσματα της δράσης τους και να εξάγουν τα συμπεράσματά τους βασιζόμενοι σε κατά συνθήκη πραγματικά δεδομένα. Εικονική πραγματικότητα μεν, πραγματικές ιδιότητες τεχνητών αντικειμένων δε!

Φυσικά σε όλη αυτή τη διαδικασία βασικό ρόλο θα έχει ο εκπαιδευτικός, που από τη μία πλευρά θα επιλέγει τα χρησιμοποιούμενα λογισμικά ανάλογα με το επίπεδο, το γνωστικό υπόβαθρο και τις εκπαιδευτικές ανάγκες των μαθητών του, και από την άλλη θα κατευθύνει την πορεία της διδακτικής διαδικασίας. Άλλωστε επιδιώκουμε το παραγόμενο από υπολογιστή ολόγραμμα να αποτελέσει εποπτικό μέσο και αποδοτικό εργαλείο στα χέρια του εκπαιδευτικού και σε καμία περίπτωση να μην «εισέλθει» στη σχολική τάξη για να υποκαταστήσει ή πολύ περισσότερο για να αντικαταστήσει τον εκπαιδευτικό και το σημαίνοντα ρόλο του.

Με αυτή την εκπαιδευτική πρακτική θα ξεφύγουμε από την «παραδοσιακή» δασκαλοκεντρική μέθοδο διδασκαλίας και θα περάσουμε στη μαθητοκεντρική. Και μάλιστα ο μαθητής θα διαδραματίζει πρωτεύοντα ρόλο, καθώς θα καθίσταται «συν-διαμορφωτής» της γνώσης. Ο δάσκαλος ή ο καθηγητής δε δίνει έτοιμη μία στείρα γνώση. Δημιουργεί τις κατάλληλες συνθήκες ώστε το παιδί να μάθει μέσα από τις δικές του ανάγκες, τα δικά του κίνητρα, τη δική του γνωστική ανάπτυξη. Συντελείται επομένως η διαδικασία μάθησης με τρόπο που «δικαιώνει» τις βασικές αρχές της κριτικής παιδαγωγικής. Ενισχύεται αυτό το παιδαγωγικό ρεύμα, αυτή η διεπιστημονική θεωρία, που αναλύει τις πολιτιστικές και κοινωνικές βάσεις των γνωστικών τομέων και έχει ως δημόσια αποστολή να κάνει την κοινωνία πιο δημοκρατική. Προσπαθεί ταυτόχρονα να είναι θεωρητική και πρακτική. Οι αξίες προς τις οποίες στοχεύει η κριτική παιδαγωγική είναι η ανθρώπινη αξιοπρέπεια, η ελευθερία, η ισότητα , η κοινωνική δικαιοσύνη. Η κριτική παιδαγωγική είναι μια παιδεία της αμφισβήτησης που στηρίζεται σε αρχές όπως η κοινωνική δικαιοσύνη, η ισότητα και ο σεβασμός των διαφορών. Επομένως η διαπαιδαγώγηση μαθητών κάτω από αυτό το πρίσμα οδηγεί σε ανθρώπους με δημοκρατικό τρόπο σκέψης, οι οποίοι προφανώς θα έχουν και συνείδηση της ανάγκης προστασίας και διατήρησης του κόσμου που μας περιβάλλει και άρα και του φυσικού περιβάλλοντος. Διαμορφώνονται μελλοντικοί πολίτες του κόσμου, οι οποίοι θα συναισθάνονται την ανάγκη για ύπαρξη της Αειφόρου/Βιώσιμης Ανάπτυξης και θα δρουν αναλογιζόμενοι τη σπουδαιότητα του σεβασμού προς το συνάνθρωπο και προς το περιβάλλον που μας «φιλοξενεί».

Παιδαγωγικά οφέλη

Συνοψίζοντας θα λέγαμε ότι από τη χρήση του παραγόμενου από υπολογιστή ολογράμματος μέσα στη σχολική τάξη και από την ενσωμάτωσή του στην καθημερινή εκπαιδευτική διαδικασία μπορούν να προκύψουν σημαντικά παιδαγωγικά οφέλη. Το κυριότερο έχει να κάνει με τη δυνατότητα επωφελούς διαδραστικής παρέμβασης από την πλευρά του παιδιού. Ο μαθητής δε μένει αμέτοχος κατά τη διδασκαλία. Αντίθετα συμμετέχει ενεργά, μεταβάλλει τα δεδομένα, δοκιμάζει, παρατηρεί, συμπεραίνει, βιώνει. Λειτουργεί «διαδραστικά» και κατά τη στιγμή αυτή δίνει και παίρνει στοιχεία, βιώματα, γνώσεις. Η εικονική πραγματικότητα φέρει από μόνη της ενδιαφέροντα στοιχεία, ικανά να προσελκύσουν την προσοχή των μικρών παιδιών. Τα τεχνολογικά αυτά εργαλεία λοιπόν, όπως το CGH, μπορούν να αποτελέσουν το επιπλέον εποπτικό μέσο διδασκαλίας που θα οδηγήσει τη διαδικασία μάθησης σε διαφορετικά μονοπάτια. Όταν το παιδί απεγκλωβίζεται από την παθητική στάση του απλού δέκτη και αναλαμβάνει ενεργό ρόλο μέσα στην τάξη, αμέσως αυξάνεται η διάθεσή του για συμμετοχή και το κίνητρό του για μάθηση. Για να γίνει αυτό όμως χρειάζεται μία διαφορετική προσέγγιση από αυτό που έχει συνηθίσει, μία προσέγγιση που θα του αφήνει περιθώρια να νιώσει χρήσιμο και σημαντικό στον περίγυρό του.

Φεύγουμε λοιπόν από την κλασσική μορφή διδασκαλίας, όπως τη γνωρίζαμε μέχρι σήμερα και προχωράμε ένα βήμα παραπέρα˙ σε μια διαδικασία μάθησης όπου ο μαθητής είναι στο επίκεντρο (μαθητοκεντρική μέθοδος) και ο εκπαιδευτικός είναι εκεί για να τον καθοδηγήσει προς την

απόκτηση της γνώσης και όχι για να του τη μεταφέρει απλά, με τρόπο δηλαδή καθαρά «διεκπεραιωτικό» και συχνά στείρο και μη ενδιαφέροντα. Η διαδικασία μάθησης είναι - ή τουλάχιστον οφείλει να είναι - μία ζωντανή διαδικασία. Μία ευχάριστη και ενδιαφέρουσα στιγμή μέσα στην τάξη τόσο για το μαθητή, όσο και για τον εκπαιδευτικό. Μία πράξη που ενδεχομένως θα κρύβει και «απρόοπτα». Αυτά μπορεί να αποτελέσουν αφορμή για αλλαγή διδακτικής πορείας, εξερεύνηση καινούριων γνώσεων, εμβάθυνση σε κάποιες έννοιες, καλύτερη κατανόηση, ευκολότερη απόκτηση της γνώσης. Άλλωστε σύμφωνα με μία από τις κυρίαρχες θεωρίες μάθησης, αυτή του κονστρουκτιβισμού, η απόκτηση γνώσεων επιτυγχάνεται με την οικοδόμηση γνώσεων πάνω στις προϋπάρχουσες (γνωστικός εποικοδομισμός κατά τον Piaget). Όσο ανεβαίνουμε σκαλοπάτια στη σχολική πραγματικότητα το παιδί πρέπει να δομεί και να διευρύνει σταδιακά τις γνώσεις του. Και αυτό το σύγχρονο μέσο των Νέων Τεχνολογιών θεωρούμε ότι μπορεί να βοηθήσει προς αυτήν την κατεύθυνση, καθώς επίσης και στην επίτευξη ενός ακόμη στόχου της σύγχρονης παιδαγωγικής, που δεν είναι άλλος από τον τεχνολογικό – ψηφιακό γραμματισμό. Γιατί δε νοείται στη σημερινή κοινωνία της κυριαρχίας της τεχνολογίας στην καθημερινότητά μας ο σύγχρονος πολίτης να είναι τεχνολογικά «αγράμματος» και να μην μπορεί να ανταποκριθεί στις «ψηφιακές προκλήσεις» (Βέρρα Μ., Φατούρος Σ., 2012).

Επιπροσθέτως στη συγκεκριμένη περίπτωση που εστιάζουμε στην εκπαίδευση για την Αειφόρο Ανάπτυξη, στόχος μας κατά την εκπαιδευτική διαδικασία δεν είναι μόνο η απόκτηση γνώσεων, αλλά και η διαμόρφωση οικολογικής συνείδησης και η εδραίωση αξιών. Οι μαθητές σίγουρα πρέπει πρώτα να μάθουν τη σημασία του περιβάλλοντος στη ζωή μας, το βαθμό της αλληλεπίδρασης που έχουμε με αυτό, την ανάγκη προστασίας του και τους τρόπους με τους οποίους μπορεί να γίνει αυτό. Ακόμα σημαντικότερο όμως ίσως είναι να κατανοήσουν πλήρως ότι ο πλανήτης είναι το δεύτερο σπίτι μας και η προστασία του περιβάλλοντος αποτελεί και προστασία του ίδιου μας του εαυτού. Το παραγόμενο από υπολογιστή ολόγραμμα είναι μία τεχνολογία η οποία με ένα κατάλληλο λογισμικό, όπως ενδεικτικά αναφέρθηκαν παραπάνω, θα παρουσιάσει στα παιδιά άμεσα και «ζωντανά» κάποιες εικόνες από το περιβάλλον μας, κάποια στοιχεία που θα κάνουν εύκολα και ταυτόχρονα δυναμικά σαφή και κατανοητή την ανάγκη για τόνωση του ενδιαφέροντος για τον κόσμο που μας περιβάλλει.

Συμπεράσματα

Η ενσωμάτωση και η χρήση του παραγόμενου από υπολογιστή ολογράμματος στην σχολική πραγματικότητα - ενταγμένο μέσα στα εργαστήρια ΤΠΕ - είναι κατά την άποψη μας ένα σημαντικό βήμα για την εισροή απαραίτητων καινοτόμων εφαρμογών που θα καταδείξουν νέα, γόνιμα μονοπάτια για τη μάθηση και την αφομοίωση της γνώσης. Η αναζήτηση, προσαρμογή και χρήση τελικά αυτών των καινοτόμων εφαρμογών είναι χρονικά ώριμη για την ελληνική σχολική πραγματικότητα. Μια πραγματικότητα που χρειάζεται επανασχεδιασμό και επαναδόμηση για να ξεκλειδώσουν νέες παιδαγωγικές πρακτικές.

Διευρύνουν δηλαδή την οπτική μας σε θέματα διδακτικής και παιδαγωγικής και μπορούν να προσδώσουν μία προστιθέμενη αξία στις προσπάθειες του εκπαιδευτικού – παιδαγωγού και τελικά να συμβάλουν με θετικό τρόπο στην επίτευξη του στόχου της μάθησης. Επιπλέον τα λογισμικά ολογραμμάτων πρέπει να χρησιμοποιηθούν ως εποπτικό μέσο διδασκαλίας, ως εργαλείο στα χέρια του εκπαιδευτικού, ως μέσο διευκόλυνσης για να γίνεται πιο κατανοητή η γνώση και να αποκτάται πιο εύκολα από τους μαθητές και να λειτουργούν συμπληρωματικά στο έργο του εκπαιδευτικού μέσα στην τάξη (Βέρρα Μ., Φατούρος Σ., 2012).

Η χρήση των πιο πάνω προτεινόμενων λογισμικών μέσα από την τεχνολογία του CGH θεωρούμε πως μπορεί να συμβάλει με θετικό τρόπο στη διαμόρφωση οικολογικής συνείδησης και στην υιοθέτηση καλών πρακτικών για το περιβάλλον από τους μαθητές, ενταγμένα στο ευρύτερο πεδίο της βιώσιμης ανάπτυξης. Είναι μέρος ενός γενικότερου πλαισίου δράσεων για τη θεμελίωση μίας ολιστικής προσέγγισης της «αειφορίας» στη ζωή μας. Βοηθούν και συμβάλλουν τελικά στη διαμόρφωση μιας γενικότερης φιλοσοφίας και στάσης οικολογικής με την οριζόντια εφαρμογή τους στην πρωτοβάθμια και δευτεροβάθμια εκπαίδευση.

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Ανάπτυξη και Εφαρμογή ενός Πλαισίου Αξιολόγησης για Πύλες Περιβαλλοντικής Εκπαίδευσης / Εκπαίδευσης για την Αειφόρο Ανάπτυξη

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Περίληψη

Τα τελευταία χρόνια έχουν αναπτυχθεί διεθνώς αρκετές διαδικτυακές πύλες που συγκεντρώνουν εκπαιδευτικό υλικό και πληροφορία για την Περιβαλλοντική Εκπαίδευση και την Εκπαίδευση για την Αειφόρο Ανάπτυξη. Στο άρθρο αυτό τεκμηριώνεται η αναγκαιότητα αξιολόγησης αυτών των πυλών και προτείνεται ένα πλαίσιο αξιολόγησής τους. Το πλαίσιο αυτό είναι αποτέλεσμα της σύνθεσης κριτηρίων για την αξιολόγηση διαδικτυακών εκπαιδευτικών πηγών γενικότερα και νέων κριτηρίων που αναδείχθηκαν από τη μελέτη πυλών που αναφέρονται στο συγκεκριμένο αντικείμενο. Στη συνέχεια αναλύονται τα κυριότερα αποτελέσματα από την εφαρμογή αυτού του πλαισίου σε τριάντα πύλες. Από τα αποτελέσματα γίνεται σαφές ότι οι πύλες ικανοποιούν σε σημαντικό βαθμό τα κριτήρια που αναφέρονται σε τεχνικές-λειτουργικές προδιαγραφές. Σε μικρότερο βαθμό ικανοποιούνται τα κριτήρια που συνδέονται με τη θεματική ποικιλότητα, τους τύπους και την παρουσίαση του περιεχομένου. Σαφή ελλείμματα καταγράφονται, ωστόσο, στην προσαρμογή του εκπαιδευτικού περιεχομένου προκειμένου να μπορεί να ενσωματωθεί εύκολα στη διδακτική πράξη.

Abstract

Several portals for Environmental Education and Education for Sustainable Development have been developed during the last years. This article emphasizes the need of evaluating these portals while it proposes an evaluation framework, i.e. a list of criteria. This list combines criteria deriving from existing frameworks that focus on web-based educational resources in general and new ones which emerged during an exploration of such specific portals. Furthermore, this article analyses the main results of an evaluation of thirty portals based on this framework. The findings indicate that these portals meet the most of the functional criteria while there is still much room for improving thematic diversity, types and the presentation of their content. Sufficient adjustments are needed to properly integrate portals' content into educational praxis.

Εισαγωγή

Η ραγδαία εξέλιξη που γνώρισε το διαδίκτυο τα τελευταία είκοσι χρόνια ως μέσο διάδοσης της πληροφορίας δημιούργησε την ανάγκη οργάνωσης της πληθώρας των δεδομένων προκειμένου οι χρήστες να εντοπίζουν εύκολα και γρήγορα τα στοιχεία που τους ενδιαφέρουν. Στην ανάγκη αυτή ανταποκρίνεται η ανάπτυξη των διαδικτυακών πυλών (portals). Μολονότι δεν είναι εύκολο να οριστούν με αυστηρό τρόπο, οι διαδικτυακές πύλες αποτελούν οργανωμένες συλλογές πληροφορίας και υπηρεσιών πληροφόρησης (π.χ. λειτουργίες αναζήτησης, εφαρμογές επικοινωνίας και συνεργασίας όπως κοινότητες χρηστών κ.ά.), οι οποίες συχνά υποστηρίζονται από δυναμικές βάσεις δεδομένων και λειτουργούν ως αφετηρία στην περιήγηση των χρηστών στον παγκόσμιο ιστό (Gappa and Nordbrock, 2004; Yang et al., 2005). Την τελευταία δεκαετία έχουν καταγραφεί διάφορα ταξινομικά σχήματα που επιδιώκουν να οργανώσουν τη μεγάλη ποικιλία τέτοιων εφαρμογών σε επιμέρους κατηγορίες, με κριτήρια όπως ο τρόπος προσέγγισης της πληροφορίας (π.χ. οριζόντιες – κάθετες) και ο σκοπός τους (π.χ. πύλες αναζήτησης, καταναλωτικές, κυβερνητικές, εταιρικές κ.ά.) (Strauss, 2002; Townsend et al., 2004). Κοινό τόπο, ωστόσο, μεταξύ διαφορετικών πυλών αποτελούν ορισμένα βασικά χαρακτηριστικά όπως η σταθερή διεπαφή, η συνεχής ενημέρωση του περιεχομένου, η μηχανή αναζήτησης, τα εργαλεία συντήρησης της πύλης, η ασφάλεια του περιεχομένου κ.ά. (Townsend et al., 2004).

Η εκπαίδευση αποτελεί έναν τομέα που επωφελείται σημαντικά από τα πλεονεκτήματα του διαδικτύου και των διαδικτυακών πυλών. Τόσο οι εκπαιδευόμενοι όσο και οι εκπαιδευτές αποκτούν πρόσβαση σε έναν τεράστιο όγκο πληροφορίας και υλικού, τα οποία μπορούν να αξιοποιήσουν στο πλαίσιο διδακτικών-μαθησιακών δραστηριοτήτων στην τυπική και στη δια βίου εκπαίδευση. Τα τελευταία χρόνια διεθνείς οργανισμοί, κρατικοί και μη κυβερνητικοί φορείς έχουν δημιουργήσει μια νέα κατηγορία, τις εκπαιδευτικές πύλες, οι οποίες επιτρέπουν την εύκολη πρόσβαση σε εκπαιδευτικό υλικό, σχετικές πληροφορίες και ειδήσεις ενώ υποστηρίζουν την επικοινωνία και συνεργασία μέσω ανταλλαγής μηνυμάτων/υλικού και ανάπτυξης διαλόγου (Burke, 2001).

Μια υποκατηγορία εκπαιδευτικών πυλών, οι πύλες Περιβαλλοντικής Εκπαίδευσης / Εκπαίδευσης για την Αειφόρο Ανάπτυξη (ΠΕ/ΕΑΑ), φιλοδοξούν να υποστηρίξουν τα μέλη της αντίστοιχης κοινότητας (εκπαιδευτές, εκπαιδευόμενους και άλλους ενδιαφερόμενους). Η ΠΕ/ΕΑΑ αποτελεί ένα σχετικά νέο εκπαιδευτικό πεδίο που επιδιώκει την προσέγγιση και κατανόηση των σύγχρονων περιβαλλοντικών-κοινωνικών ζητημάτων μέσα από μια διεπιστημονική και διαθεματική οπτική. Επενδύει στην κριτική και τη συστημική σκέψη ενώ είναι σταθερά προσανατολισμένη στις αξίες και την πολιτική δράση (Φλογαΐτη, 2006; Λιαράκου και Φλογαΐτη, 2007). Έχοντας αυτά τα χαρακτηριστικά, η ΠΕ/ΕΑΑ αντλεί από μια ευρύτατη θεματολογία, επιδιώκει ένα σύνθετο φάσμα στόχων, που ξεκινά από τον γνωστικό τομέα και καταλήγει στην καλλιέργεια αξιών και ικανοτήτων δράσης, ενώ παράλληλα αξιοποιεί μια μεγάλη ποικιλία μεθοδολογικών προσεγγίσεων. Κατ' επέκταση, η πληροφορία και το εκπαιδευτικό υλικό που εντάσσεται σε αυτό το πεδίο συνδέεται με μεγάλη ποικιλία θεματικών ενοτήτων, παιδαγωγικών προσεγγίσεων και μεθοδολογικών εργαλείων. Η ποικιλότητα αυτή δικαιολογεί την εμφάνιση των πυλών ΠΕ/ΕΑΑ, οι οποίες επιδιώκουν την οργάνωση και αποτελεσματική διάδοση της σχετικής πληροφορίας. Στον διεθνή αλλά και στον ελληνικό χώρο καταγράφονται σήμερα αρκετές διαδικτυακές εφαρμογές που θα μπορούσαν να χαρακτηριστούν ως πύλες ΠΕ/ΕΑΑ. Σε αυτή την κατηγορία δεν συμπεριλαμβάνονται εφαρμογές οι οποίες περιέχουν πληροφορία σχετικά με τα ζητήματα του περιβάλλοντος και της αειφορίας αλλά δεν έχουν εκπαιδευτικό προσανατολισμό. Χαρακτηριστικά παραδείγματα πυλών ΠΕ/ΕΑΑ στον ελληνικό χώρο αποτελούν η Πύλη Παιδαγωγικού Υλικού Περιβαλλοντικής Εκπαίδευσης (www.env-edu.gr), η πύλη του Κέντρου Περιβαλλοντικής Εκπαίδευσης Καστοριάς (www.kpe.gr) και η πύλη του ΕΚΚΕ/ΙΑΑΚ 'Περιβαλλοντική Γωνιά' (www.ekke.gr/estia/gr_pages/gr_index.htm) (Γαβριλάκης κ.ά., 2009).

Το γεγονός ότι έχει αναπτυχθεί πλέον ένας μεγάλος αριθμός πυλών ΠΕ/ΕΑΑ καθιστά αναγκαία τη δημιουργία ενός πλαισίου αξιολόγησής τους, μέσω του οποίου οι χρήστες τέτοιων εφαρμογών θα μπορούν να αναγνωρίσουν εύκολα τα πλεονεκτήματα, τις αδυναμίες και τα ιδιαίτερα χαρακτηριστικά κάθε πύλης. Μέχρι σήμερα, ωστόσο, δεν υπάρχει ένα τέτοιο πλαίσιο. Αντίθετα, τις τελευταίες δεκαετίες αρκετοί ερευνητές έχουν ασχοληθεί με την ανάπτυξη εργαλείων για την

αξιολόγηση πυλών και διαδικτυακών πηγών γενικότερα. Μεταξύ αυτών αξίζει να επισημανθεί το πλαίσιο του Harris (1997) με τίτλο 'Evaluating Internet Research Sources' και ειδικότερα η λίστα κριτηρίων CARS (Credibility, Accuracy, Reasonableness, Support – Αξιοπιστία, Ακρίβεια, Λογική, Υποστήριξη) που επικαιροποιείται συνεχώς και ασχολείται με την ποιότητα του περιεχομένου ιστότοπων, καθώς και η ρουμπρίκα της Payton (1997) με κριτήρια για την αξιολόγηση ιστότοπων από μαθητές, η οποία δεν περιορίζεται μόνο στο περιεχόμενο αλλά αξιολογεί επίσης τον σχεδιασμό, τα τεχνικά χαρακτηριστικά και την αξιοπιστία ενός ιστότοπου. Την αξιολόγηση του περιεχομένου ενός ιστότοπου επιδιώκει επίσης το πλαίσιο της Beck (1997) που περιλαμβάνει πέντε κατηγορίες κριτηρίων (Authority, Accuracy, Objectivity, Currency, Coverage – Κύρος, Ακρίβεια, Αντικειμενικότητα, Επικαιρότητα, Κάλυψη) και το παρεμφερές πλαίσιο του Kapoun (1998). Μια διαφορετική προσέγγιση προτείνουν οι Von Dran et al. (1999) με το μοντέλο 'Kano' που διαβαθμίζει την έννοια ποιότητα σε όρους περιεχομένου, σχεδίασης και λειτουργικότητας και δίνει έμφαση στην ελκυστικότητα του ιστότοπου για τον χρήστη. Πιο πρόσφατα πλαίσια αξιολόγησης είναι το Web-site Quality Evaluation Methodology (QEM) των Olsina et al. (2001) για τα τεχνικά χαρακτηριστικά και τις λειτουργίες ενός ιστότοπου, που εισάγει την ιεραρχική οργάνωση των κριτηρίων σε κατηγορίες, υποκατηγορίες και ιδιότητες καθώς και την κατάταξη των χρηστών σε κατηγορίες. Ο Dragulanescu (2002) προσθέτει τρεις νέες κατηγορίες (Density, Interactivity, Promptness – Πυκνότητα, Διαδραστικότητα, Αμεσότητα) στα προηγούμενα πλαίσια ενώ η McLachlan (2002) παρουσιάζει δύο ρουμπρίκες, μία που αναφέρεται στο περιεχόμενο και μία στη σχεδίαση του ιστότοπου. Το 2003, ο Ευρωπαϊκός οργανισμός Minerva (Minerva, 2003) δημοσίευσε δέκα αρχές ποιότητας για την αξιολόγηση πολιτιστικών ιστότοπων. Επιπλέον, οι McInerney and Bird (2004) πρότειναν ένα εργαλείο (Website Quality Evaluation Tool - WQET) που αξιολογεί με ενιαίο τρόπο τόσο το περιεχόμενο όσο και τις τεχνικές λειτουργίες ενός ιστότοπου. Τέλος, ένα ιδιαίτερα συνεκτικό πλαίσιο αξιολόγησης διαδικτυακών εκπαιδευτικών πηγών, το οποίο ενέπνευσε και την εργασία που παρουσιάζεται σε αυτό το άρθρο, είναι αυτό των Sofos and Kostas (2009), οι οποίοι άλλωστε επισημαίνουν ότι είναι προτιμότερο να χρησιμοποιηθεί ένα εξειδικευμένο μοντέλο αξιολόγησης για κάθε επιστημονικό πεδίο (εκπαίδευση, οικονομία, πολιτισμός κ.λπ.) παρά ένα γενικευμένο για κάθε ιστότοπο, λόγω της μεγάλης ετερογένειας της διαδικτυακής πληροφορίας.

Αν και τα παραπάνω πλαίσια δεν αναφέρονται ειδικά σε εκπαιδευτικές πύλες, ωστόσο μπορούν να αποτελέσουν τη βάση για την ανάπτυξη ενός εξειδικευμένου προτύπου για την αξιολόγηση πυλών ΠΕ/ΕΑΑ. Στην εργασία που παρουσιάζεται εδώ επιδιώχθηκε η ανάπτυξη ενός τέτοιου πλαισίου κριτηρίων αξιολόγησης πυλών ΠΕ/ΕΑΑ και η εφαρμογή του σε μια σειρά από χαρακτηριστικές πύλες του χώρου που καταγράφονται σε εθνικό και διεθνές επίπεδο. Η εφαρμογή αυτή επιτρέπει την αποτύπωση μιας συνολικής εικόνας των πλεονεκτημάτων και των περιθωρίων βελτίωσης των πυλών. Η εικόνα αυτή μπορεί επιπλέον να διευκολύνει τον χρήστη στον εντοπισμό των καταλληλότερων πυλών σύμφωνα με τα δικά του κριτήρια και προτιμήσεις.

Μεθοδολογία

Για την επίτευξη του σκοπού της εργασίας, πραγματοποιήθηκε αρχικά μια συστηματική καταγραφή υφιστάμενων πλαισίων αξιολόγησης διαδικτυακών πηγών (ιστοτόπων και άλλων εφαρμογών). Καθώς, όπως αναφέρθηκε και παραπάνω, δεν υπάρχει μέχρι σήμερα ένα πλαίσιο που να έχει διαμορφωθεί ειδικά για εκπαιδευτικές πύλες, και ως εκ τούτου για πύλες ΠΕ/ΕΑΑ, δανειστήκαμε αρχικά κατηγορίες και κριτήρια από αυτά τα πλαίσια και τα εμπλουτίσαμε στη συνέχεια με νέα κριτήρια που απορρέουν από το θεωρητικό πλαίσιο και τις αρχές του πεδίου της ΠΕ/ΕΑΑ. Πιο κοντά στις ανάγκες του δικού μας εγχειρήματος βρίσκεται το πλαίσιο που έχει αναπτυχθεί από τους Sofos and Kostas (2009) και γι' αυτό αποτέλεσε τη βάση της προσπάθειάς μας. Από την αρχική αυτή μήτρα, ορισμένα κριτήρια δεν συμπεριλήφθηκαν, με το σκεπτικό ότι δεν μπορούν να χρησιμοποιηθούν για την αξιολόγηση μιας πύλης ΠΕ/ΕΑΑ. Ορισμένα άλλα προσαρμόστηκαν κατάλληλα, ενώ προστέθηκαν αρκετά νέα κριτήρια, τα οποία κρίθηκαν απαραίτητα για την αξιολόγηση μιας τέτοιας πύλης. Από το σύνολο των τελικών κριτηρίων, το

52% δεν υπήρχαν στην αρχική μήτρα. Θα πρέπει να υπογραμμιστεί ότι το αρχικό πλαίσιο που διαμορφώσαμε αναθεωρήθηκε κατά τη διαδικασία αξιολόγησης πυλών ΠΕ/ΕΑΑ που ακολούθησε, αρκετά κριτήρια προσαρμόστηκαν, ορισμένα αφαιρέθηκαν και άλλα προστέθηκαν βάσει νέων στοιχείων που εντοπίζονταν στις πύλες.

Για να διαμορφωθεί ένα πλαίσιο που επιτρέπει μια κατά το δυνατό αντικειμενική αξιολόγηση, δόθηκε ιδιαίτερη βαρύτητα στην επιλογή και διαμόρφωση κριτηρίων που διαβαθμίζονται στην κλίμακα 'ναι/όχι', 'υπάρχει/δεν υπάρχει', 'προσφέρεται/δεν προσφέρεται'. Η επιλογή αυτή δεν ευνοεί την ποιοτική ανάλυση κάθε κριτηρίου, αλλά δίνει τη δυνατότητα αποτύπωσης μιας ξεκάθαρης συνολικής εικόνας κάθε πύλης ενώ επιτρέπει και τη συγκριτική αξιολόγηση μεταξύ διαφορετικών πυλών. Θα πρέπει να σημειωθεί εξάλλου ότι το πλαίσιο αυτό δεν προσανατολίζεται στην αξιολόγηση της ποιότητας του περιεχομένου, κάτι το οποίο δεν αποτελεί αντικείμενο της παρούσας εργασίας.

Μετά την ανάπτυξη του αρχικού πλαισίου, αναζητήθηκαν στο διαδίκτυο και επιλέχθηκαν προς αξιολόγηση 30 πύλες ΠΕ/ΕΑΑ, ένας αριθμός που δεν απέχει πολύ από το σύνολο των πυλών αυτού του είδους. Κοινό γνώρισμα των πυλών αυτών είναι ότι περιέχουν πληροφορία και υλικό το οποίο είτε δηλώνεται ρητά είτε συνάγεται από τα χαρακτηριστικά του ότι μπορεί να απευθύνεται στην εκπαιδευτική κοινότητα, με την έννοια ότι μπορεί να αξιοποιηθεί σε μια εκπαιδευτική διαδικασία. Από τις τριάντα πύλες, οι δύο είναι ελληνικές και οι υπόλοιπες διεθνείς στην αγγλική γλώσσα. Πρέπει να σημειωθεί ότι αν και μπορεί να υπάρχουν ορισμένες αξιόλογες πύλες ΠΕ/ΕΑΑ σε άλλες γλώσσες, δεν υπήρχε η δυνατότητα διερεύνησής τους. Πριν ξεκινήσει η τυπική διαδικασία της αξιολόγησης, οι πύλες που επιλέχθηκαν μελετήθηκαν σε βάθος για να γίνει κατανοητή η δομή, η λειτουργία τους, τα χαρακτηριστικά του περιεχομένου τους καθώς επίσης για να επιλεχθούν νέα κριτήρια και να οριστικοποιηθεί το αρχικό πλαίσιο αξιολόγησης. Κατά τη διαδικασία της αξιολόγησης, τρεις αξιολογητές βαθμολογούσαν για κάθε πύλη το σύνολο των κριτηρίων και όπου υπήρχε διαφοροποίηση, εξεταζόταν εκ νέου το συγκεκριμένο στοιχείο προκειμένου να υπάρξει συμφωνία για την αξιολόγησή του. Έτσι συμπληρώθηκε μια μήτρα διπλής εισόδου στην οποία από τη μια εμφανίζονται οι πύλες και από την άλλη τα κριτήρια αξιολόγησης (Εικόνα 1).

Εικόνα 1: Μήτρα διπλής εισόδου για την αξιολόγηση πυλών ΠΕ/ΕΑΑ.

Πλαίσιο αξιολόγησης πυλών ΠΕ/ΕΑΑ

Έχοντας ως βασική αφετηρία τη μήτρα των Sofos and Kostas (2009) το πλαίσιο αξιολόγησης πυλών ΠΕ/ΕΑΑ αρθρώνεται σε 9 κατηγορίες, 11 υποκατηγορίες και 130 κριτήρια, τα οποία αναφέρονται σε τρεις άξονες: (α) *Λειτουργία*, που περιλαμβάνει κριτήρια σχετικά με τα τεχνικά-λειτουργικά χαρακτηριστικά μιας πύλης, (β) *Εκπαίδευση*, που περιλαμβάνει κριτήρια τα οποία συνδέονται με τα χαρακτηριστικά του περιεχομένου μιας πύλης και (γ) *Διδακτική Αξιοποίηση*, που αναφέρεται στους τρόπους διδακτικής αξιοποίησης του περιεχομένου μιας πύλης (Πίνακας 1).

1. ΛΕΙΤΟΥΡΓΙΑ
1.1. Λειτουργικότητα
1.1.1. Πλοήγηση → Μενού | Πολλαπλά μενού | Επιλογή αρχικής σελίδας | Breadcrumbs | Χάρτης ιστοχώρου | Μηχανή αναζήτησης | Εξειδικευμένη Αναζήτηση
1.1.2. Πολυμεσικά στοιχεία
1.1.2.1. Ενημέρωση → Ανακοινώσεις | Πρόσφατες ειδήσεις | Δημοφιλή | Newsletters | Αρχειοθέτηση | RSS feeds | Διαφημίσεις
1.1.2.2. Επικοινωνία / Αλληλεπίδραση / Συνεργασία → Chat | Video chat - Video Conference - Web Camera | Forum | Online Community | Email | Mailing List | Wiki | Blog | Facebook | Twitter | Youtube
1.1.2.3. Τεχνολογία → Σύστημα Διαχείρισης Περιεχομένου (CMS) | Σελίδα με HTML και PHP | Σελίδα με ASPX
1.1.2.4. Πρόσθετες λειτουργίες → Δυνατότητα ανάρτησης υλικού (από τον χρήστη) | Λήψεις | Online Χρήστες | Δημοσκοπήσεις | Επιλογές Προτύπων | Στατιστικά | Ημερολόγιο | Χορηγίες
1.2. Προσβασιμότητα
1.2.1. Είδος Πρόσβασης → Δωρεάν | Επί πληρωμής | Μικτή
1.2.2. Είσοδος χρηστών → Ελεύθερη σε όλη την πύλη | Απαιτείται εγγραφή στην πύλη (συνολικά) | Απαιτείται εγγραφή σε ορισμένο μέρος της πύλης
Άλλα κριτήρια: Mobile learning | Text-only version | Εκφώνηση για τυφλούς | Πολυγλωσσική Πύλη
1.3. Διαφάνεια
1.3.1. Φορέας ανάπτυξης πύλης → Διεθνής οργανισμός | Οργανισμός της ΕΕ | Κρατικός Οργανισμός | Εκπαιδευτικός οργανισμός (Παν/μιο - Ερευν. Κέντρο - Σχολείο - ΚΠΕ - Άλλο (Δίκτυα κ.ά.)) | Ιδιωτ. Πρωτοβουλία | Επαγγελματική Οργάνωση | ΜΚΟ
1.3.2. Ομάδα στόχος → Εκπαιδευτικοί-Εκπαιδευτές | Φοιτητές | Μαθητές | Γονείς | Άλλες | Δεν δηλώνεται ρητά
Άλλα κριτήρια: Ταυτότητα πύλης | Στόχοι πύλης | Στοιχεία Επικοινωνίας | Προσωπικό | Όροι Χρήσης | Ημερομηνία ενημέρωσης περιεχομένου
2. ΕΚΠΑΙΔΕΥΣΗ
2.1. Περιεχόμενο
2.1.1. Θεματικές ενότητες → Αγροοικοσυστήματα | Αέρας | Απορρίμματα | Βιοποικιλότητα | Δάσος | Έδαφος | Ενέργεια | Θάλασσα | Κλίμα / Κλιματική Αλλαγή | Νερό | Πόλη | Αειφόρος Ανάπτυξη | Άλλες
2.1.2. Είδη περιεχομένου
2.1.2.1. Περιβαλλοντικό → Κείμενα | Άρθρα | Βιβλία | Σύνδεσμοι | Βίντεο | Γλωσσάρια - Λεξικά | Photo Gallery | Ήχος | Προσομοιώσεις - Οπτικοποιήσεις
2.1.2.2. Εκπαιδευτικό → Κείμενα | Άρθρα | Βιβλία | Σύνδεσμοι | Βίντεο | Εκπαιδευτικά προγράμματα | Εκπαιδευτικές δραστηριότητες | Σχέδια μαθήματος | Εκπαιδευτικά παιχνίδια | Προσομοιώσεις - Οπτικοποιήσεις | Διεθνή δίκτυα | Διαγωνισμοί
2.1.3. Ποιότητα περιεχομένου → Εγκυρότητα-Αξιοπιστία | Συνάφεια | Πολυγλωσ. περιεχόμενο
Άλλα κριτήρια: Βοήθεια -Εγχειρίδια χρήσεως - FAQ
2.2. Δομή - Διάταξη → Ισορροπία κειμένου και οπτικών στοιχείων | Αισθητική
2.3. Εκπαιδευτικό επίπεδο → Προσχολική ηλικία | Δημοτικό σχολείο | Γυμνάσιο | Λύκειο | Πανεπιστήμιο | Δια βίου μάθηση
3. ΔΙΔΑΚΤΙΚΗ ΑΞΙΟΠΟΙΗΣΗ
3.1. Σύνδεση του περιεχομένου με την εκπαιδευτική πράξη → Σύνδεση με μαθήματα ή/και το αναλυτικό πρόγραμμα | Εξ αποστάσεως εκπαίδευση | Ανατροφοδότηση | Οδηγίες εκπαιδευτικού για υλικό που απευθύνεται σε μαθητές
3.2. Περιγραφή του περιεχομένου → Περίληψη | Ομάδα-στόχος μαθητών | Στόχοι | Διδακτική μεθοδολογία | Χρονοδιάγραμμα υλοποίησης | Αξιολόγηση | Απαιτούμενα μέσα
3.3. Παρατηρήσεις χρηστών → Αξιολόγηση του υλικού από τους χρήστες | Απόκριση χρηστών

Πίνακας 1: Πλαίσιο αξιολόγησης πυλών ΠΕ/ΕΑΑ.

Αποτελέσματα αξιολόγησης πυλών

Παρακάτω συνοψίζονται τα πιο ενδιαφέροντα από τα ευρήματα της αξιολόγησης, εστιάζοντας στα πιο χαρακτηριστικά κριτήρια που αναδεικνύουν τον τρόπο λειτουργίας των πυλών, τα στοιχεία και την προσέγγιση του περιεχομένου τους.

Σε επίπεδο Λειτουργίας το 90% των πυλών που αξιολογήθηκαν χρησιμοποιεί πολλαπλά μενού για πλοήγηση αλλά μόλις το ένα τρίτο από αυτές διαθέτει οδηγό πλοήγησης και χάρτη ιστοτόπου, δυο στοιχεία χρήσιμα για ιστότοπους με σύνθετη δομή όπως είναι συνήθως οι πύλες. Παρόμοια, μόνο το 43% των πυλών διαθέτει μηχανισμό εξειδικευμένης αναζήτησης, *ένα ιδιαίτερα σημαντικό εργαλείο για τον εύκολο εντοπισμό των στοιχείων που ενδιαφέρουν τον χρήστη μέσα σε έναν συχνά μεγάλο όγκο περιεχομένου.* Σε ό,τι αφορά την ενημέρωση, οι περισσότερες πύλες προσφέρουν ανακοινώσεις (60%) αλλά και newsletters (80%), ενώ μόλις το 17% διαθέτει αρχειοφυλακείο (π.χ. www.neefusa.org). Θα πρέπει να υπογραμμιστεί ότι καμία πύλη δεν περιέχει διαφημίσεις, γεγονός που συνάδει με τον εκπαιδευτικό τους προσανατολισμό. Σε επίπεδο πολυμεσικών στοιχείων εξετάστηκε εάν οι ιστότοποι αυτοί διαθέτουν ή συνδέονται με εργαλεία που συμβάλλουν στη συνεργασία και αλληλεπίδραση των χρηστών. Έκπληξη προκαλεί το γεγονός ότι σε ποσοστά μικρότερα του 10% οι πύλες προσφέρουν εφαρμογές για chat, video-conference, forum, online communities, ενώ καμία δεν διαθέτει wiki. Το έλλειμμα τέτοιων εφαρμογών υποδηλώνει ότι οι συγκεκριμένες πύλες δεν επενδύουν ιδιαίτερα σε τέτοια εργαλεία για να ενισχύσουν τη συνεργασία των χρηστών τους. Παρόλα αυτά ενσωματώνουν σε μεγαλύτερο βαθμό εργαλεία κοινωνικής δικτύωσης, όπως το facebook και το twitter (73% και 57% αντίστοιχα) τα οποία φαίνεται ότι εισέρχονται δυναμικά και διαμορφώνουν ένα εναλλακτικό πλαίσιο αλληλεπίδρασης των χρηστών μιας πύλης. Επιπλέον, περίπου οι μισές πύλες διαθέτουν κάποιο blog στο οποίο δίνεται η δυνατότητα στους χρήστες τους να αποτυπώσουν τις απόψεις τους για διάφορα εκπαιδευτικά και περιβαλλοντικά θέματα (π.χ. www.nwf.org). Σε ό,τι αφορά την κατηγορία που περιλαμβάνει τα κριτήρια της τεχνολογίας ανάπτυξης των πυλών, στο 37% των πυλών δηλώνεται ρητά ότι υποστηρίζονται από κάποιο σύστημα διαχείρισης περιεχομένου (CMS) (π.χ. www.eetap.org). Αξίζει να σημειωθεί ότι μόνο η πύλη www.env-edu.gr χρησιμοποιεί την τεχνολογία ASPX ενώ οι υπόλοιπες έχουν αναπτυχθεί με την τεχνολογία των HTML ή PHP. Τέλος, περίπου μία στις δέκα πύλες διαθέτουν ορισμένες πρόσθετες λειτουργίες όπως καταγραφή του αριθμού των χρηστών που είναι online, επιλογή προτύπου διεπιφάνειας, παρουσίαση δημοσκοπήσεων και στατιστικά στοιχεία. Παρομοίως, μόλις το 20% των πυλών δίνουν τη δυνατότητα στους χρήστες να αναρτούν το δικό τους υλικό (π.χ. www.earthportal.org), μια λειτουργία που έχει ιδιαίτερη σημασία σε τέτοιου είδους πύλες, οι οποίες συνήθως σκοπεύουν στον διαμοιρασμό εκπαιδευτικού υλικού. Εκτιμάται ότι η συγκεκριμένη δυνατότητα δεν παρέχεται από αρκετές πύλες είτε εξαιτίας των τεχνικών απαιτήσεων είτε λόγω της δυσκολίας ελέγχου της ποιότητας του αναρτώμενου υλικού.

Στον ίδιο άξονα, της Λειτουργίας, και σε όρους προσβασιμότητας, κρίνεται ως πολύ θετικό το γεγονός ότι το 90% των πυλών επιτρέπουν τη δωρεάν πρόσβαση στο υλικό και την πληροφορία που διαθέτουν ενώ μόνο τρεις απαιτούν πληρωμή για την πρόσβαση σε μέρος του υλικού τους (π.χ. www.caee.org). Αντίστοιχα, το 63% των πυλών ζητούν την εγγραφή των χρηστών σε κάποιο τμήμα των λειτουργιών τους ενώ οι υπόλοιπες επιτρέπουν την ελεύθερη πλοήγηση (χωρίς εγγραφή) σε όλη την έκτασή τους. Η ελευθερία πρόσβασης και προμήθειας υλικού σε μια τέτοια πύλη είναι κρίσιμη για τους χρήστες-εκπαιδευτικούς καθώς διευρύνει τη γκάμα των επιλογών που έχουν σε εκπαιδευτικούς πόρους, συμβάλλοντας με αυτό τον τρόπο στον εμπλουτισμό της εκπαιδευτικής διαδικασίας.

Η τρίτη κατηγορία του άξονα Λειτουργία αναφέρεται στη διαφάνεια. Το 40% των πυλών που αξιολογήθηκαν ανήκουν σε μη κυβερνητικές οργανώσεις (π.χ. www.eco-schools.org). Το 30% έχει δημιουργηθεί από εκπαιδευτικούς φορείς, όπως Πανεπιστήμια και Κέντρα Περιβαλλοντικής Εκπαίδευσης (π.χ. www.riverbendeec.org). Οι πύλες που ανήκουν σε κρατικούς φορείς, όπως Υπουργεία, ανέρχονται στο 20% (π.χ. www.education.noaa.gov) ενώ οι υπόλοιπες πύλες υποστηρίζονται από διεθνείς οργανισμούς και επαγγελματικές οργανώσεις. Έχει ενδιαφέρον το γεγονός ότι καμία από τις πύλες που εξετάστηκαν δεν έχει δημιουργηθεί από κάποια ιδιωτική

πρωτοβουλία, πιθανώς διότι η υποστήριξη μιας τέτοιας εφαρμογής απαιτεί μεγάλη επένδυση χρόνου και άλλων πόρων. Ιδιαίτερα θετικό είναι και το γεγονός ότι σχεδόν όλες οι πύλες αναφέρουν τους στόχους τους, την ταυτότητά τους και παρέχουν στοιχεία επικοινωνίας. Αξίζει να σημειωθεί, ωστόσο, ότι μόλις στο 57% των πυλών είναι εμφανής η ημερομηνία τελευταίας ενημέρωσης του περιεχομένου τους, γεγονός που δημιουργεί ορισμένες επιφυλάξεις για τον βαθμό επικαιροποίησής τους, έστω και αν το εκπαιδευτικό υλικό που προσφέρουν μπορεί να έχει διαχρονική αξία. Τέλος, το 70% των πυλών αναφέρονται σε περισσότερες από μια ομάδα-στόχο, με κυριότερη αυτή των εκπαιδευτικών (έξι στις δέκα πύλες απευθύνονται σε αυτή την ομάδα), ενώ το 30% των πυλών δεν αναφέρουν ρητά στην ομάδα στόχο στην οποία απευθύνονται. Η ενασχόληση των πυλών με πολλαπλές ομάδες συνάδει με την γενική έννοια της διαδικτυακής πύλης και με τον εκπαιδευτικό τους χαρακτήρα.

Σε ό,τι αφορά τον άξονα Εκπαίδευση οι περισσότερες πύλες καλύπτουν πολλές θεματικές ενότητες με δημοφιλέστερες το κλίμα / κλιματική αλλαγή (67%), το νερό (60%) και την αειφόρο ανάπτυξη (57%). Οι πύλες www.env-edu.gr και www.classroomearth.com μάλιστα πραγματεύονται περισσότερες από δέκα θεματικές η καθεμιά. Τα είδη περιεχομένου που προσφέρουν οι πύλες χωρίζονται σε δυο ευρύτερες ομάδες, οι οποίες έχουν παραπλήσια κριτήρια. Ο διαχωρισμός αυτός είναι απαραίτητος καθώς οι περισσότερες πύλες εκτός από εκπαιδευτικό περιεχόμενο προσφέρουν και περιεχόμενο σχετικά με το περιβάλλον χωρίς να έχουν γίνει οι απαραίτητες προσαρμογές/επιλογές που θα του προσέδιδαν εκπαιδευτικό προσανατολισμό. Σε γενικές γραμμές οι περισσότερες πύλες προσφέρουν ποικίλα είδη περιεχομένου όπως κείμενα, δημοσιεύσεις, βιβλία, βίντεο, φωτογραφίες και στους δύο τύπους περιεχομένου. Εστιάζοντας στο εκπαιδευτικό περιεχόμενο, που αποτελεί και το επίκεντρο του ενδιαφέροντος σε τέτοιες εφαρμογές, το 84% των πυλών παρουσιάζουν εκπαιδευτικά προγράμματα, το 73% εκπαιδευτικές δραστηριότητες και το 70% κείμενα. Το 43% των πυλών διαθέτει σχέδια μαθήματος (π.χ. http://eelinked.naaee.net), ενώ λίγες πύλες (27%) προσφέρουν εκπαιδευτικά παιχνίδια (π.χ. http://planetconnect.org/). Αναφορικά με την ποιότητα του περιεχομένου το 60% των πυλών φαίνεται ότι πληροί το κριτήριο της εγκυρότητας και αξιοπιστίας του περιεχόμενου, το οποίο στην παρούσα εργασία προσδιορίστηκε ως η αναφορά της ταυτότητας των στοιχείων του περιεχομένου και της ημερομηνία ενημέρωσής του. Το ποσοστό αυτό κρίνεται ως σχετικά χαμηλό καθώς η συγκεκριμένη παράμετρος έχει ιδιαίτερη σημασία για υλικό που πρόκειται να αξιοποιηθεί για εκπαιδευτικούς σκοπούς. Αντίθετα, το ποσοστό των πυλών που κρίθηκε ότι περιέχουν υλικό συναφές με τους δεδηλωμένους στόχους τους και τις θεματικές τους ενότητες προσεγγίζει το 90%. Δυστυχώς μόλις το 10% των πυλών προσφέρουν πολυγλωσσικό περιεχόμενο (π.χ. www.unep.org). Η πολυγλωσσία του περιεχομένου θεωρείται πολύ χρήσιμη διότι θα επέτρεπε την ευκολότερη διάδοση του εκπαιδευτικού υλικού σε πολλές χώρες. Τέλος, το περιεχόμενο της συντριπτικής πλειονότητας των πυλών (93%) περιλαμβάνει υλικό για το δημοτικό σχολείο, το 73% για το γυμνάσιο ενώ οι μισές περίπου πύλες προσφέρουν υλικό για το λύκειο και την προσχολική ηλικία.

Από την αξιολόγηση προέκυψε ότι κατά μέσο όρο μόλις το 9% του συνόλου των κριτηρίων του άξονα Διδακτική Αξιοποίηση ικανοποιούνται από τις πύλες ενώ το 40% των πυλών δεν πληροί κανένα από τα κριτήρια που τέθηκαν σε αυτό τον άξονα. Στην κατηγορία σύνδεση του περιεχομένου με την εκπαιδευτική πράξη, το κριτήριο που αναφέρεται στη σύνδεση με το αναλυτικό πρόγραμμα καλύπτεται μόνο από το 30% των πυλών (π.χ. www.seek.state.mn.us). Δεδομένου ότι μια από τις βασικές προσεγγίσεις για την ενσωμάτωση της ΠΕ/ΕΑΑ στο σχολείο είναι η διάχυση των στοιχείων της μέσα από τα επιμέρους μαθήματα, οι πύλες θα ήταν καλό να δίνουν στους χρήστες-εκπαιδευτικούς τις απαραίτητες κατευθύνσεις προκειμένου να μπορούν να ενσωματώσουν εύκολα το προσφερόμενο υλικό στη διδακτική πράξη. Στην ίδια κατηγορία κριτηρίων, μόνο η πύλη portal.environment.umn.edu παρέχει υλικό για εξ αποστάσεως εκπαίδευση ενώ η πύλη www.ecokids.ca είναι η μοναδική που παρέχει κάποιου είδους ανατροφοδότηση, δηλαδή απαντήσεις σε ερωτήματα του χρήστη σχετικά με τη διδακτική αξιοποίηση του υλικού που προσφέρεται. Επιπλέον, μόνο οι πύλες dnr.wi.gov και www.ecokids.ca δίνουν στον εκπαιδευτή οδηγίες για το εκπαιδευτικό υλικό που απευθύνεται άμεσα στους μαθητές. Η συνοπτική και περιεκτική περιγραφή του παρεχόμενου εκπαιδευτικού υλικού αποτελεί χρήσιμη προσέγγιση για την κατάλληλη διδακτική αξιοποίησή του. Ελάχιστες

πύλες, ωστόσο, παρέχουν τέτοιου είδους περιγραφή. Το 27% των πυλών παρουσιάζουν, λόγου χάρη, περίληψη ή την ομάδα στόχο του υλικού ενώ τους μαθησιακούς στόχους και τη διδακτική μεθοδολογία παρουσιάζουν μόνο δύο και μία πύλη αντίστοιχα. Τέλος, μόνο οι πύλες www.classroomearth.org και www.ecokids.ca δίνουν τη δυνατότητα κάποιου είδους αξιολόγησης του υλικού από τους χρήστες και μόλις τέσσερις πύλες επιτρέπουν στους χρήστες να καταθέτουν σχετικά σχόλια για το υλικό, όπως η http://planetconnect.org.

Συζήτηση

Καθώς το ενδιαφέρον της εκπαιδευτικής κοινότητας στην Ελλάδα και διεθνώς στρέφεται ολοένα και περισσότερο στην αξιοποίηση εκπαιδευτικών πόρων που διατίθενται μέσα από διαδικτυακές πηγές, η αξιολόγηση εκπαιδευτικών πυλών, και ειδικότερα πυλών ΠΕ/ΕΑΑ, αποτελεί ένα πεδίο το οποίο αξίζει περισσότερης ερευνητικής προσοχής. Το γεγονός ότι η ΠΕ/ΕΑΑ αποτελεί ένα ιδιαίτερα ανοικτό πεδίο, σε όρους θεματολογίας, διδακτικής προσέγγισης, άρα και ποικιλίας εκπαιδευτικών πόρων, ενισχύει ακόμα περισσότερο αυτή την ανάγκη. Η ευχρηστία και η ποιότητα του περιεχομένου των πυλών που συγκεντρώνουν σχετικό υλικό και πληροφορία δεν θα πρέπει να υποτιμηθεί από την ερευνητική κοινότητα.
Σκοπός αυτού του άρθρου ήταν να τεθούν οι βάσεις για ένα συνεκτικό πλαίσιο αξιολόγησης των πυλών ΠΕ/ΕΑΑ. Η πρώτη εφαρμογή αυτού του πλαισίου σε μερικές από τις πιο δημοφιλείς σχετικές πύλες σε διεθνές επίπεδο ανέδειξε ότι σε τεχνικό-λειτουργικό επίπεδο οι ιστότοποι αυτοί πληρούν σε μεγάλο βαθμό τα κριτήρια αξιολόγησης. Συχνά μάλιστα διαθέτουν πληθώρα χαρακτηριστικών που μπορούν να διευκολύνουν και να εξυπηρετήσουν τις ανάγκες των χρηστών τους, έστω και αν η πραγματική εξυπηρέτηση των χρηστών θα πρέπει να ερευνηθεί και από τη δική τους πλευρά. Όμως σε όρους περιεχομένου, τόσο από πλευράς θεματικής ποικιλότητας, όσο και από πλευράς ειδών και δομής (παρουσίασης) του περιεχομένου, υπάρχει σαφές περιθώριο βελτίωσης και εμπλουτισμού των πυλών αυτών. Η διαφορά που εντοπίζεται μεταξύ τεχνικού-λειτουργικού επιπέδου και εκπαιδευτικού περιεχομένου μπορεί να δικαιολογηθεί από το γεγονός ότι πρόκειται για σχετικά νέες διαδικτυακές εφαρμογές για τις οποίες έχει δοθεί μεγαλύτερο βάρος στην λειτουργική τους αρτιότητα. Επιπλέον, από την αξιολόγηση γίνεται φανερό ότι η προσαρμογή του περιεχομένου των πυλών προκειμένου να μπορεί να ενσωματωθεί με ευκολότερο τρόπο στη διδακτική πράξη, πρέπει να τύχει μεγαλύτερης προσοχής. Θα πρέπει, ωστόσο, να υπογραμμιστεί ότι το προτεινόμενο πλαίσιο δεν προσανατολίζεται στην αξιολόγηση της ποιότητας του περιεχομένου των πυλών, κάτι το οποίο απαιτεί διαφορετική ερευνητική προσέγγιση και θα πρέπει επίσης να μας απασχολήσει ερευνητικά.
Μολονότι το προτεινόμενο πλαίσιο αξιολόγησης μπορεί να αποτυπώσει σε ικανοποιητική έκταση την συνολική εικόνα μιας πύλης, αποκαλύπτοντας εύκολα τα πλεονεκτήματα και τις ελλείψεις της, καλό θα ήταν σε επόμενη φάση να αποκτήσει μια πιο εκλεπτυσμένη μορφή. Αυτό σημαίνει να αποδοθούν στα κριτήρια συντελεστές βαρύτητας και ενδεχομένως να επανεξεταστούν οι ομαδοποιήσεις με πιθανές συνενώσεις ορισμένων κριτηρίων ή ανάλυση κάποιων άλλων. Παρά την πρωτογενή της μορφή όμως αυτή η λίστα κριτηρίων φαίνεται ότι μπορεί να αποτελέσει τη βάση για μια αξιολογική προσέγγιση και να βοηθήσει κατ' επέκταση τους χρήστες, κυρίως τους εκπαιδευτές της ΠΕ/ΕΑΑ, να αναζητούν πιο αποτελεσματικά εκπαιδευτικούς πόρους.

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Η Εξ Αποστάσεως Εκπαίδευση ως μέσο Αξιοποίησης στην Ενδοσχολική Επιμόρφωση Εκπαιδευτικών στη Χρήση και Εφαρμογή των Νέων Τεχνολογιών στον Τομέα της Εκπαίδευσης για τη Βιώσιμη/Αειφόρο Ανάπτυξη

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Περίληψη

Η ιδιομορφία και ο στόχος αυτής της ενδοσχολικής επιμόρφωσης είναι η αποδοχή, η αξιοποίηση των νέων εργαλείων οργάνωσης - σχεδιασμού της διδασκαλίας και η παιδαγωγική – διδακτική αξιοποίηση τους. Ιδιαίτερο ενδιαφέρον έχει , ότι οι συνάδελφοι είναι διαφορετικών ειδικοτήτων και έχουν διαφορετική εξοικείωση με τις Τεχνολογίες Πληροφορικής & Επικοινωνιών . Με την χρήση της εξ αποστάσεως εκπαίδευσης , την ηλεκτρονική διαχείριση τάξης, την επεξήγηση του εννοιολογικού θεωρητικού πλαισίου και των βασικών τεχνικών λειτουργιών σε συνδυασμό με τα διδακτικά σενάρια που προτείνονται με βάση την εμπειρία συναδέλφων, επιτυγχάνονται οι διδακτικοί και μαθησιακοί στόχοι. Με την εξ αποστάσεως εκπαίδευση είναι ευκολότερο να ξεπεραστούν οι φόβοι της χρήσης των Τεχνολογιών Πληροφορικής - Επικοινωνιών και διαδραστικών συστημάτων. Παράδειγμα και πειραματισμός η χρήση της ηλεκτρονική τάξης μου http://eclass.sch.gr/courses/G1002105/ .

«Ανακάλυψη» - κατανόηση της άποψης ότι δεν θα πρέπει να υπάρχουν ψευδαισθήσεις σχετικά με τη διδακτική αξιοποίηση της τεχνολογίας στη σχολική τάξη και ότι ¨δεν διδάσκουμε τεχνολογία αλλά διδάσκουμε μαθητές¨. Συνειδητοποίηση της εφαρμογής και χρήσης των νέων τεχνολογιών στον τομέα της εκπαίδευσης για τη βιώσιμη/αειφόρο ανάπτυξη.

Abstract

The peculiarity and the target of intra school training is the acceptance and the exploitation of new tools of organization and planning of teaching and paedagogical teaching exploitation .Special interest has the fact that the colleagues are of different specialties and are not all familiar with the Computer Technologies and Communications .Using distance learning ,electronic management of classroom ,the explanation of the meaning of theoretical frame and the basic technological functions in combination with the teaching scenarios that are suggested with the teaching scenarios based on the experience of the colleagues ,the teaching and learning targets are succeeded. With the distance learning it is easier to overcome the fears of use of Computer Technologies and Communications and interactive systems .An example and experimentation with the use of my electronic class http://eclass.sch.gr/courses/G1002105/

"Discovery" -understanding of the view that there must not be illusions about the exploitation of teaching technology in class –we do not teach technology but students .Understanding of the application and use of new technologies in the field of education redefine sustainable development.

Μαθήματα χρήσης διαδραστικών πινάκων για εκπαιδευτικούς

Το αναλυτικό σχέδιο βρίσκεται και στο «βιβλίο ύλης» της ηλεκτρονικής μου τάξης και περιλαμβάνει:
1. Εισαγωγή - περιγραφή διαδραστικού συστήματος, είδη διαδραστικών πινάκων απαραίτητες για τη συνδεσμολογία των επιμέρους περιφερειακών-πρακτική από τους συναδέλφους.
2. Λίγα λόγια για τη θεωρία εφαρμογής του διαδραστικού συστήματος που αφορά την παιδαγωγική και διδακτική αξιοποίηση του στην τάξη (υπάρχει και σχετική ανακοίνωση).
3. Παρουσίαση ενός σεναρίου - προϊόντος αναζήτησης από το διαδίκτυο – συζήτηση με τους συναδέλφους για την πιθανή εφαρμογή του στην ειδικότητα τους.
4. Χρήση και πρακτική από τους συναδέλφους - ανάλυση τρόπου εφαρμογής και ενσωμάτωσης στην ειδικότητα τους-παρουσίαση του τι περιλαμβάνει το εικονίδιο «υλικό μαθήματος» στο ηλεκτρονικό μάθημά μου (αρχική οθόνη) .
5. Επεξήγηση βασικών δραστηριοτήτων με το διαδραστικό σύστημα με το δικό μου βλέμμα - ακολουθεί συζήτηση για τη χρήση διδακτικών σεναρίων
6. Παρουσίαση των ανακοινώσεων μου και επίλυση αποριών - συζήτηση των ερωτήσεων-απαντήσεων που περιλαμβάνονται στο ηλεκτρονικό μάθημα μου (αρχική οθόνη) , στα εικονίδια «ανακοινώσεις» και «ασκήσεις» αντίστοιχα.
7. Οριοθέτηση νέων ερωτήσεων που αφορούν τη χρήση του διαδραστικού πίνακα και τη χρήση διδακτικών σεναρίων -αναλυτική παρουσίαση εργασιών - ασκήσεων - με βάση τους συνδέσμους που περιγράφω στο αντίστοιχο εικονίδιο του ηλεκτρονικού μαθήματος μου (αρχική οθόνη).

Η ιδιομορφία αυτής της ενδοσχολικής επιμόρφωσης και υποστήριξης συνίσταται στο ότι ,οι συνάδελφοι είναι διαφορετικών ειδικοτήτων και έχουν διαφορετική εξοικείωση με τις Τεχνολογίες Πληροφορικής & Επικοινωνιών. Γι' αυτό τον λόγο χρησιμοποιώ την εξ αποστάσεως εκπαίδευση - ηλεκτρονική διαχείριση τάξης για :

- Την επεξήγηση του εννοιολογικού θεωρητικού πλαισίου και των βασικών τεχνικών λειτουργιών σε συνδυασμό με τα διδακτικά σενάρια που προτείνονται στην επιμόρφωση και των δύο επιπέδων με βάση την εμπειρία συναδέλφων στη χρήση Τεχνολογιών Πληροφορικής & Επικοινωνιών και διαδραστικών συστημάτων (Αναστασιάδης et al, 2010),
- Τα videos που εξηγούν τη χρήση των Τεχνολογιών Πληροφορικής & Επικοινωνιών και διαδραστικών συστημάτων (Τσαμάνδρουρας, χ.η.),
- Τις προτάσεις συνδέσμων για αξιοποίηση υλικού από το διαδίκτυο και γνωριμία με τις εφαρμογές web 2.0 με δυνατότητες ενεργού εμπλοκής των χρηστών στην οποία είναι ενσωματωμένα όλα τα βιβλία που αναπτύσσονται σε ψηφιακή μορφή, εμπλουτισμένα με πρόσθετο διαδραστικό υλικό (Ψηφιακό Σχολείο, 2011) (εκπαιδευτικά παιχνίδια, μικροπειράματα, animations, videos, υπερσυνδέσμους, κλπ) και τέλος
- Τις παραπομπές μέσα από το Πανελλήνιο Σχολικό Δίκτο σε εργασίες συναδέλφων που περιγράφουν σχέδια μαθημάτων ανά ειδικότητα (Τσαμάνδουρας & Μπαλκίζας, 2012)

Ο σκοπός αυτής της προσπάθειας μου είναι:
- Η παιδαγωγική αξιοποίηση μέσα από τη σελίδα του σχολείου μας
του «η-τ@ξη» ενός ολοκληρωμένου εργαλείου βασισμένο στον Παγκόσμιο Ιστό για την ηλεκτρονική διαχείριση τάξης (Ηλεκτρονική Διαχείριση Τάξης, χ.η.) και
- Η εφαρμογή του διαδραστικού πίνακα στην τάξη, γιατί προσωπικά πιστεύω ότι η χρήση του ενισχύει την μαθητοκεντρική και συνεργατική μάθηση, αρκεί οι συνάδελφοι να κατανοήσουν τον τρόπο αξιοποίηση του.

<u>Στόχος</u>
Οι συνάδελφοι να απαριθμούν-επιλέγουν, να οργανώνουν και να υποστηρίζουν τους στόχους, γιατί αποτελούν το πιο βασικό κριτήριο για την επιλογή ,τον προγραμματισμό του περιεχομένου και των μεθόδων διδασκαλίας, ειδικά:
• Κατευθύνουν τη διδασκαλία
• Εστιάζουν την προσοχή των μαθητών σ' αυτά που πρόκειται να μάθουν.

• Προσανατολίζουν το μαθητή σε συγκεκριμένες ενέργειες τέτοιες ώστε να επιτευχθούν οι στόχοι.

• Αποτελούν τη βάση για την αξιολόγηση των αποτελεσμάτων της διδασκαλίας.

Θα πρέπει λοιπόν να αφορούν και να δομηθούν τα επίπεδα:

α) επίπεδο των γνώσεων και δεξιοτήτων (γνωστικές δεξιότητες), τις οποίες επιδιώκεται να αποκτήσουν οι μαθητές (λειτουργίες κατανόησης, ανάλυσης, σύνθεσης, αξιολόγησης, εφαρμογής και

β) επίπεδο των στάσεων των μαθητών, οι οποίες χρειάζεται να ενισχυθούν ή να μετασχηματιστούν (στάση είναι ένα σύνολο αξιών που υιοθετούν τα άτομα με βάση τις οποίες καθορίζεται η συμπεριφορά τους). Επιτυγχάνεται μέσω των βιωματικών τεχνικών εκπαίδευσης που διασυνδέουν τη θεωρητική προσέγγιση με την πράξη. Επαναπροσδιορίζεται η αποδοχή της αξιοποίησης των νέων εργαλείων οργάνωσης , ο σχεδιασμός της διδασκαλίας και η παιδαγωγική – διδακτική αξιοποίηση τους λαμβάνοντας υπόψη τα εξής :

- Οι διδακτικοί και μαθησιακοί στόχοι να οριοθετούνται ουσιαστικά , να αφορούν τον προσδιορισμό, τη γνώση, την κατανόηση, την εφαρμογή και την τελική κριτική σκέψη (Κόμης et al, 2010).

- Η εξοικείωση με τη δομή και τη φιλοσοφία των διδακτικών σεναρίων και η εφαρμογή τους με τη χρήση του διαδραστικού πίνακα,

- Η απομυθοποίηση ότι τα νέα εργαλεία της εκπαίδευσης απαιτούν εξειδικευμένες γνώσεις και εξειδικευμένες τεχνικές δεξιότητες,

- Η αναζήτηση και ο εντοπισμός διαδραστικών εφαρμογών, η αξιοποίηση τους για τα γνωστικά αντικείμενα κάθε ειδικότητας συναδέλφων του Γυμνασίου, με τη βοήθεια συνδέσμων που προτείνονται,

- Η αξιοποίηση του διαδραστικού πίνακα και των διαδικτυακών περιβαλλόντων, τα εργαλεία του Web 2.0, του κοινωνικό λογισμικού , του Youtube, flickr, των προσωπικών περιβαλλόντων - blogger, αλληλεπίδραση- MySpace, Facebook, των εφαρμογών Wiki, Google maps, κ.λ.π μπορούν να χρησιμοποιηθούν ποικιλοτρόπως στην εκπαιδευτική διαδικασία -εκπαίδευση γιατί συμβαδίζουν με τις αρχές που διέπουν τις σύγχρονες θεωρίες μάθησης (Κουτσογιάννης et al, 2010).

- Η αξιοποίηση υλικού και η εξοικείωση με τη δομή και τη φιλοσοφία των διδακτικών σεναρίων παράλληλα με τη χρήση του διαδραστικού πίνακα, και τέλος

- Να ξεπεραστούν οι φόβοι χρήσης των Τεχνολογιών Πληροφορικής - Επικοινωνιών και διαδραστικών συστημάτων, με τον πειραματισμό της χρήσης μέσα από την ηλεκτρονική τάξη μου και η «ανακάλυψη» - κατανόηση της άποψης ότι δεν θα πρέπει να υπάρχουν ψευδαισθήσεις σχετικά με τη διδακτική αξιοποίηση της τεχνολογίας στη σχολική τάξη και ότι ¨δεν διδάσκουμε τεχνολογία αλλά διδάσκουμε μαθητές (Παιδαγωγικό Ινστιτούτο, 2011).

Μερικές από τις βασικές λειτουργίες της ανοιχτής πλατφόρμας ηλεκτρονικής διαχείρισης «η-τα@ξη» του Πανελλήνιου Σχολικού Δικτύου που χρησιμοποίησα και προτείνω και στους συναδέλφους είναι:

1.   Η δημοσίευση ηλεκτρονικών σημειώσεων,
2.   η παράθεση βοηθητικών πηγών,
3.   ο προγραμματισμός μαθημάτων,
4.   δημιουργία ασκήσεων αυτοαξιολόγησης, ή ακόμη και
5.   η ηλεκτρονική διαχείριση του παραδοσιακού βιβλίου διδασκομένης ύλης
6.   Ενδεικτικά αναφέρουμε ότι με το η-τ@ξη μπορούμε να:

   - Δημοσιεύσουμε εκπαιδευτικό υλικό - έγγραφα (Ms Word, PDF, HTML, βίντεο) και να διαχειριστούμε κατάλογο με εναλλακτικές εκπαιδευτικές πηγές από το Διαδίκτυο

Ειδικά : το βιβλίο ύλης πλατφόρμα "η-τ@ξη" παρέχει τη λειτουργία Χειρισμού του "Βιβλίο Ύλης" του "η-τ@ξη" παράλληλα με το κλασικό έντυπο που έχομε στην τάξη.

Ειδικότερα μέσα από τη διαχείριση της ψηφιακής τάξης μου για τη χρήση του διαδραστικου πίνακα υπάρχουν ερωτήσεις-απαντήσεις του τύπου:

- Τι πρέπει να προσέξουμε όταν συνδέουμε τον φορητό Η/Υ στο διαδραστικό σύστημα (αν δεν είναι μόνιμα συνδεμένος)

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- Πώς διαπιστώνω ότι το σύστημά μου «βλέπει» το internet
- Τι περιλαμβάνει η επιφάνεια εργασίας του διαδραστικού πίνακα
- Πώς ρυθμίζω την ακρίβεια κίνησης και ενεργοποίησης (μικρό-ρύθμιση) του στυλό ή του δακτύλου μας 9
- Πώς δουλέυει το στυλό και πώς χρησιμοποιείται (κλικ, διπλό κλικ, κλικ και σύρσιμο)
- Πώς ενεργοποιώ το διαδραστικό σύστημα – «τρέχω» το αντίστοιχο πρόγραμμα
- Πώς απομονώνω τον πίνακα από άλλα περιβάλλοντα του Η/Υ π.χ να δουλέψω τον πίνακα μου σαν «μαυροπίνακα» (πλήρη οθόνη και να δω βελάκια), Τι ακριβώς ενεργοποιούν τα κάτω δεξιά βελάκια(οθόνη), Τι εξυπηρετεί το βελάκι στην πλήρη οθόνη
- Πώς εισάγω νέα σελίδα στον πίνακα μου (δυο τρόποι), Πώς θα δω τα όρια της σελίδας μου, και πώς με το ¨χεράκι ¨ θα το μεταφέρω, Πώς θα μικρύνω τη σελίδα μου ώστε να την δώ ολόκληρη, Πώς το σύστημα θα αναγνωρίζει αυτόματα τα σχήματα, Πώς κάνω ευθείες ακριβώς τοποθετημένες, Πώς κάνω έτοιμα σχήματα,
- Ποια είναι η βασική σκέψη , όταν χρησιμοποιώ τα εργαλεία του διαδραστικού πίνακα (δείχνω κάνω κλικ και …)
- Γράφω στον διαδραστικό – μετά κάνω κλικ – πώς σέρνω-μεταφέρω –αυξομειώνω – τι γίνεται με το βελάκι και τι άλλο μπορεί να κάνω πώς θα δω λεπτομέρειες, Πως ενεργοποιώ τις συναρτήσεις
- Πώς θα διαπιστώσω την ευκολία διαχείρισης της καμπύλης π.χ. του ημίτονου (χωριστά καμπύλη – άξονες), Πώς εισάγω πίνακα στον διαδραστικό (αυξομείωση κελιών , όλου , μετακίνηση αντικειμένων μέσα στον πίνακα), Πώς εισάγω-πληκτρολογώ κείμενο
- Πώς εστιάζω σε ένα σημείο – χρήση φακού, Πώς αλλάζω μέγεθος ¨τρύπας¨ και πως την μετακινώ
- Πώς χρησιμοποιώ τα βελάκια-εργαλεία κάτω δεξιά της γενικής οθόνης
- Πώς χρησιμοποιώ το εικονίδιο του προγράμματος και ποιος ο ρόλος του
- Πώς θα περιέγραφα τελικά τη χρήση όλων των εργαλείων, Πώς χρησιμοποιώ το εργαλείο-εικονίδιο διαγώνια του φακού
- Πώς , αφού κάνω ένα τετράγωνο, μια καμπύλη, πληκτρολογογώ ένα κείμενο, κάνω ένα πινακάκι να τα ομαδοποιήσω -τι άλλο μπορώ να κάνω- πώς θα αποθηκεύσω στο στικάκι και τι άλλο παρατηρώ
- Πώς μετά που θα το αποθηκεύσω (αριστερή μεριά της οθόνης) – βλέπω τον υπολογιστή μου- λειτουργίες των άλλων εικονιδίων
- Πώς χρησιμοποιώ την αποθήκευση – μενού αρχείο- πάνω αριστερά - και ποια η διαφορά των διαφορετικών φορμάτ αποθήκευσης (αντικείμενα-εικόνα κ.λ.π.)
- Πώς χρησιμοποιώ τα εικονίδια αριστερά στην οθόνη μου-τι κάνουν π.χ video
- Πώς θα βιντεοσκοπήσω σε αρχείο το μάθημα μου – εργαλείο δίπλα στη μηχανή
- Πώς θα δω το video που τράβηξα , αφού κλείσω το πρόγραμμα του διαδραστικού (από το εικονίδιο μενού- κάτω δεξιά). Να αυξομειώσω το παράθυρο του video
- Πώς θα δουλέψω συγχρόνως το περιβάλλον του διαδικτύου και τον διαδραστικό πίνακα σαν απλό πίνακα (google maps-όλα τα προγράμματα επιλέγω το πρόγραμμα του διαδραστικού-κάτω δεξιά της οθόνης δίπλα στο μενού τι είναι τα windows).
- Πώς χρησιμοποιώ το digitalschool στον διαδραστικό πίνακα
- Πώς ανοίγω τον διαδραστικό, αυξομειώνω τον ήχο του διαδραστικού πίνακα και τι κάνω όταν τελειώσω το μάθημα μου.
- Πώς θα τακτοποιούσα τις παρακάτω οθόνες ανάλογα με την εφαρμογή και τη χρησιμότητα τους ανάλογα με το γνωστικό αντικείμενο της ειδικότητας
- Πώς καταλαβαίνετε το νόημα της ηλεκτρονικής τάξης και την πιθανή εφαρμογή της στο μάθημα σας.
- Τι είναι το εκπαιδευτικό σενάριο – η περιγραφή ενός μαθησιακού πλαισίου με προσανατολισμένο γνωστικό αντικείμενο με στόχους και δράσεις που αξιοποιούν εκπαιδευτικά εργαλεία και λογισμικά.
- Από τι αποτελείται ένα σενάριο – την κεντρική ιδέα, τους μαθησιακούς στόχους, τη διάρκεια των επιμέρους δραστηριοτήτων , τη συνολική διάρκεια.

- Τι σκέπτομαι όταν σχεδιάζω ένα σενάριο μαθήματος με ζητούμενα τη διερευνητική μάθηση, τη συνεργατική μάθηση , τη διαθεματική –διεπιστημονική προσέγγιση.
- Ποια η σχέση των διδακτικών στρατηγικών με την έρευνα - εμπλοκή των μαθητών στην επιστημονική διαδικασία.
- Τι πρέπει να χαρακτηρίζει ένα σενάριο – η απλότητα , ρόλο για κάθε μαθητή, να προβλέπω το χρόνο και τις επιμέρους δραστηριότητες (και του συνόλου), το ρόλος της αλληλεπίδρασης , η σκέψη ότι τα παιδιά έχουν την τάση της δημιουργίας και της διερεύνησης , οι δυνατότητες συνεργασίας μεταξύ των μαθητών της τάξης ή άλλων τμημάτων ή ακόμα και άλλων σχολείων, προβληματισμός για καλλιέργεια των δεξιοτήτων και προσαρμογή στην κοινωνία και στη ζωή
- Τι εννοούμε όταν λέμε ότι το σενάριο περιγράφει τη μαθησιακή διαδικασία–τι κάνουν οι μαθητές, τι θέλω να κερδίσουν από αυτή τη δραστηριότητα-διαδικασία δηλαδή το σενάριο να περιγράφει τη δομή του σχεδιασμού των δραστηριοτήτων μάθησης πάντα με το σκεπτικό πως θα ενεργοποιηθούν και θα δραστηριοποιηθούν οι μαθητές.
- Πώς περιγράφεται η αμφίδρομη σχέση του διδακτικού σεναρίου με το σχέδιο μαθήματος – στο σχέδιο μαθήματος λείπει η αλληλεπίδραση μαθητή εκπαιδευτικού αλλά περιλαμβάνεται η πλήρης περιγραφή των φάσεων της διδασκαλίας, άρα το διδακτικό σενάριο εστιάζεται στο γνωστικό αντικείμενο , αφού βάλουμε συγκεκριμένους στόχους – πρακτικές και διδακτικές αρχές.
- Γιατί τα σενάρια μάθησης παρέχουν εμπειρίες για μάθηση – αξιοποιούν και διασύνδεουν τις δυνατότητες μάθησης με την εκπαιδευτική στρατηγική που δίνει έμφαση στην έρευνα.
- Τι λένε οι σύγχρονες θεωρίες μάθησης για την έννοια του διδακτικού σεναρίου που πρέπει οπωσδήποτε να περιλαμβάνει τις εξής δομές:
- εμπλοκή-διερεύνηση –ανάπτυξη αξιοποιώντας τη λεπτομέρεια και την αξιολόγηση.
- Ο σχεδιασμός από τον εκπαιδευτικό πρέπει να επιτρέπει παρεμβάσεις , αλλαγές και γνώση των σχέσεων παθητικότητα-δραστηριοποίηση , εξάρτηση-ανεξαρτησία και το κλειστό σχολείο –με το ανοιχτό σχολείο στην κοινωνία και τη ζωή.
- Πώς το σχέδιο μαθήματος θα προκύψει από τον δικό μας σχεδιασμό οριοθετώντας-επεξηγώντας τις φάσεις της διδακτικής μας προσέγγισης και θα περιλαμβάνει τους στόχους του μαθήματος ,δηλαδή ο τελικός αποδέκτης-μαθητής να έχει κατανοήσει τα αντικείμενα του θέματός μας, να μπορεί να εφαρμόσει τις επιμέρους ενότητες του θέματός μας , αφού πρώτα διαπιστώσουμε ότι τις έχει ξεκαθαρίσει και τέλος να μπορεί να προσδιορίζει τα αποτελέσματα που προκύπτουν. Στο διδακτικό σχεδιασμό του μαθήματος , πρέπει να ληφθούν υπόψη: τα δομικά στοιχεία του μαθήματος, αναλυτική περιγραφή των επιμέρους βημάτων, οι μαθησιακοί και διδακτικοί στόχοι του γνωστικού αντικειμένου, ο αριθμός των μαθημάτων που απαιτούνται (χρόνος διδασκαλίας),τα χαρακτηριστικά των μαθητών και η βαθμίδα γνώσης, η οριοθέτηση των επιμέρους δραστηριοτήτων και διδακτικών προσεγγίσεων (άμεση σχέση με καθοδηγούμενη διερεύνηση ή ομαδοσυνεργατική διδασκαλία –ανάπτυξη κριτικής σκέψης) , το εκπαιδευτικό υλικό – πολυμεσικές εφαρμογές- διαδίκτυο –χρήση διαδραστικών εφαρμογών , η σκέψη ότι κάτι μπορεί να μην πάει όπως το περιμέναμε και τέλος η αξιολόγηση της μάθησης δηλαδή να καταλάβουμε αν ο μαθητής έμαθε και τι μπορεί να κάνει με αυτά που έμαθε - αξιοποίηση της μάθησης.

Εκτός από τα παραπάνω στην ηλεκτρονική τάξη έχω ενημερώσεις σχετικά με το ότι :
- δημιουργείται δημόσια διαθέσιμη ψηφιακή πλατφόρμα ανοικτού λογισμικού, με δυνατότητες ενεργού εμπλοκής των χρηστών με εργαλεία Web 2.0, στην οποία θα είναι ενσωματωμένα όλα τα βιβλία που αναπτύσσονται σε ψηφιακή μορφή, εμπλουτισμένα με πρόσθετο διαδραστικό υλικό (εκπαιδευτικά παιχνίδια, μικροπειράματα, animations, videos, υπερσυνδέσμους, κλπ)
- δημοσιεύονται σχέδια μαθημάτων για κάθε ενότητα, τα οποία προβλέπουν την ένταξη των νέων τεχνολογιών στη διδασκαλία

Ο διαδραστικός πίνακας είναι ένα εργαλείο που δίνει τη δυνατότητα στους εκπαιδευτικούς και με τη χρήση των παραπάνω, να διεξάγουν το μάθημά τους «ζωντανά», αξιοποιώντας ήδη υπάρχουσες πλατφόρμες λογισμικού. Για παράδειγμα, τα σχολικά εγχειρίδια του Γυμνασίου, βρίσκονται

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αναρτημένα σε πλατφόρμες του Παιδαγωγικού Ινστιτούτου και «μαθήματα χωρίς σύνορα με ψηφιακό εκπαιδευτικό περιεχόμενο» μαζί με αρχεία τους, πρόσθετα στοιχεία και υποστηρικτικό υλικό διατίθενται από το Υπουργείο Παιδείας Δια Βίου Μάθησης και Θρησκευμάτων. Η αξιοποίηση του υλικού αυτού μέσω των διαδραστικών συστημάτων μπορεί να επιτύχει την ενεργή συμμετοχή των μαθητών. Η σειρά των βημάτων τα οποία οι εκπαιδευτικοί μπορούν να κάνουν και να τα χρησιμοποιήσουν και σε άλλους τομείς/αντικείμενα της σχολικής μονάδας είναι η επιλογή των κατάλληλων πόρων για το διαδραστικό πίνακα που δίνεται στο παρακάτω σχήμα (Κόμης et al, 2010).
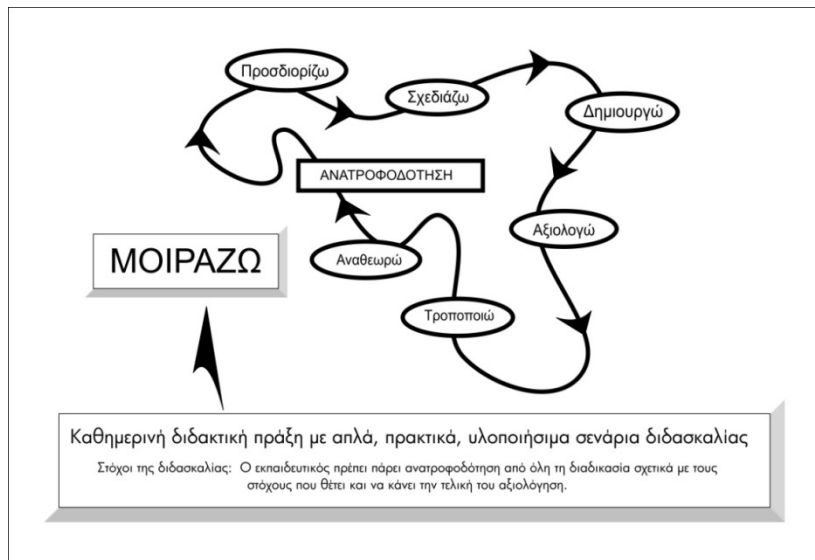
Διάγραμμα 1

Ο εκπαιδευτικός από την πλευρά του θα έχει την ευκαιρία να πάρει ανατροφοδότηση από όλη τη διαδικασία σχετικά με τους στόχους που θέτει (στόχοι της διδασκαλίας) και να κάνει την τελική του αξιολόγηση. Αυτό θα τον οδηγήσει στο να βελτιώσει το σενάριό του, διατηρώντας τα δυνατά του στοιχεία και παράλληλα να κάνει τις κατάλληλες παρεμβάσεις σε όσα περιεχόμενα και μέσα δεν απέδωσαν ή δεν ήταν τα κατάλληλα , για να οδηγήσουν στην υλοποίηση των στόχων μάθησης.

Τελικά η διαχείριση μιας τάξης ή μιας εργασίας ή ενός προγράμματος ή ενός project μπορεί να οργανωθεί με την κατάλληλη χρήση του διαδραστικού πίνακα. Είναι προφανές ότι ο διαδραστικός πίνακας μπορεί να χρησιμοποιηθεί σε δραστηριότητες που αφορούν όχι μόνο όλη την τάξη αλλά και τη διεύρυνση της εφαρμογής και σε άλλους τομείς/αντικείμενα της σχολικής μονάδας, ενώ μπορεί επίσης να αποτελέσει σημείο εργασίας ανάμεσα σε ομάδες μαθητών , όπου ο εκπαιδευτικός έχει κυρίως διευκολυντικό ή υποστηρικτικό ρόλο.

Οι φάσεις της εφαρμογής που περιγράφονται αναλυτικά είναι:

1η φάση: κατευθύνεται από τον εκπαιδευτικό και περιλαμβάνει μια επισκόπηση οικείων δραστηριοτήτων με όλη την τάξη μπροστά στο διαδραστικό πίνακα. Προσδοκώμενα αποτελέσματα της φάσης: συμμετοχή όλης της τάξης … επιτυχή αποτελέσματα ;

2η φάση: συνεχίζεται η παραπάνω διαδικασία με την ίδια διάταξη μαθητών. Επιχειρείται η δημιουργία σύνδεσης με προηγούμενα και/ή υποστήριξη (scaffolding) του εκάστοτε θέματος με προβολή βίντεο, animation ή με συμπλήρωση, φυσική αλληλεπίδραση παιδιών με πίνακα/δεδομένα, προφορική απάντηση σε ερωτήσεις με ή χωρίς κατάδειξη.

3η φάση: ομαδική εργασία – ατομικά ή συνεργατικά εξετάζοντας σε βάθος τα υπό μελέτη θέματα συνήθως χωρίς το διαδραστικό πίνακα. Μπορούν επίσης να γίνουν δραστηριότητες με φύλλα εργασίας ή με φυσικά αντικείμενα.

4η φάση: αναθεώρηση των σημαντικών σημείων του μαθήματος, ανασκόπηση των δυσκολιών των μαθητών με τη χρήση του διαδραστικού πίνακα. Το σημαντικό στοιχείο αυτής της φάσης

είναι να διερευνήσουμε τους τρόπους με τους οποίους θα μπορέσουμε να το αξιοποιήσουμε παιδαγωγικά προκειμένου να επιτύχουμε τους μαθησιακούς μας στόχους. (Κόμης et al 2010)

Για την εισαγωγή των ΤΠΕ στην σχολική τάξη είναι απαραίτητες τόσο οι παιδαγωγικές όσο και οι τεχνολογικές προϋποθέσεις. Η διδακτική μεθοδολογία θα πρέπει να δημιουργεί τις απαραίτητες συνθήκες για την ενεργό συμμετοχή του εκπαιδευομένου σε μια διαδικασία όπου θα μπορεί να επεξεργάζεται την πληροφορία με κριτικό τρόπο και να τη μετουσιώνει σε γνώση.

Τελικά , οι παραπάνω φάσεις - σκέψεις μου και η εφαρμογή τους με τη μορφή ενδοσχολικής επιμόρφωσης του 7^{ου} Γυμνασίου μέσα από την ανοικτή σύγχρονη πλατφόρμα «η-τάξη» του Πανελλήνιου Σχολικού Δικτύου, θα μπορούσε να ήταν αφορμή για επέκταση και σε άλλα θέματα πέρα από την εφαρμογή του διαδραστικού πίνακα , όπως δημιουργία και άλλων μαθημάτων και άλλων δραστηριοτήτων εφαρμογής σε άλλους τομείς/αντικείμενα της σχολικής μονάδας όπως προγράμματα αγωγής υγείας, περιβάλλοντος κ.λ.π..

Όμως η ενίσχυση των υποδομών δικτύου και του ηλεκτρονικού εξοπλισμού των σχολείων με στόχο τη δημιουργία της ψηφιακής τάξης κρίνονται απαραίτητα . Η ψηφιακή τάξη πρέπει να έχει γρήγορη σύνδεση με το διαδίκτυο και να είναι εξοπλισμένη με διαδραστικά συστήματα διδασκαλίας (π.χ. διαδραστικούς πίνακες), ενώ ο εκπαιδευτικός και οι μαθητές αλληλεπιδρούν με δυναμικό τρόπο με τη χρήση όλων των σύγχρονων εργαλείων των Τεχνολογιών της Πληροφορίας και της Επικοινωνίας (ΤΠΕ) στην Εκπαίδευση, με πλούσιο, διαδραστικό και αντιστοιχισμένο με τα προγράμματα σπουδών ψηφιακό εκπαιδευτικό περιεχόμενο (e-books) για όλες τις τάξεις και τα μαθήματα

Πέρα από τον εξοπλισμό οφείλουμε να διερευνήσουμε τους τρόπους με τους οποίους θα μπορέσουμε να το αξιοποιήσουμε παιδαγωγικά προκειμένου να επιτύχουμε τους μαθησιακούς μας στόχους.

Οι εκπαιδευτικοί θα πρέπει να αποφύγομε όμως το κύριο μειονέκτημα του διαδραστικού πίνακα, που εδράζεται στην ενδεχόμενη χρήση του, ως κλασικού εποπτικού μέσου, ως εργαλείου δηλαδή που αναπαράγει τον συμβατικό τρόπο διδασκαλίας.

Επιδίωξη της εργασίας μου είναι να γίνει αυτή το έναυσμα για δημιουργία μαθημάτων και δραστηριοτήτων εφαρμογής και σε άλλους τομείς/αντικείμενα της σχολικής μονάδας όπως προγράμματα αγωγής υγείας, περιβάλλοντος κ.λ.π. που θα κάνουν και την υλοποίηση και τη διδασκαλία πιο ευχάριστη τόσο για τους μαθητές όσο και για τους εκπαιδευτικούς. Ο διαδραστικός πίνακας είναι στην ουσία ένας πίνακας που συνδυάζει την απλότητα και λειτουργικότητα ενός συμβατικού πίνακα με τις δυνατότητες ενός υπολογιστή. Αποτελείται από μια επιφάνεια εργασίας, που υποστηρίζει τις λειτουργίες της προβολής και της αλληλεπίδρασης και συνδέεται με έναν υπολογιστή και ένα βιντεοπροβολέα. Μέσω του προβολέα εμφανίζεται στον πίνακα η οθόνη του υπολογιστή. Η ιδιαιτερότητα του διαδραστικού πίνακα είναι ότι ο χρήστης του, με την αξιοποίηση του κατάλληλου λογισμικού, μπορεί να αλληλεπιδρά μαζί του με την αφή ή την ειδική γραφίδα. Για το λόγο αυτό, θα πρέπει ο εκπαιδευτικός να έχει τη δεξιότητα να αξιοποιεί τις ποικίλες λειτουργίες του, μαζί με τους μαθητές του, στην καθημερινή διδακτική πρακτική. Υπάρχει άφθονο υλικό στο διαδίκτυο, αρκετές εκπαιδευτικές εφαρμογές και σενάρια που υποστηρίζουν ποικίλα γνωστικά αντικείμενα, εκπαιδευτικά λογισμικά ανοιχτού και κλειστού κώδικα, τα οποία με μια εποικοδομητική προσέγγιση μπορούν να συνδράμουν τη διδακτική και μαθησιακή διαδικασία. Η εργασία μου υλοποιήθηκε, για να καλύψει την υποστήριξη των εκπαιδευτικών του σχολείου μας, πάνω στη χρήση διαδραστικών πινάκων και γενικά την ενσωμάτωση των Τ.Π.Ε. στην καθημερινή διδακτική πράξη με απλά, πρακτικά, υλοποιήσιμα σενάρια διδασκαλίας. Ο διαδραστικός πίνακας είναι ένα πολυχρηστικό εργαλείο, το οποίο μεταμορφώνεται σε διδακτικό και γνωστικό, όταν αξιοποιείται παιδαγωγικά στην τάξη. Βασικό στοιχείο στην αποτελεσματική χρήση ενός αλληλεπιδραστικού πίνακα είναι η αποτελεσματική προετοιμασία του εκπαιδευτικού με τη δημιουργία ή την επαναχρησιμοποίηση κατάλληλων διδακτικών πόρων. Ο διαδραστικός πίνακας στα χέρια ενός επιμορφωμένου εκπαιδευτικού, μπορεί να θεωρηθεί το πλέον σύγχρονο εργαλείο. Κατ' αρχάς θα πρέπει να ξεχωρίσει από την υπερπληθώρα των πληροφοριών τις χρήσιμες και ύστερα, με τον επαγγελματισμό του (δημιουργία σεναρίων) και φυσικά με το μεράκι του, να τις παρουσιάσει και να τις εντάξει με έναν άλλο τρόπο μέσα στη μαθησιακή διαδικασία . Στόχος οι παραπάνω χρήσιμες πληροφορίες να μετατραπούν σε γνώσεις.

Από την εμπειρία μου (Ιούνιος 2011 μέχρι σήμερα) στη χρήση του διαδραστικού πίνακα στην τάξη αλλά και από την προσπάθεια μου να βοηθήσω συναδέλφους στην απομυθοποίηση του, κατέληξα στα εξής συμπεράσματα:

α)   Με δεδομένο την όρεξη των εκπαιδευτικών για επιμόρφωση, η αποδοχή και η σωστή χρήση-εφαρμογή του διαδικαστικού πίνακα στην εκπαιδευτική διαδικασία, ξεκινά από την σωστή επιμόρφωση τους και την απομυθοποίηση του συνδυασμού διαδραστικών εφαρμογών και υπολογιστή ,

β) Τον διαδραστικό πίνακα οι μεν μαθητές στην αρχή τον αντιμετώπισαν σαν άλλο ένα γκάτζετ ! με τον εντυπωσιασμό και τον ενθουσιασμό να κυριαρχεί σ' αυτές τις περιπτώσεις. Από την άλλη μεριά οι συνάδελφοι στην αρχή τον αντιμετώπισαν και τον αντιμετωπίζουν με επιφύλαξη για διάφορους λόγους. Μετά από αυτή την προσπάθεια μπορώ να ισχυριστώ ότι τα πράγματα αρχίζουν σιγά-σιγά να αλλάζουν,

γ) Προσωπικά πιστεύω ότι με τη σωστή επιμόρφωση των συναδέλφων ο διαδραστικός πίνακας, παράλληλα με τις διαδραστικές εφαρμογές στον υπολογιστή, θα αναδείξει την αξία του και τελικά θα πείσει τους μαθητές με την αμεσότητα που προσφέρει στην καθημερινή πρακτική κατά την διάρκεια του μαθήματος.

Είναι γνωστό ότι η καλή διδασκαλία είναι καλή ανεξάρτητα από τη χρήση της τεχνολογίας. Η τεχνολογία μπορεί να ενισχύσει την παιδαγωγική διάσταση μόνο αν μαθητές και εκπαιδευτικοί γνωρίζουν τις δυνατότητές της, δεν τη θεωρούν αυτοσκοπό και αναπτύσσουν κατάλληλες μαθησιακές δραστηριότητες.

Η τεχνολογία στην σχολική τάξη προκαλεί προβληματισμούς, καθώς πολλές φορές η έμφαση δίνεται περισσότερο στους διαθέσιμους τεχνολογικούς πόρους και λιγότερο στις παιδαγωγικές προϋποθέσεις που θα πρέπει να διέπουν ένα περιβάλλον μάθησης. Τα πορίσματα πολλών ερευνών αναδεικνύουν τα τελευταία χρόνια τη ραγδαία ανάπτυξη της τεχνολογίας και του διαδικτύου, την ύπαρξη ποικίλων υπολογιστικών περιβαλλόντων και την παραγωγή εκπαιδευτικών λογισμικών. Κατά συνέπεια , η επιμόρφωση των εκπαιδευτικών στη χρήση και παιδαγωγική αξιοποίηση στις ολοένα αυξανόμενες δυνατότητες των Τεχνολογιών της Πληροφορίας και της Επικοινωνίας (ΤΠΕ) στην Εκπαίδευση , κρίνεται ως πρωταρχική ανάγκη.

Στην εφαρμογή της ψηφιακής τάξης που υλοποιώ, πιστεύω να οριοθέτησα διάφορες τεχνικές που ενδέχεται να διαφοροποίησαν τις χρήσεις του διαδραστικού πίνακα προς την κατεύθυνση (μέσα από τη διαδραστικότητα), της ενίσχυσης της μαθησιακής διαδικασίας, της οργάνωσης της λειτουργίας της τάξης, της κοινωνικής αλληλεπίδρασης, της επικοινωνίας και της συνεργασίας

Ευελπιστώ μέσα από την ηλεκτρονική μου τάξη να φανεί η χρησιμότητα της εφαρμογής του διαδραστικού πίνακα. Η αγάπη και το μεράκι αποτέλεσαν τα βασικά χαρακτηριστικά για αυτή την εργασία , πιστεύοντας ότι υπάρχει πιθανότητα μ' αυτό τον τρόπο να βοηθηθούν και άλλοι συνάδελφοι.

* Την πρακτική εφαρμογή και χρήση της ανοιχτής πλατφόρμας ηλεκτρονικής διαχείρισης «η-τα@ξη» του Πανελλήνιου Σχολικού Δικτύου, για την ενδοσχολική επιμόρφωση και υποστήριξη των συναδέλφων του 7ου Γυμνασίου Ηρακλείου Κρήτης στην αξιοποίηση και εφαρμογή του διαδραστικού πίνακα, **μπορείτε να την βρείτε** :
http://eclass.sch.gr/courses/G1002105/
Και μέσα από την σελίδα του σχολείου μας πατώντας στο εικονίδιο « ΔΙΑΔΡΑΣΤΙΚΟΣ ΠΙΝΑΚΑΣ» http://srv1-7gym-irakl.ira.sch.gr/
Δείτε τα videos που βρίσκονται στην αρχή του εικονιδίου «ΣΥΝΔΕΣΜΟΙ» ειδικά το εισαγωγικό για την ψηφιακή τάξη μου :

ΜΑΘΗΜΑΤΑ ΧΡΗΣΗΣ ΔΙΑΔΡΑΣΤΙΚΩΝ ΠΙΝΑΚΩΝ ΓΙΑ ΕΚΠΑΙΔΕΥΤΙΚΟΥΣ
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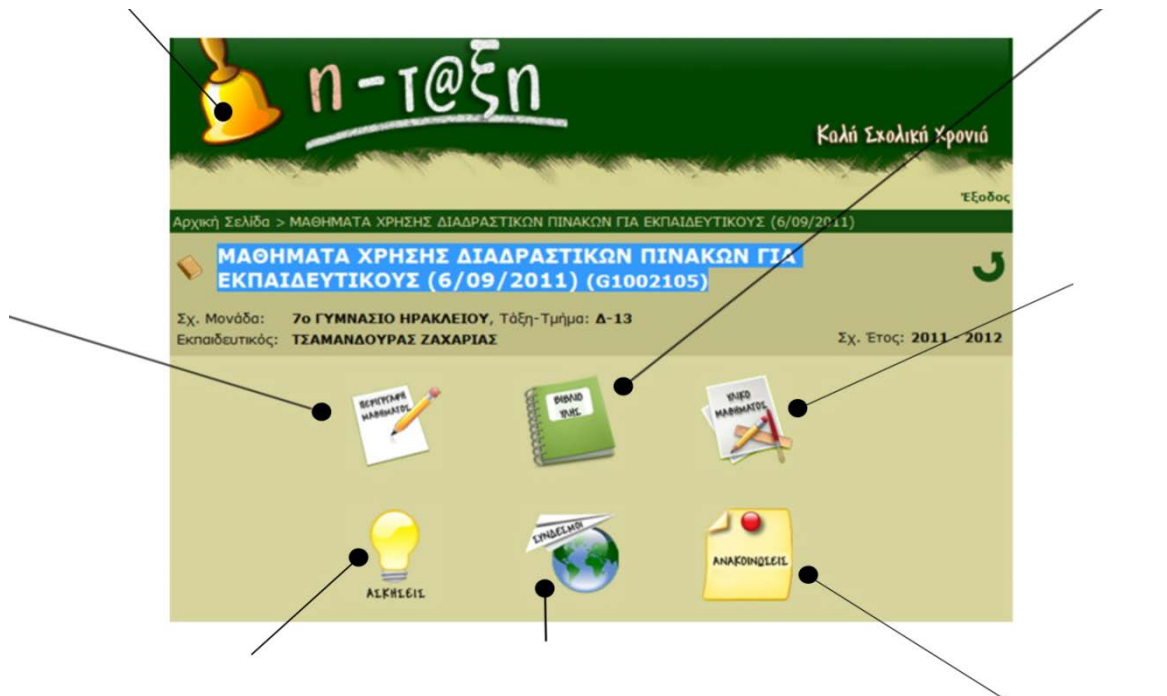
Φωτογραφία 1

"Η ανοιχτή πλατφόρμα ηλεκτρονικής διαχείρισης «η-τα@ξη» του Πανελλήνιου Σχολικού Δικτύου(Π.Σ.Δ). , ως μέσο της ενδοσχολικής επιμόρφωσης των συναδέλφων του 7ου Γυμνασίου Ηρακλείου Κρήτης στη χρήση και εφαρμογή του διαδραστικού πίνακα."
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Γραμματισμός στα ΜΜΕ: Από την Οθόνη της Τηλεόρασης στο Εικονοαφήγημα (Comics)

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Περίληψη

Η εργασία αυτή, αποτελεί το τελευταίο τμήμα ενός προγράμματος, για την καλλιέργεια του αλφαβητισμού στα ΜΜΕ, παιδιών προσχολικής ηλικίας, από ποικίλα πολιτισμικά και γλωσσικά περιβάλλοντα, με την ενεργό εμπλοκή των οικογενειών. Σκοπός της παρούσας εργασίας, είναι η διερεύνηση των ομοιοτήτων και των διαφορών, που παρουσιάζει ο τρόπος αφήγησης μιας ιστορίας, με κινούμενη εικόνα και φωνούμενο λόγο (τηλεόραση), από την αφήγησή της με στατική εικόνα και γραπτό κείμενο (comics). Πιο συγκεκριμένα, θα περιγραφεί ο τρόπος εξοικείωσης των παιδιών με διαδικασίες σύγκρισης, ομαδοποίησης, ταξινόμησης στοιχείων και εξαγωγής συμπερασμάτων, σε σχέση με τους διαφορετικούς τρόπους αφήγησης μιας ιστορίας. Η εργασία, ολοκληρώνεται με την παρουσίαση της διαδικασίας που ακολουθήθηκε, προκειμένου τα παιδιά, εργαζόμενα ατομικά, σε ομάδες και στην ολομέλεια, να δημιουργήσουν νέες ιστορίες με βάση τις αγαπημένες τους τηλεοπτικές, να τις εικονογραφηγηθούν και να παράγουν το δικό τους βιβλίο – comics. Εν κατακλείδι, να παρουσιάσουν το πρόγραμμα, στο άμεσο εκπαιδευτικό και οικογενειακό τους περιβάλλον.

Abstract

This paper is the last part of a program for the cultivation of media literacy in kindergarten, for children from diverse cultural and linguistic backgrounds, with the active involvement of families. The aim of this study is to explore the similarities and differences of the mode of story telling, with animation and sound (television) on one hand, and static image and written text (comics), on the other. More specifically, we describe, how children familiarize with procedures of comparison, grouping, sorting data and draw conclusions, in relation to the different ways of telling a story. The work concludes, with the presentation of the process followed, in order children working individually, in groups and in plenary, to create new stories based on their favourite ones, to illustrate and produce their own comics. In conclusion, they present the whole program, to their direct educational environment and families.

Εισαγωγή

Ως αλφαβητισμό, όπως αναφέρει ο Buckingham (2008), εννοούμε τις γνώσεις και δεξιότητες που αποκτούν οι εκπαιδευόμενοι, μέσα από τη διαδικασία της διδασκαλίας και της μάθησης. Ο συγκεκριμένος όρος, περιλαμβάνει την ερμηνεία και την παραγωγή και αναφέρεται στην ανάγνωση και τη γραφή. Η έννοια του αλφαβητισμού διαμορφώνεται και εξελίσσεται διαρκώς, ανάλογα με τις διευρυνόμενες απαιτήσεις των διαρκώς εξελισσόμενων κοινωνιών.
Η εμπειρία στα ΜΜΕ, η θέση που κατέχουν στην καθημερινότητα των παιδιών και ειδικά της τηλεόρασης, αποτελεί κοινό σημείο αναφοράς όλων των παιδιών, όταν φτάσουν στο νηπιαγωγείο. Αυτό επιβάλλει την ενσωμάτωσή τους στο εκπαιδευτικό σύστημα, ως αντικείμενο κριτικής και ως εργαλείο μάθησης (Κούρτη, 2003). Οι έρευνες γύρω από τη σχέση των παιδιών με τα ΜΜΕ έχουν δείξει ότι, το παιδί δεν είναι παθητικός δέκτης των μέσων. Επιπλέον δε, ότι κάθε παιδί, κάνει τη δική του ανάγνωση κειμένου/προϊόντος των ΜΜΕ ανάλογα με τις δικές του εμπειρίες. Στόχος λοιπόν της εκπαίδευσης στα ΜΜΕ, είναι να αξιοποιήσει την μιντιακή κουλτούρα των παιδιών, τις

προτιμήσεις και τις απολαύσεις τους, προς εκείνη την κατεύθυνση, ώστε να ελαχιστοποιήσει την οπτικοακουστική κατανάλωση και να τη μετατρέψει σε «ενεργή ανάγνωση» (Κούρτη, 2003). Ο αλφαβητισμός στα ΜΜΕ υποδηλώνει τον κριτικό τηλεθεατή– αναγνώστη, τον οξυδερκή και απαιτητικό καταναλωτή με άποψη. Η καλλιέργειά του δε στο νηπιαγωγείο προετοιμάζει τα παιδιά για την ιδιότητα του ενεργού πολίτη (Buckingham, 2008). Καλλιεργεί την ικανότητά τους να διερωτώνται με ποιο τρόπο, με ποιες προθέσεις και από ποιόν παράγεται το κάθε οπτικοακουστικό προϊόν, να ερμηνεύουν τα μηνύματα που προσλαμβάνουν και να οργανώνουν πεδία ατομικής και συλλογικής αντίστασης. Ικανότητα, που κατακτάται μέσα από την δυνατότητα πρόσβασης, την κατανόηση, την κριτική ανάλυση, την αξιολόγηση και την παραγωγή «μηνυμάτων».

Στο νηπιαγωγείο ειδικότερα, μέσα από τον αλφαβητισμό στα ΜΜΕ επιδιώκεται να αποκτήσει το παιδί οπτικοακουστική συνείδηση. Να αντιληφθεί ότι τα οπτικοακουστικά προϊόντα κατασκευάζονται με τη χρήση κάποιων εργαλείων, τα οποία αποτελούν μέσα διατύπωσης απόψεων, έκφρασης συναισθημάτων και επικοινωνίας. Είναι δηλαδή, τα προϊόντα των ΜΜΕ μια κατασκευασμένη και υποκειμενική δημιουργία, μια αναπαράσταση του κόσμου. Όλα αυτά αποτελούν ένα είδος πρώιμου αλφαβητισμού, καθώς το παιδί μαθαίνει να αποκωδικοποιεί την οπτικοακουστική εμπειρία, όχι ως ψευδή και παραπλανητική, αλλά ως προσωπική κατάθεση του δημιουργού της (Θεοδωρίδης, 2002). Όπως, μάλιστα, αναφέρει ο Backingham, (2008) οι προσχολικοί μαθητές πρέπει να είναι ικανοί όχι απλώς να «διαβάζουν» - κατανοούν – τα μιντιακά κείμενα, αλλά και να παράγουν τα δικά τους. Επιπλέον, να μάθουν να αναστοχάζονται συστηματικά πάνω στις διαδικασίες συγγραφής και ανάγνωσης ως αναγνώστες, αλλά και ως συγγραφείς. Να αιτιολογούν τις κρίσεις και τις αποφάσεις τους βάσει στοιχείων και κριτηρίων. Τέλος, να αποκτήσουν την συγκεκριμένη «επιστημονική» μεταγλώσσα με την οποία θα περιγράφουν και θα αναλύουν τις λειτουργίες του κειμενικού αυτού είδους. Όπως σε όλα τα είδη γραφής, οι γνώσεις αυτές και δεξιότητες είναι σκόπιμο να κατακτηθούν με επικοδομητικό διδακτικό και μαθησιακό τρόπο ο οποίος ταυτόχρονα θα αξιοποιεί στο πλαίσιο κοινωνικο-πολιτισμικών διαδικασιών τη δημιουργικότητα και την αυτοέκφραση των εμπλεκομένων ενηλίκων και ανηλίκων.

Στο πλαίσιο της παρούσας εργασίας επιδιωκόμενος σκοπός ήταν να υποστηριχτούν κατάλληλα τα παιδιά της προσχολικής αγωγής, με τη διδακτική αξιοποίηση των δικών τους κοινωνικο-πολιτισμικών εμπειριών, να εξοικειωθούν με την κατανόηση των μιντιακών προϊόντων που απαντούν στο κοινωνικό, εκπαιδευτικό και οικογενειακό τους περιβάλλον, να γνωρίσουν σε βάθος ένα προσφιλές σε αυτά κειμενικό είδος, το κόμικ, και να παράγουν τα δικά τους ανάλογα κείμενα.

Το Πρόγραμμα

Για την υλοποίηση του σκοπού που θέσαμε και την κατάκτηση των επιμέρους στόχων που απορρέουν από αυτόν, οργανώθηκαν και υλοποιήθηκαν δραστηριότητες, οι οποίες κινήθηκαν σε δύο κατευθύνσεις: (α) μελέτη έτοιμου, και (β) παραγωγή νέου προϊόντος, δηλαδή, τα παιδιά αφού εξοικειώθηκαν με τα εργαλεία τα πήραν στα χέρια τους και ενθαρρύνθηκαν να τα χρησιμοποιήσουν, με άλλα λόγια «τα εργαλεία εντέλει κατέληξαν στα χέρια των παιδιών». Έτσι, προχωρήσαμε στην οργάνωση κατάλληλων και παιδοκεντρικά προσανατολιζόμενων διδακτικών πρακτικών, κατά τις οποίες υποστηρίχτηκε ο κριτικός στοχασμός των παιδιών πάνω στις μιντιακές προτιμήσεις τους και στους τρόπους που σε αυτές κατασκευάζεται το νόημα. Οι δράσεις μας είχαν ως βάση τις υπάρχουσες εμπειρίες τους, γλωσσικές και πολιτισμικές, σε σχέση με τα ΜΜΕ, τις οποίες φέρνουν από το οικογενειακό και κοινωνικό τους περιβάλλον. Για το σκοπό αυτό αναπτύξαμε μια σε βάθος και ποιότητα συνεργασία με τους γονείς, προκειμένου να εργαστούμε από κοινού στην προοπτική ενός σχολείου ανοιχτού στην κοινωνία, και να ανταλλάξουμε χρήσιμες πληροφορίες σχετικά με το υπό μελέτη θέμα μας τις πρακτικές του γραμματισμού στα ΜΜΕ που βιώνουν τα παιδιά στο σπίτι τους.

Μέσα σε αυτή την πορεία υλοποίησης του προγράμματος και σε ένα πλέγμα κοινωνικής αλληλεπίδρασης που αναπτύχθηκε, αναδύθηκαν και καλλιεργήθηκαν, επίσης, πέρα από τους πρωταρχικούς μας στόχους και ένα πλήθος γνώσεων και δεξιοτήτων από όλες σχεδόν τις μαθησιακές περιοχές που περιλαμβάνει το ΔΕΠΠΣ (ΥΠΕΠΘ, 2003) για το νηπιαγωγείο.

Ειδικότερα, στην πορεία κατάκτησης του μιντιακού γραμματισμού, υλοποιήθηκαν δραστηριότητες, που ταυτόχρονα εξυπηρετούσαν την καλλιέργεια δεξιοτήτων, έκφρασης και δημιουργίας προϊόντων, την εξοικείωση των μαθητών με αισθητικές παραμέτρους της οπτικοακουστικής έκφρασης, όπως: κάδρο, πλάνο, ροή, καρέ κ.ά., την ανάπτυξη της γλώσσας και του γραμματισμού, των μαθηματικών εννοιών και τη γνωριμία του φυσικού και ανθρωπογενούς περιβάλλοντος των παιδιών. Επιπλέον, επιδιώχτηκε η καλλιέργεια της κριτικής σκέψης-ανάλυσης των μιντιακών προϊόντων που καταναλώνουν, μέσα από τη σύγκριση μεταξύ τους, την ταξινόμηση και την απόπειρα ερμηνείας τους.

Μεθοδολογικά υιοθετήσαμε την βιωματική – επικοινωνιακή προσέγγιση τόσο από την άποψη των ήδη βιωμένων εμπειριών των νηπίων, όσο και της ενεργού συμμετοχής τους στην εκτύλιξη των γεγονότων. Καθώς και την επικοινωνία, με την έννοια της προσπάθειας για ισότιμη ανταλλαγή απόψεων, η οποία υποστηρίζει την ομάδα να πάρει κάποιες αποφάσεις σχετικά με την οργάνωση, το σχεδιασμό και την διεξαγωγή των δραστηριοτήτων (Χρυσαφίδης, 2002).

Για την επιτυχία των στόχων, η διαμόρφωση του χώρου έγινε συνειδητά με την ενεργό συμμετοχή των παιδιών, ώστε να επιτρέπει και να εμπνέει την εμπλοκή τους σε παιχνίδια και πειραματισμούς που οδηγούν στην ερμηνεία και την παραγωγή με τη χρήση πολλών μέσων. Με οργάνωση τέτοια, ώστε μέσα από αυθεντικές επικοινωνιακές εμπειρίες να αξιοποιεί τις γνώσεις και τις επιθυμίες τους και να τα υποστηρίξει να ελέγξουν, να εμπλουτίσουν και να διευρύνουν τις γνώσεις, που ήδη έχουν αρχίσει να αναδύονται από το οικογενειακό και το άμεσο κοινωνικό τους περιβάλλον .Να αντιπροσωπεύει τα παιδιά από όλα τα πολιτισμικά και γλωσσικά περιβάλλοντα. Να δίνει ευκαιρίες στα παιδιά να εμπλέκονται σε γλωσσικές δραστηριότητες που σχετίζονται με τα βιώματά τους, στα πλαίσια του αναδυόμενου γραμματισμού, αξιοποιώντας τον περιβάλλοντα γραπτό λόγο της τάξης (Τάφα, 2001).

Η νηπιαγωγός είναι διακριτικά πανταχού παρούσα, συνδημιουργός, εμψυχωτής και υποστηρικτής της μαθησιακής διαδικασίας. Η αξιολόγηση του προγράμματος ήταν διαρκής, αυθεντική, διαφοροποιημένη και ενσωματωμένη στις καθημερινές διαδικασίες, καλύπτοντας ένα μεγάλο εύρος μαθησιακών εμπειριών. Ήταν τόσο αρχική – διαγνωστική, σταδιακή - διαμορφωτική, όσο και τελική – συνολική. Υλοποιήθηκε με συστηματική παρατήρηση και καταγραφή από την νηπιαγωγό, με αναστοχασμό και συστηματική συλλογή δειγμάτων εργασίας των παιδιών σε ατομικό και ομαδικό επίπεδο. Η αυτοαξιολόγηση και η ετεροαξιολόγηση ακολουθούσε όλες τις δραστηριότητες, με στόχο να βελτιώνεται η διαδικασία μάθησης , ατομικά και συλλογικά. Οι πληροφορίες που συλλέγονταν, αξιοποιούνταν για να ανατροφοδοτήσουν τις δράσεις της ομάδας (ΔΕΠΠΣ για το νηπιαγωγείο, 2003).

Το πλαίσιο εφαρμογής του προγράμματος
Το νηπιαγωγείο μας, ένα από τα δύο ολοήμερα νηπιαγωγεία των Χανίων στα οποία εφαρμόστηκε το πρόγραμμα στο σύνολό του, βρίσκεται στο κέντρο της πόλης των Χανίων, είναι διθέσιο με τρεις εκπαιδευτικούς. Για το σχεδιασμό, την υλοποίηση και την εφαρμογή του προγράμματος, με την ενεργό εμπλοκή και των οικογενειών, δημιουργήθηκε μια ομάδα πρακτικής αποτελούμενη από τη Σχολική Σύμβουλο προσχολικής αγωγής του Νομού Χανίων, δύο νηπιαγωγούς, καθώς και μια μετεκπαιδευόμενη νηπιαγωγό στο Πανεπιστήμιο Κρήτης. Η ομάδα συνεδρίαζε σε τακτές συναντήσεις (συνολικά 10) μία ανά 15-20 μέρες, καθ' όλη τη διάρκεια του προγράμματος, το οποίο εφαρμόστηκε από τον Οκτώβριο 2011 μέχρι το Μάιο 2012. Το πρόγραμμα στο σύνολό του εξελίχθηκε από το πρώτο στάδιο, αυτό της εμπλοκής των γονέων και της συμπλήρωσης ερωτηματολογίου για τις τηλεοπτικές προτιμήσεις των παιδιών τους, μέχρι την κορύφωση του, δηλαδή της παρουσίασης από τα νήπια όλου του προγράμματος

Στο μαθητικό δυναμικό του ολοήμερου τμήματος του νηπιαγωγείου μας που υλοποίησε το πρόγραμμα περιλαμβάνονταν 18 παιδιά από ποικίλα γλωσσικά και πολιτισμικά περιβάλλοντα, ενώ δύο από αυτά είχαν ειδικές εκπαιδευτικές ανάγκες. Οι κτιριακές συνθήκες, θα λέγαμε, ότι δεν εξυπηρετούν ικανοποιητικά τις ανάγκες των παιδιών, ιδιαίτερα στο ζήτημα του χώρου καθώς συστεγάζεται με Δημοτικό σχολείο με αποτέλεσμα τον περιορισμό του ατομικού χώρου του κάθε παιδιού και της ασφάλειας που σε αυτό παρέχεται. Παρόλα αυτά, διαθέτει ικανοποιητικό τεχνολογικό εξοπλισμό.

Παιδαγωγική αξιοποίηση των τηλεοπτικών προτιμήσεων των παιδιών στο πλαίσιο των γνωστικών περιοχών και επιδιώξεων του ΔΕΠΠΣ (2003).

Αρχικά και αφού ενημερώσαμε τους γονείς για την υλοποίηση του συγκεκριμένου προγράμματος, επιδιώχτηκε η διερεύνηση των τηλεοπτικών προτιμήσεων των παιδιών, άμεσα από τα παιδιά και έμμεσα από τους γονείς και η καταγραφή τους ατομικά, σε ζευγάρια και ομαδικά. Κατόπιν με την ενεργό συμμετοχή των παιδιών αξιοποιήθηκε και εμπλουτίστηκε ο περιβάλλον γραπτός λόγος της τάξης, ώστε να είναι προσβάσιμος πολιτισμικά από όλα τα παιδιά: εκπαιδευτικά παιχνίδια (memo, domino). Προχωρήσαμε στην εικονιστική αναπαράσταση των προτιμήσεων και στην οργάνωση των δεδομένων σε λίστες, πίνακες, διαγράμματα. Όλη τη διαδικασία υποστήριζε η χρήση ΤΠΕ.

Τρόποι αναπαράστασης των αφηγηματικών στοιχείων μιας ιστορίας στην τηλεόραση.

Σε αυτή τη φάση υποστηρίχτηκε ο κριτικός στοχασμός των παιδιών πάνω στις μιντιακές τους προτιμήσεις και στον τρόπο που σε αυτές κατασκευάζεται το νόημα. Επικεντρωθήκαμε σε μαθησιακές εμπειρίες που αφορούσαν την διερεύνηση και την καταγραφή με τη χρήση εικόνων και κειμένου, των τρόπων που αναπαρίστανται τα αφηγηματικά στοιχεία μιας ιστορίας (χώρος, χρόνος, πρωταγωνιστές, πλοκή), όταν αυτή παρουσιάζεται στην τηλεόραση. Υποστηρίξαμε τα παιδιά να αναγνωρίσουν τα στοιχεία αυτά για να δηλώσουν το είδος του χώρου που διαδραματίζεται μια ιστορία, το φύλο, τα συναισθήματα και τους ρόλους του πρωταγωνιστή, του βοηθού και του ανταγωνιστή του. Να συζητήσουν και να εξάγουν συμπεράσματα για την υποκείμενη δομή της ιστορίας. Όλα αυτά τα στοιχεία αναπαραστάθηκαν με εικαστικό τρόπο δουλεύοντας σε ομάδες. Αφού κάθε ομάδα τα παρουσίασε στην ολομέλεια της τάξης, προχωρήσαμε στη σύνθεσή τους σε ενιαίο όλο.

Από την οθόνη της τηλεόρασης στο εικονοαφήγημα (comics).

Σε αυτή τη φάση του προγράμματος, που θα περιγραφεί εκτενέστερα στην παρούσα εργασία, επιχειρήθηκε η διερεύνηση των ομοιοτήτων και των διαφορών που παρουσιάζει ο τρόπος αφήγησης μιας ιστορίας με κινούμενη εικόνα και φωνούμενο λόγο, με τον τρόπο αφήγησης μιας ιστορίας με γραπτό λόγο και στατική εικόνα (comics). Θα περιγραφούν αναλυτικά οι διαδικασίες σύγκρισης, ομαδοποίησης και ταξινόμησης στοιχείων και εξαγωγής συμπερασμάτων, η εργασία των παιδιών ατομικά, σε ζευγάρια, σε ομάδες και στην ολομέλεια, ώστε να δημιουργήσουν τις δικές τους ιστορίες comics, με βάση τις αγαπημένες τους τηλεοπτικές σειρές και να κατασκευάσουν το δικό τους περιοδικό ως τάξη.

Τέλος, θα περιγραφούν οι διαδικασίες που ακολουθήθηκαν μέχρι να υλοποιηθεί η απόφαση των παιδιών για την παρουσίαση του προγράμματος στο άμεσο οικογενειακό και εκπαιδευτικό τους περιβάλλον. Το πλαίσιο που κινείται η εργασία στηρίζεται στον αναδυόμενο γραμματισμό, στον κριτικό γραμματισμό και στους πολυγραμματισμούς. Στον αναδυόμενο γραμματισμό, το παιδί σύμφωνα με τις κοινωνικοπολιτισμικές του εμπειρίες, με την ενεργό του συμμετοχή και την υποστήριξη του περιβάλλοντός του, φυσικού (υλικά) και κοινωνικού (αλληλεπιδράσεις), κατασκευάζει τις γνώσεις του σχετικά με τη γλώσσα (ομιλία, ακρόαση, ανάγνωση και γραφή (Τάφα, 2001).

Στον κριτικό γραμματισμό, βαρύτητα δίνεται όχι μόνο στην κατανόηση του μηνύματος που αναπαρίσταται από κάποιο μέσο, αλλά και του τρόπου που στο συγκεκριμένο μέσο το μήνυμα κατασκευάζεται (Κασσωτάκη-Ψαρουδάκη, 2011). Η έννοια του παραδοσιακού «γραμματισμού», στις μέρες μας αντικαθίσταται από το όρο «πολυγραμματισμός». Την κατανόηση δηλαδή των διαδικασιών κατασκευής ενός γραπτού κειμένου με τη χρήση όλων των διαθέσιμων «τρόπων», όπως εικόνα, γράφημα, φωτογραφία, χρώμα, ήχος που τυχόν συνυπάρχουν σε ένα γραπτό κείμενο (Κασσωτάκη-Ψαρουδάκη, 2011). Οι πολυγραμματισμοί όμως, προϋποθέτουν την πολυτροπικότητα, τη διαδικασία δηλαδή, σχεδιασμού, παραγωγής και λήψης ενός επικοινωνιακού προϊόντος με τη χρήση ποικίλων σημειωτικών τρόπων και τη διασύνδεση των τρόπων αυτών μεταξύ τους σε ένα νέο σημασιολογικό συμβάν (Κασσωτάκη-Ψαρουδάκη, 2011). Ένα πολυτροπικό κείμενο είναι και το comics, στην πρόσληψη και παραγωγή του οποίου οδηγηθήκαμε μέσα από την κλιμάκωση των εκπαιδευτικών δράσεων που θα περιγραφούν.

Τι είναι όμως το comics;

Ο Μαρτινίδης, (1990) αναφέρει τα comics ως εικονογραφηγήματα, εικονογραφηγημένες ιστορίες που μέσα από μια σειρά στενά συνδεδεμένων σκίτσων και διαλόγων, που τα συνοδεύουν, αποδίδουν κατά τρόπο ζωντανό, ιστορίες δράσης. Είναι μια σειρά σχεδίων που συνοδεύονται από λόγο, αλλά και η ίδια η τέχνη της δημιουργίας σχεδίων με λόγο. Ενώνουν τη ζωγραφική με τη λογοτεχνία, το εύκολο και ευχάριστο ανάγνωσμα με το καλό λογοτεχνικό βιβλίο (Γρόσδος, 2011). Τα παιδιά γελούν με τα «γκλου-γκλου», «γκουπ», «ντουκ», «πλατς», «μπαμ», «κρατς», «σνιφ», «αούχ» κ.ά. των comics, γιατί από τη μια αποτελούν κωμικά ερεθίσματα, ενώ ταυτόχρονα συνδυάζονται με τις κωμικές καταστάσεις που απεικονίζονται. Επίσης, έχει παρατηρηθεί ότι τα παιδιά όταν μιλούν συχνά χρησιμοποιούν ηχοποιήσεις και ονοματοποιίες, όχι γιατί δεν γνωρίζουν απαραίτητα τις λέξεις που τις αντιπροσωπεύουν, αλλά γιατί μοιάζουν με επιφωνήματα που υπάρχουν σε κάθε γλώσσα για να μεταδώσουν μηνύματα. Έτσι, τα comics μπορούν να αποδειχτούν ιδιαίτερα χρήσιμα για τα παιδιά που ξεκινούν το ταξίδι τους προς τη μάθηση. Είναι, λοιπόν, τα comics μια ιστορία που λέγεται με εικόνες, πολλές φορές αστεία, μια που comics σημαίνει αστείος, κωμικός (Παπαδημητρίου, 1999). Ιδιαίτερη βαρύτητα δίνεται στο σκίτσο, αλλά και το κείμενο βοηθάει πολύ στο τελικό αποτέλεσμα.

Τα comics θυμίζουν λίγο τον κινηματογράφο. Γιατί, όπως αναφέρει ο Μαλαφάντης, (1996:744) τα comics στηρίζονται κυρίως στην ελκυστική λειτουργία της ζωγραφιστής, συχνά υπαινικτικής, εικόνας, η οποία από μόνη της αναπτύσσει την ιστορία, με κινηματογραφικό τόπο, και δεν την αναπαριστάνει στατικά, όπως, για παράδειγμα, η γελοιογραφία. Επιπλέον, υπάρχουν πρωταγωνιστές – ήρωες, καθένας με τα χαρίσματα και τα ελαττώματά του. Εμείς οι αναγνώστες παρακολουθούμε τις περιπέτειές τους. Οι ήρωες αυτοί μιλάνε, αισθάνονται, μοιάζουν με τους πραγματικούς ανθρώπους (Παπαδημητρίου, 1999). Η ιστορία τους ξεκινάει από τα προϊστορικά σχέδια που βρέθηκαν σε σπήλαια τα οποία αποτελούν ένα είδος αφήγησης με εικόνες (comics). Γενικά, οι άνθρωποι πάντα χρησιμοποιούσαν το σχέδιο για να εκφραστούν.

Γιατί όμως να ασχοληθούμε με το comics στο νηπιαγωγείο;

Ο Τζιάνι Ροντάρι, (1985) αναφέρει ότι το comics δίνει την ευκαιρία στο παιδί, να διαβάσει με πραγματική περιέργεια και χωρίς παρακίνηση, γιατί θέλει να μάθει τι συμβαίνει, όχι γιατί του ανατέθηκε ως εργασία, γεγονός που ανταποκρίνεται στις μεθοδολογικές προσεγγίσεις της γνώσης στο νηπιαγωγείο. Παρ' όλα αυτά το σχολείο δείχνει να αγνοεί αυτό το δημοφιλές ανάγνωσμα των παιδιών, ενώ θα μπορούσε να το αξιοποιήσει ως γέφυρα που ενώνει τη ζωγραφική με τη λογοτεχνία, προκαλώντας τους το ενδιαφέρον και εμπλουτίζοντας το λεξιλόγιό τους. Συγχρόνως, μπορούν να αποτελέσουν αφετηρία για προσέγγιση, επεξεργασία και παραγωγή ποικίλων μορφών προφορικού και γραπτού λόγου, προς την κατεύθυνση του οπτικοακουστικού γραμματισμού. Αποτελούν άριστα ερεθίσματα του νου και της φαντασίας. Οι εικόνες συμπυκνώνουν νοήματα και πληροφορίες που χρειάζονται ερμηνεία. Οι χαρακτήρες δεν είναι μόνο φανταστικά δημιουργήματα, αλλά και εκφραστές στάσεων και αξιών, ιδεολογικών, ηθικών και κοινωνικών. Η αισθητική τους είναι προσεγμένη και διακρίνονται από εικαστική ευαισθησία.

Για να αξιοποιήσουμε στο νηπιαγωγείο όλες αυτές τις παραμέτρους που μας προσφέρουν τα comics απαιτείται ενεργητική παρέμβαση με κατάλληλα σχεδιασμένες διδακτικές προσεγγίσεις που θα ενεργοποιούν το παιδί να αποκωδικοποιεί, να αναλύει, να συνθέτει και να δημιουργεί μηνύματα με ποικίλους εκφραστικούς τρόπους, ατομικά και ομαδικά, χωρίς όμως να στερείται τον αυθόρμητο ενθουσιασμό και τη χαρά της ανάγνωσης.

Υλοποίηση του προγράμματος

Από την τηλεόραση στο εικονογραφήγημα (comics)

Προκειμένου να συνδέσουμε την κινούμενη εικόνα (τηλεοπτική) με τη στατική (comics) και τον έντυπο λόγο, θέσαμε τον προβληματισμό:

«με ποιο άλλο τρόπο μπορούμε να πούμε την αγαπημένη μας τηλεοπτική ιστορία;»

Με μια σειρά κατάλληλα επιλεγμένων και διαρθρωμένων ιεραρχικά ερωτήσεων, οδηγηθήκαμε στο συμπέρασμα ότι μπορούμε:

- Να παίξουμε αυτή την ιστορία (να την κάνουμε θέατρο-δραματοποίηση).
- Να μας τη πει η κυρία μας.
- Να τη διαβάσουμε σε βιβλίο χωρίς εικόνες.
- Να τη διαβάσουμε σε βιβλίο που έχει και μερικές εικόνες.
- Να τη διαβάσουμε σε περιοδικό που έχει πολλές εικόνες και κάποια λόγια μέσα σε αυτές

Στη συνέχεια αποφασίστηκε να επιχειρήσουμε όλοι να βρούμε μέσα και έξω από το νηπιαγωγείο με τη βοήθεια των γονέων τις αγαπημένες τηλεοπτικές ιστορίες σε έντυπη μορφή (βιβλία, περιοδικά, comics), τις φέραμε στο νηπιαγωγείο και να γνωρίσουμε τα κοινά σημεία που υπάρχουν ανάμεσα στους πολλαπλούς τρόπους αφήγησής τους.   Το υλικό που ήρθε στο νηπιαγωγείο αποτέλεσε κομμάτι της καθημερινότητάς μας και εμπλούτισε τη βιβλιοθήκη μας με μια ακόμα μορφή έντυπου λόγου. Τις ομοιότητες και διαφορές που εντοπίσαμε ανάμεσα στα παραπάνω οργανώσαμε και καταγράψαμε σε δύο διαγράμματα Venn (διάγραμμα 1&2).

Διάγραμμα 1

Διάγραμμα 2

Η γνωριμία μας με το comic

Στη συνέχεια με βάση το ενδιαφέρον που εκδηλώθηκε από τα παιδιά για τα comics, επικεντρωθήκαμε στη διερεύνηση των ζητημάτων σχετικά με αυτά, τα οποία προέκυψαν μέσα από την τεχνική της ιδεοθύελλας μετά και την ομαδοποίησή τους, όπως: (α) τι είναι τα comics, και (β) πώς είναι φτιαγμένα. Προκειμένου να βρεθούν απαντήσεις στα παραπάνω ερωτήματα τα παιδιά πρότειναν:

«Να παρατηρήσουμε καλά τα comics που έχουμε στην τάξη μας με τον αγαπημένο ήρωα που είδαμε στην T.V.»

Μέσα από την προσεκτική παρατήρηση των comics αποκωδικοποιήσαμε τις σημειολογικές, τις οπτικές, τις ηχητικές, τις ψυχολογικές και τις ιδεολογικές συμβάσεις, εντοπίσαμε και επεξεργαστήκαμε τα ιδιαίτερα χαρακτηριστικά, εικονικά και γλωσσικά, της συγκεκριμένης μορφής έντυπου λόγου, όσον αφορά στη μορφή αφήγησης (στατική -παγωμένη εικόνα, λόγο και σύμβολα), στη γλώσσα γλωσσικά χαρακτηριστικά αφήγηση, λόγος, σκέψη) και στα εικονικά χαρακτηριστικά [«καρέ – καρέ», κάδρο, zoom, πλάνο (κοντινό, μεσαίο, μακρινό), πλαίσιο και κενό ανάμεσα στα καρέ]. Τα αναπαραστήσαμε με τη γλώσσα του σώματος (παντομίμα) και με τη γλώσσα των comics χρησιμοποιώντας ζωγραφική και τεχνικές κολάζ.

Με βάση τις παρατηρήσεις μας καταλήξαμε στα ακόλουθα συμπεράσματα: (α) στα comics μιλάνε οι εικόνες, (β) στα μπαλόνια ο δημιουργός γράφει διαλόγους, σκέψεις ηρώων και αφήγηση, (γ) οι διάλογοι γράφονται σε μπαλόνια που η μύτη τους καταλήγει στον ομιλητή, (δ) οι σκέψεις ενώνονται με τον ήρωα με κυκλάκια σαν μπουρμπουλήθρες, (στ) η αφήγηση τοποθετείται σε ορθογώνια πλαίσια, (ε) οι ήχοι, τα συναισθήματα και η κίνηση «γράφονται», (ζ) γύρω από το κάθε καρέ υπάρχει πλαίσιο, (η) ανάμεσα στα καρέ υπάρχει μικρή απόσταση, (θ) οι ήρωες μιλάνε: *φωνάζουν με μεγάλα γράμματα, ψιθυρίζουν με πεζά,* και (ι) όπως και στον κινηματογράφο, τα πλάνα – η εικόνα που κάθε φορά βλέπουμε στο καρέ – αλλάζει συνεχώς θέση ανάλογα με το τι θέλουμε να δείξουμε και γίνεται κοντινό, μεσαίο, μακρινό.

Τα σχετικά με τη γλώσσα των comics συμπεράσματα καταγράψαμε σε κείμενο με τη μορφή λίστας, η οποία παρέμεινε ανοιχτή, ώστε να εμπλουτίζεται με σχετικά στοιχεία που εντοπίζαμε κατά τη διάρκεια της χρονιάς.
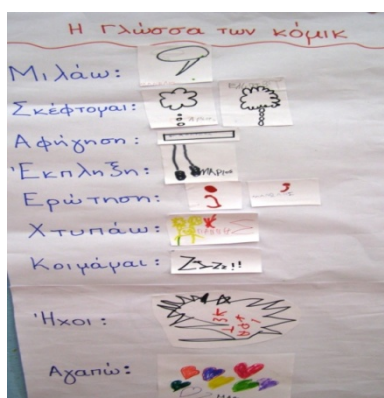
Λίστα

Η παραγωγή των δικών μας εικονοαφηγημάτων (comics)
Επειδή, όπως αναφέρει ο Backingham (2008), οι προσχολικοί μαθητές πρέπει να γίνουν ικανοί όχι μόνο να κατανοούν τα μιντιακά κείμενα, αλλά και να παράγουν τα δικά τους, η επόμενη φάση στην επαφή των παιδιών με τα comics ήταν να δημιουργήσουν τα δικά τους. Επιπλέον, αυτή η διαδικασία, θα μας παρείχε την δυνατότητα να αξιολογήσουμε το βαθμό πρόσληψης των ιδιαίτερων χαρακτηριστικών τους αυτών των κειμένων, να αξιοποιήσουμε παιδαγωγικά όσα προηγήθηκαν και να ανατροφοδοτήσουμε την παιδαγωγική και διδακτική διαδικασία. Για το λόγο αυτό οργανώθηκαν δύο διαδοχικές αλληλοσχετιζόμενες μεταξύ τους δραστηριότητες.

Δραστηριότητα 1η
Με την δραστηριότητα αυτή επιχειρήθηκε μια πρώτη ενεργός εμπλοκή των παιδιών με τη δημιουργία ιστοριών comic. Η εισαγωγή στη δραστηριότητα έγινε με την υποβολή δύο ερωτημάτων – προβληματισμών στην ολομέλεια της τάξης:
  ➢   Τι σας άρεσε από αυτά που έχουνε τα comics για να μας πουν την ιστορία τους;
  ➢   Μπορεί καθένας/μια από σας να φτιάξει όπως θέλει αυτό που του άρεσε;
Τα παιδιά κατέγραψαν ατομικά με τη γλώσσα των comics τις προτιμήσεις τους, τα παρουσίασαν στην ολομέλεια και έπειτα προχώρησαν στην ταξινόμηση των καταγραφών τους σε κατηγορίες με κριτήρια τα στοιχεία «κίνηση», «ήχος», «ήρωα» και «συναίσθημα». Στη συνέχεια δημιουργήθηκαν ομάδες παιδιών, σε κάθε μια από τις οποίες υπήρχαν όλα τα παραπάνω στοιχεία. Κάθε ομάδα πειραματίστηκε με το σύνολο αυτών των στοιχείων, αλληλεπίδρασαν τα μέλη της μεταξύ τους, αλλά και με τη νηπιαγωγό, αξιοποίησαν τον περιβάλλοντα γραπτό λόγο. Και έτσι δημιουργήθηκε από κάθε ομάδα με τη σύνθεση των στοιχείων μια ιστορία comic.

Δραστηριότητα 2η
Τον πρώτο πειραματισμό ακολούθησε η συστηματική παραγωγή εικοαφηγημάτων και ενεργοποιούσε τα παιδιά να συνεργάζονται και να δημιουργούν πάνω σε συγκεκριμένους άξονες:

(α) πώς γεννιέται και εξελίσσεται ο ήρωας μιας ιστορίας; (β) πάνω σε ποιους κανόνες θα εξελιχθεί το σενάριο; (γ) πώς αποτυπώνεται στο χαρτί το comic;

Τις απαντήσεις έβρισκαν μέσα από συζητήσεις που έκαναν μεταξύ τους, στη βάση των εμπειριών που είχαν αποκτήσει μέσα από τις προηγούμενες μαθησιακές καταστάσεις που είχαν βιώσει σχετικά με τα comics στην τάξη τους. Κατά τη διάρκεια της παραγωγής, αυτοαξιολογούνται και αξιολογούν τους συντρόφους τους προς την κατεύθυνση της πληρέστερης υλοποίησης των στόχων της κάθε ομάδας. Αφού ολοκλήρωναν την ιστορία τους, την επαναξιολογούσαν για πιθανές βελτιώσεις και κάθε ομάδα παρουσίαζε τη δικιά της στην ολομέλεια (φωτο, 1).

Φωτογραφία 1

Φωτογραφία 2

Η απόφαση της ολομέλειας των παιδιών ήταν όλες οι ιστορίες τους να «εκδοθούν» τη μορφή περιοδικού, ακολουθώντας όλες τις συμβάσεις δημιουργίας του συγκεκριμένου εντύπου, όπως: εξώφυλλο, οπισθόφυλλο, σελιδαρίθμηση, διαφημίσεις, παιχνίδια, σεναριογράφους, σκιτσογράφους, περιεχόμενα (φωτο, 2).

Ολοκλήρωση του προγράμματος – Αξιολόγηση

Το πρόγραμμα, μετά από απόφαση των παιδιών, ολοκληρώθηκε με την παρουσίασή του στο άμεσο οικογενειακό και εκπαιδευτικό περιβάλλον. Για να υλοποιηθεί η απόφαση αυτή, προέκυψε η ανάγκη παραγωγής κατευθυντικών κειμένων (πρόσκληση-αφίσα). Η παρουσίαση έγινε από τα ίδια τα παιδιά, ατομικά σε ζευγάρια και μικρές ομάδες. Παρουσιάστηκαν οι καταγραφές, τα συμπεράσματα και οι παραγωγές τους, που διέτρεξαν βήμα- βήμα όλη τη χρονιά. Το πρόγραμμα έκλεισε σε κλίμα ενθουσιασμού και περηφάνιας τόσο από τα παιδιά, που είδαν ολοκληρωμένη τη δουλειά που αγάπησαν, όσο και από τους γονείς που αντιλήφθηκαν το ρόλο του νηπιαγωγείου τόσο στο γνωστικό κομμάτι του, όσο και στο κομμάτι που αφορά στην υιοθέτηση στάσεων και αξιών, στην κατεύθυνση της δημιουργίας του ενεργού και ευσυνείδητου πολίτη με κριτική σκέψη, όραμα και δημιουργική δράση. Αξιολογώντας το όλο πρόγραμμα, καταλήγουμε στο βασικό συμπέρασμα ότι, επειδή αυτό κατά βάση στηρίχτηκε στις πολιτισμικές και κοινωνικές εμπειρίες των παιδιών, έδωσε τις ευκαιρίες σε όλα, ανεξάρτητα από την πολιτισμική ή εθνική τους προέλευση να συμμετέχουν στον κριτικό στοχασμό πάνω στα διάφορα μιντιακά προϊόντα που τα ίδια καταναλώνουν και να τα αντιμετωπίζουν με μεγαλύτερη αναλυτική και κριτική διάθεση. Τέλος, με βάση τις ατομικές και ομαδικές εργασίες των παιδιών διαπιστώσαμε ότι η όλη διαδικασία είχε άμεση σύνδεση με την καλλιέργεια όλων των γνωστικών περιοχών όπως αυτές προβλέπονται στο πρόγραμμα σπουδών για το νηπιαγωγείο (ΔΕΠΠΣ, 2003), με τις επιδιώξεις και τις θεωρητικές αρχές του. Συγχρόνως, αποτελεί ένα άριστο πλαίσιο ανάδυσης του γραμματισμού στο νηπιαγωγείο, αφού έδωσε πολλές ευκαιρίες στα παιδιά να εμπλακούν σε δραστηριότητες ανάγνωσης, γραφής, ομιλίας και ακρόασης, σχετικές με τις εμπειρίες και τα βιώματά τους που είχαν νόημα για αυτά.-

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Οι Τηλεοπτικές Προτιμήσεις των Παιδιών και η Παιδαγωγική Αξιοποίησή τους στο Νηπιαγωγείο

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Περίληψη

Η εργασία αυτή αποτελεί μέρος ενός ευρύτερου προγράμματος με θέμα «Ο Αλφαβητισμός στα ΜΜΕ», που σχεδιάστηκε και εφαρμόστηκε από ομάδα νηπιαγωγών και τη Σχολική Σύμβουλο Π.Α. στο Νομό Χανίων. Σκοπός του προγράμματος ήταν η διερεύνηση των τηλεοπτικών προτιμήσεων των παιδιών και η διδακτική, παιδαγωγική και μαθησιακή αξιοποίησή τους για την καλλιέργεια του γραμματισμού στα ΜΜΕ στο νηπιαγωγείο. Στο πλαίσιο αυτό αξιοποιήθηκαν οι προτιμήσεις των παιδιών και ο περιβάλλον γραπτός λόγος των τάξεων τους εμπλουτίστηκε κατά τρόπο προσβάσιμο από όλα τα παιδιά, καθώς στηρίχθηκε στις πολιτισμικές και κοινωνικές τους εμπειρίες, ενώ τα ίδια είχαν εμπλακεί ενεργά στη δημιουργία του. Επίσης, τα παιδιά υποστηρίχτηκαν να κατανοήσουν ότι, αν και όλες οι ιστορίες, από το παραδοσιακό παραμύθι μέχρι το σύγχρονο κόμικ υιοθετούν παρόμοια δομικά στοιχεία για να δηλώσουν το πλαίσιο (χρόνος και χώρος), τους πρωταγωνιστές, το πρόβλημα και την πλοκή των γεγονότων για την επίλυσή του, οι τρόποι που αυτά αναπαρίστανται διαφέρουν ανάλογα με το μέσο παρουσίασής τους. Τα δεδομένα που συλλέχτηκαν (άμεση παρατήρηση, φωτογραφίες, βίντεο, ατομικές και ομαδικές εργασίες) αποδεικνύουν ότι τα παιδιά είχαν πολλές ευκαιρίες, εργαζόμενα δημιουργικά και συνεργατικά, να καλλιεργήσουν, εκτός των άλλων, δεξιότητες, κριτικής σκέψης, που αποτελούν τη βάση του γραμματισμού στα ΜΜΕ.

Abstract

Present study, forms part of a program which intended to cultivate media literacy in order to identify and highlight the diverse opportunities offered, for engagement with literacy and language learning in kindergarten. Specifically concerns, the investigation of the television preferences of children and figurative (tables, charts) representation of these preferences in the classroom. In this way, taking full advantage of children's preferences, not only environmental print enriched, but children became emotionally engaged to it, having been actively involved in its creation. It is, this kind of written speech, accessible by all children since it's relied on their cultural and social experiences. In this context, the children were helped to understand that, although all the stories, whether it's about a traditional fairy tale or a modern comic, use similar structural elements to indicate the context (time and space), the protagonists, the problem and the plot. The ways they are represented vary depending on the presentation of media stories. The data collected (direct observation, photographs, videos, individual and group projects) demonstrate that the kids had a lot of opportunities, working creatively and collaboratively to develop, among other things, skills, critical thinking, which form the basis of MEDIA literacy.

Εισαγωγή

Στις μέρες μας η τηλεόραση είναι μια τεχνολογία, ένα μέσο πανταχού παρόν, που παίζει σημαντικό ρόλο στη διαδικασία της μαζικής επικοινωνίας του σύγχρονου πολιτισμού. Μπορεί να φτάνει σε ευρύτερες κατηγορίες κοινού και να συμβάλλει στη δημιουργία προτύπων συμπεριφοράς, να επηρεάσει τον τρόπο ζωής και το σύστημα αξιών των αποδεκτών του. (Κασσωτάκη-Ψαρουδάκη, 2011). Η τηλεόραση είναι αναπόσπαστο κομμάτι της καθημερινής ζωής των περισσότερων παιδιών, εμπλουτίζει την άποψή τους για τον κόσμο και τον εαυτό τους.

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Όπως χαρακτηριστικά αναφέρει η Palmer, (2001: 281) «Οι "ιστορίες" με τη μορφή παράστασης, κινουμένων σχεδίων, ειδήσεων, ντοκιμαντέρ και διαφημίσεων, δίνουν στα παιδιά μια αίσθηση του κόσμου ευρύτερη από εκείνη που μπορούν να αποκτήσουν μέσα στα όρια της γειτονιάς τους».

Η τηλεόραση ανήκει στο φάσμα των σύγχρονων ΜΜΕ: κινηματογράφο, βίντεο, ραδιόφωνο, φωτογραφία, διαφήμιση, εφημερίδες και περιοδικά, ηχογραφημένη μουσική, ηλεκτρονικά παιχνίδια και Διαδίκτυο. Τα κείμενα των μέσων, ραδιοτηλεοπτικά προγράμματα, κινηματογραφικές ταινίες, εικόνες, ιστοχώροι κλπ συνδυάζουν πολλές γλώσσες: οπτικές (στατικές ή κινούμενες εικόνες), ακουστικές (ήχος, μουσική ή λόγος) και γραπτές (Buckingham , 2008:38). Επομένως η εκπαίδευση στα ΜΜΕ σύμφωνα με την Κούρτη (2008:15) αφορά τις πρακτικές διδασκαλίας που έχουν ως στόχο την ανάπτυξη ορισμένων δεξιοτήτων σχετικά με τη χρήση των μέσων. Πιο συγκεκριμένα στόχος της εκπαίδευσης αυτής είναι να αναπτυχθεί η ικανότητα πρόσβασης, κατανόησης και δημιουργίας μηνυμάτων σε διάφορα μιντιακά περιβάλλοντα. Με απώτερο σκοπό, όπως επισημαίνει ο Buckingham (2008) την κριτική κατανόηση όσο και την ενεργό συμμετοχή των παιδιών, δηλαδή την ανάπτυξη των κριτικών και δημιουργικών ικανοτήτων τους.

Ένας από τους βασικούς λόγους που κάνουν απαραίτητη από το νηπιαγωγείο ακόμα την εκπαίδευση στα ΜΜΕ, και όχι απλά την εκπαίδευση με τα μέσα, είναι το δεδομένο ότι αυτά δεν αποτελούν ένα ανοικτό παράθυρο στον κόσμο αλλά διαμεσολαβούν για την αναπαράστασή του. Η έννοια της αναπαράστασης είναι μια από τις θεμελιώδεις αρχές της εκπαίδευσης στα ΜΜΕ ακριβώς επειδή τα ΜΜΕ δεν μας προσφέρουν ένα ανοικτό παράθυρο στον κόσμο αλλά μια διαμεσολαβημένη εκδοχή του κόσμου. Δεν παρουσιάζουν απλά την πραγματικότητα, την αναπαριστούν. Με άλλα λόγια, οι αναπαραστάσεις των ΜΜΕ μας καλούν να δούμε τον κόσμο με ορισμένους τρόπους και όχι με άλλους. (Buckingham 2008). Ιδιαίτερα η επιλογή και η χρήση της γλώσσας και των ποικίλων άλλων σημειωτικών τρόπων στη διαμόρφωση των κειμένων των μέσων, κατέχει ξεχωριστή θέση στη διαδικασία αλλά και τη φύση του τελικού μιντιακού προϊόντος Για όλους τους παραπάνω λόγους είναι σημαντικό το Σχολείο, από την πρώτη του κιόλας βαθμίδα, να υποστηρίζει την «εκπαίδευση» στα ΜΜΕ (Κούρτη, 2003). Καθώς, όπως τονίζει η Χοντολίδου (1999:117), «το σχολείο θα όφειλε να ανοίξει τους ορίζοντές του στη συστηματική πλέον διδασκαλία και ανάλυση των πολυτροπικών κειμένων, προετοιμάζοντας τους μαθητές του να χειρίζονται ικανοποιητικά την πληθώρα αυτού του είδους τα κείμενα που τους περιβάλλει (Τύπος, τηλεόραση, teletext, βιντεοκλίπ, internet,κλπ)». Πράγμα που, όπως παρατηρεί η ίδια, θα καθιστούσε εκπαιδευτικούς και μαθητές πιο συνειδητοποιημένους στη μεταξύ τους επικοινωνία και θα διευκόλυνε την πρόσληψη και αποκωδικοποίηση της πραγματικότητας που βιώνουν. Επιπλέον, θα έκανε την εκπαίδευση πιο ουσιαστική. Με βάση αυτό το σκεπτικό, η παρούσα μελέτη έδωσε την ευκαιρία στα παιδιά να έρθουν σε επαφή με αυθεντικά προϊόντα ΜΜΕ, να τα ερμηνεύσουν με βάση τις κοινωνικές τους εμπειρίες, να αρθρώσουν κριτικό και εμπεριστατωμένο λόγο γύρω από αυτά και τέλος, να παράγουν τα ίδια τα δικά τους. Επιπρόσθετα, στην παρούσα εργασία θεωρητική βάση προσέφερε το παράδειγμα του αναδυόμενου γραμματισμού, σύμφωνα με το οποίο το παιδί με βάση τις κοινωνικο-πολιτισμικές του εμπειρίες συμμετέχει ενεργά, υποστηριζόμενο βέβαια από το περιβάλλον του, στην κατασκευή των γνώσεών του σχετικά με το γραπτό λόγο (Hall, 2001). Έτσι, σταδιακά τα παιδιά θα αρχίσουν να αποκτούν τις απαραίτητες γνώσεις και δεξιότητες, σε ένα παιδαγωγικό κλίμα που θα διασφαλίζει την ενεργό συμμετοχή τους, θα προωθεί τη δημιουργική τους έκφραση και θα λαμβάνει υπόψη τα ΑΠΣ για το νηπιαγωγείο. Βασική οπτική μας ήταν οι ιδιαίτερες προτιμήσεις καθώς και οι απολαύσεις που αντλούν τα παιδιά από την επαφή τους με την τηλεόραση και όχι μια επικριτική στάση που την ακυρώνει στο σύνολό της αυτά και δεν ξεκινήσαμε με δεδομένο ότι όλα αυτά είναι άκυρα ή ότι έχουν «ιδεολογική χροιά». Η προσέγγισή μας στο θέμα του αλφαβητισμού στα ΜΜΕ στηρίζεται σε τρεις βασικές παραδοχές για τα κείμενα των ΜΜΕ : (α) αυτά αναπαριστούν με κάποιο τρόπο τον κόσμο, (β) μέσω αυτών γίνεται η επικοινωνία με το κοινό, και (γ) είναι οργανωμένα με συστηματικούς τρόπους σε μηνύματα με συνοχή. Η λειτουργία δε της τελευταίας παραδοχής αποσκοπεί στο να εξυπηρετεί τις δύο πρώτες.

Στην παρούσα έρευνα, μεθοδολογικά χρησιμοποιήσαμε την επικοινωνιακή προσέγγιση η οποία επιδιώκει την ανάπτυξη της επικοινωνιακής ικανότητας, μέρος της οποίας είναι και η γλωσσική . Σύμφωνα με τη συγκεκριμένη προσέγγιση ιδιαίτερη σημασία δίνεται στην καταλληλότητα και

αποτελεσματικότητα στη χρήση της γλώσσας. Δίνει ιδιαίτερη σημασία στην ενεργητική συμμετοχή των μαθητών, με την έννοια της εμπλοκής σε επικοινωνιακές δραστηριότητες και γεγονότα, όπου οι συμμετέχοντες δεν είναι παθητικοί δέκτες, αλλά παίρνουν πρωτοβουλίες, (Χαραλαμπόπουλος, 1999:50). Καθώς οι δραστηριότητες αυτές πρέπει να δημιουργούν επικοινωνιακές συνθήκες, στις οποίες οι μαθητές να νιώθουν την ανάγκη να χρησιμοποιήσουν τη γλώσσα, ευνοώντας την ανάπτυξη των διαπροσωπικών σχέσεων.

Πιο συγκεκριμένα, κατά τη σχολική χρονιά (2011-2012) η Σχολική Σύμβουλος της 50ης Περιφέρειας Π.Α. και δύο νηπιαγωγοί των Χανίων, καθώς και μια μετεκπαιδευόμενη νηπιαγωγός στο Πανεπιστήμιο Κρήτης, δημιουργήσαμε μια ομάδα-κοινότητα πρακτικής (Κασσωτάκη-Ψαρουδάκη & Αμπαρτζάκη, 2011), προκειμένου να σχεδιάσουμε, να εφαρμόσουμε με την ενεργό εμπλοκή των οικογενειών, και να αξιολογήσουμε ένα πρόγραμμα εκπαίδευσης των παιδιών στα ΜΜΕ. Η ομάδα συνεδρίαζε σε τακτές συναντήσεις (συνολικά δέκα) μία ανά 15-20 μέρες, καθ' όλη τη διάρκεια του προγράμματος, το οποίο εφαρμόστηκε στα ολοήμερα τμήματα δύο διθέσιων νηπιαγωγείων των Χανίων, τα οποία βρίσκονται σε συνοικίες της πόλης κοντά στο κέντρο από τον Οκτώβριο 2011 μέχρι το Μάιο 2012. Ο βασικός στόχος του προγράμματος ήταν να υποστηριχτούν τα παιδιά, με αβίαστο τρόπο και τη χρήση αναπτυξιακά κατάλληλων πρακτικών, προκειμένου να αποκτήσουν ένα είδος αλφαβητισμού το οποίο να τους επιτρέπει να κατανοούν την κουλτούρα των ΜΜΕ που τα περιβάλλει και να συμμετέχουν ενεργά σε αυτή. Επιπλέον, να κατανοήσουν την έννοια της αναπαράστασης μέσα από τους ήρωες. Να αντιληφθούν ότι μια τηλεοπτικά αφηγούμενη ιστορία αποτελεί μια αναπαράσταση, μια κατασκευή.

Περιγραφή βασικών συνιστωσών προγράμματος

Η οργάνωση των περιβαλλοντικών παραμέτρων

Επειδή είναι δεδομένο ότι ο σχολικός χώρος δεν αποτελεί απλά το υλικό περιβάλλον, στο οποίο διαδραματίζεται η εκπαιδευτική διαδικασία, αλλά με τη δυναμική που αναπτύσσεται ανάμεσα σε αυτόν και τους χρήστες του, ανάγεται σε σημαντική παράμετρο των διαδικασιών αγωγής (Γερμανός, 2002). Από την έναρξη του προγράμματος ιδιαίτερη μέριμνα δόθηκε στην κατάλληλη διευθέτηση του χώρου και του εξοπλισμού του, ώστε τα νήπια να παρακινούνται από αυτόν στη ανάληψη πρωτοβουλιών για δράση και εξασκώντας έτσι τις γνώσεις τους από τις σκόπιμα οργανωμένες παρεμβάσεις (Κασσωτάκη Ψαρουδάκη, 2007). Πιο συγκεκριμένα: στη βιβλιοθήκη προστέθηκαν περιοδικά, παραμύθια, μικρές ιστορίες. Το κέντρο του δραματικού παιγνιδιού σταδιακά εξοπλίστηκε με υλικά μεταμφίεσης για να είναι δυνατό να υποστηριχτούν μιντιακοί ρόλοι. Ο περιβάλλον γραπτός λόγος , αποτελούμενος από αφίσες, κείμενα σε ηλεκτρονική μορφή, πίνακες με διευρυμένο ή και περιορισμένο κείμενο, πίνακες οργάνωσης και διοίκησης, κοινωνικά και εμψυχωτικά κείμενα, καθώς και αντιπροσωπευτικά της γλωσσικής ποικιλίας των παιδιών, σταδιακά οργανώθηκε και εμπλουτίστηκε κατάλληλα. Η μόνιμη και συνεχώς εμπλουτιζόμενη έκθεση δειγμάτων της γραπτής και εικαστικής έκφρασης των νηπίων, καθώς και των φωτογραφικών απεικονίσεων των πεπραγμένων της τάξης, συμπληρώνει την διδακτική παρέμβαση, μιας και τα παιδιά πολλές φορές ανατρέχουν σε αυτήν και αντλούν στοιχεία για την εξυπηρέτηση κάποιων αναγκών τους. Τα σχετικά επιτραπέζια παιγνίδια αποδείχτηκαν, πέρα από την ψυχαγωγία, εξαιρετικά χρήσιμα και για την καλλιέργεια ποικίλων γλωσσικών και άλλων δεξιοτήτων. Τέλος, η ύπαρξη του ηλεκτρονικού υπολογιστή και της βιντεοκάμερας- φωτογραφικής μηχανής ήταν σημαντική για την προβολή …αποθήκευση και εκτύπωση

Η υλοποίηση του προγράμματος άρχισε με τη συλλογή των δημογραφικών στοιχείων του μαθητικού δυναμικού των δύο σχολείων, την κωδικοποίησή και την εισαγωγή τους στο στατιστικό πακέτο SPSS 17. Τα αναλυτικά στοιχεία του μαθητικού δυναμικού των δύο νηπιαγωγείων φαίνονται στον πίνακα που ακολουθεί:

ΔΗΜΟΓΡΑΦΙΚΑ ΣΤΟΙΧΕΙΑ ΜΑΘΗΤΙΚΟΥ ΔΥΝΑΜΙΚΟΥ			
		N	**%**
Νηπιαγωγεία Χανίων	**5ᵒ**	18	52.9
	11ᵒ	16	47.1
Ηλικία	Νήπια	25	73.5
	Προνήπια	9	26.5
Φύλλο	Αγόρια	17	50
	Κορίτσια	17	50
Καταγωγή μητέρας	Ελληνική	28	82.4
	Αλβανική	3	8.8
	Γεωργιανή	1	2.9
	Σλοβάκικη	1	2.9
	Παλιννοστούσα	1	2.9
Καταγωγή πατέρα	Ελληνική	29	85.3
	Αλβανική	3	8.8
	Γεωργιανή	1	2,9
	Παλιννοστών	1	2,9
Σύνολο μαθητών		34	

Πίνακας 1: Δημογραφικά στοιχεία μαθητικού δυναμικού.

Διερεύνηση τηλεοπτικών προτιμήσεων παιδιών
Τα δεδομένα για τις τηλεοπτικές προτιμήσεις των παιδιών συλλέχτηκαν με δύο τρόπους: (α) άμεσα, από τα ίδια τα παιδιά και (β) έμμεσα, από τους γονείς.
Άμεση διερεύνηση: Απευθύνθηκαν στα παιδιά, ανά φάση διερεύνησης, οι ακόλουθες ανοιχτές ερωτήσεις που διευκολύνουν το διάλογο με τα παιδιά, τους δίνουν επίσης τη δυνατότητα να εκφράσουν τα συναισθήματα και τις απόψεις τους (ΥΠΕΠΘ-ΠΙ, 2011: 61-62).
Α΄ φάση: Ερώτηση εκπαιδευτικού: Τι βλέπεις **συνήθως** στην τηλεόραση;
    Απάντηση παιδιού: Δόθηκε μέσω ατομικής ζωγραφικής.
Β΄ φάση: Ερώτηση εκπαιδευτικού: Από αυτά που βλέπεις στην τηλεόραση ποιο πρόγραμμα
    -εκπομπή είναι αυτό που σου αρέσει περισσότερο;
    Απάντηση παιδιού: Δόθηκε προφορικά και καταγράφηκε από τη νηπιαγωγό
*Γ΄ φάση:***:** Ερώτηση εκπαιδευτικού: Γιατί ο αγαπημένος σου ήρωας σου αρέσει, τι τον κάνει
    ξεχωριστό;
     Απάντηση παιδιού: Δόθηκε προφορικά και καταγράφηκε σε μαγνητόφωνο.

Αποτελέσματα Α φάσης: Αφού συλλέξαμε τις απαντήσεις από όλα τα παιδιά, για το τι βλέπουν συνήθως στην τηλεόραση, τις μελετήσαμε και καταλήξαμε σε κάποιες πρώτες διαπιστώσεις, ότι:

- Τα παιδιά βλέπουν κυρίως παιδικά προγράμματα
- Ωστόσο υπήρξαν και 1-2 που διάλεξαν πχ ποδόσφαιρο, ντοκιμαντέρ με ζώα
- Στην πλειονότητά τους ταυτίζονται με ήρωες του φύλου τους
- Ακόμη και σήμερα υπάρχουν παιδιά που επιλέγουν κλασικά κινούμενα σχέδια: Μίκυ, Τομ και Τζέρυ

Αποτελέσματα Β΄ φάσης: Ρωτώντας τα παιδιά ποιο πρόγραμμα-εκπομπή είναι αυτό που σου αρέσει περισσότερο από αυτά που βλέπεις στην τηλεόραση, καταγράψαμε την προτίμηση του καθενός σε λίστα. Κατόπιν μελετώντας τες διαπιστώσαμε ότι, με κριτήριο την προτίμησή τους, θα μπορούσαν να ενταχθούν σε 5 ομάδες: Ντόρα, Μπεν 10, Σούπερ ήρωες, Μπάρμπυ και Μπομπ Σφουγγαράκης.

Αποτελέσματα Γ΄ φάσης: Από την απομαγνητοφώνηση των απαντήσεων των παιδιών στην ερώτηση, γιατί τους αρέσει ο συγκεκριμένος ήρωας και τι τον κάνει ξεχωριστό, διακρίναμε ότι τα παιδιά επικεντρώνονται:

- στα εξωτερικά χαρακτηριστικά των ηρώων κυρίως: μέγεθος, χρώματα, ρούχα.
- στα στερεότυπα του φύλου τους: τα κορίτσια την ομορφιά, τα αγόρια την εξουσία, τον πόλεμο και τη δύναμη.
- στο αντιθετικό ζεύγος καλό – κακό. Οι καλοί ήρωες πολεμούν τους κακούς.

Ενδεικτικά παραθέτουμε, σχόλιά τους για κάποιους ήρωες :

Τον Μπεν 10: *«Είναι λίγο μικρός, αλλά αλλάζει κόκαλα όταν πατάει το ρολόι του και γίνεται πιο μεγάλος, γίνεται τέρας ...» «Φοράει μια άσπρη μπλούζα κι εδώ είναι (δείχνει στο στήθος) κάτι μαύρο, αλλά... είναι κοντομάνικο….» «Είναι άνθρωπος αλλά γίνεται και τέρας μπορεί να γίνει και αρχηγός, που είναι πολύ δυνατός...».*

Τους σούπερ ήρωες (Μπάτμαν, Σπάιντερμαν, Σούπερμαν): *«Έχει μία στολή κόκκινη ... τρέχει πολύ γρήγορα, δεν μπορεί να τον πιάσει κανείς. Ούτε ο γρηγορότερος από όλους...» «Πολεμάνε μόνο με τους κακούς» «Επειδή σώζουν τον κόσμο... επειδή είναι καλοί » «γιατί θέλω να πάρω και μία στολή του».*

Τη Μπάρμπυ: *« Γιατί είναι καλή... Γιατί... στο χωριό μου και στο σπίτι μου είδα ότι χιόνισε στο χωριό της Μπάρμπυ και έβαλε ένα φόρεμα και η αδερφή της έβαλε μια φούστα και ωραία παπούτσια» «Γιατί έχει ωραίο φόρεμα ... Και για τα μαλλιά της... Και βάφεται, βάφει τα χείλη ».*

Έμμεση διερεύνηση: Ταυτόχρονα ξεκινήσαμε την έμμεση διερεύνηση, εμπλέκοντας τους γονείς. Η σύγχρονη εκπαιδευτική έρευνα αποκαλύπτει ότι τα πιο αποτελεσματικά προγράμματα είναι εκείνα που εμπλέκουν τους γονείς στις διαδικασίες μάθησης των παιδιών τους (Δαφέρμου, Κουλούρη, Μπασαγιάννη, 2007). Επιπλέον επισημαίνεται ότι για να δοθεί στα παιδιά η αίσθηση της συνέχειας μεταξύ σχολείου σπιτιού, για να καταστήσουν τους γονείς συμμέτοχους στην εκπαιδευτική διαδικασία είναι απαραίτητο οι εκπαιδευτικοί να τους ενημερώνουν συστηματικά και με διάφορους τρόπους για το πρόγραμμα, τους στόχους, τις δραστηριότητες κλπ. (Γιαννικοπούλου, 1998). Επιλέξαμε να τους δώσουμε ερωτηματολόγια τα οποία συνοδεύονταν από εισαγωγική επιστολή για το πρόγραμμα (Βάμβουκας, 1998). Οι ερωτήσεις ήταν λίγες, απλές, ξεκάθαρες και εύκολες ώστε να απαντηθούν πρόθυμα από τους γονείς. Ο στόχος της χρήσης του ερωτηματολογίου ήταν να διερευνηθούν ζητήματα σχετικά με: (α) το είδος των καναλιών που διαθέτουν οι οικογένειες (β) τις τηλεοπτικές προτιμήσεις και (γ) τις συνήθειες των παιδιών. Επιπλέον, επιδίωξή μας ήταν η ενίσχυση της συνεργασίας σχολείου-οικογένειας.

Αφού συλλέξαμε όλα τα ερωτηματολόγια από τους γονείς, οι οποίοι τα συμπλήρωσαν με προθυμία, καταγράψαμε τα στοιχεία σε σχετική βάση δεδομένων και στη συνέχεια έγινε η ανάλυσή τους με το στατιστικό πακέτο για τις κοινωνικές επιστήμες SPSS 17. Σύμφωνα με τα αποτελέσματα της στατιστικής ανάλυσης περιγραφικού χαρακτήρα που πραγματοποιήσαμε διαπιστώσαμε ότι:

- Δορυφορική έχουν μόνο τα αλλοδαπά παιδιά και παλιννοστούντα. Ενώ Καλωδιακή και μερικά ημεδαπά. Σε άλλες γλώσσες προγράμματα παρακολουθούν, μόνο τα αλλοδαπά και παλιννοστούντα παιδιά.
- Τα περισσότερα παιδιά (21, 61.8%) δε βλέπουν μόνα τους τηλεόραση, αλλά με τα αδέρφια τους.
- Το 41.2% (14 από τα 34) των παιδιών δεν βλέπει με κανένα από τους δύο γονείς τηλεόραση.

- Οι 11 από τις 34 οικογένειες παρακολουθούν προγράμματα όλοι μαζί (ελληνικές ταινίες-σίριαλ-ειδήσεις). Μέσα σε αυτές ανήκουν, όλες οι οικογένειες των αλλοδαπών-παλιννοστούντων παιδιών.
- Λιγότερα από τα μισά παιδιά 41.2% (14 παιδιά), παρακολουθούν και άλλα προγράμματα εκτός από παιδικά. Από αυτά τα παιδιά παρακολουθεί επιπλέον: το 41.2% (14 παιδιά) σίριαλ (εφηβικά & ενηλίκων), το 38.1% (13 παιδιά) ελληνικές ταινίες, το 32.4% (11παιδιά) ντοκιμαντέρ. Ψυχαγωγικά προγράμματα παρακολουθεί το 23.5% (8 παιδιά), ενώ το 20.6% (7 παιδιά) ειδήσεις και μόλις το 11.8% (4 παιδιά) αθλητικά.
- Συστηματικά παρακολουθούν, όλα τα παιδικά του Σαββατοκύριακου το 73.5% (25 παιδιά). Ενώ, πολύ λίγα παιδιά παρακολουθούν συστηματικά κάποιο συγκεκριμένο πρόγραμμα (8 στα 34). Για παράδειγμα, την Πάτυ και τη Ντόρα το 5.9%, την Τεμπελοχώρα και τη Μπάρμπυ το 2.9%.
- Η πλειονότητα των οικογενειών θέτει όρια στη χρονική διάρκεια παρακολούθησης (27 στις 34).
- Η πλειοψηφία των παιδιών (29 στα 34) παρακολουθεί σε καθημερινή βάση τηλεόραση, ενώ υπάρχουν και 4 που παρακολουθούν μόνο το Σαββατοκύριακο.
- Τέλος, διαπιστώθηκε ότι, στα παραπάνω δεδομένα, δεν υπήρχαν σημαντικά στατιστικές διαφορές, ούτε μεταξύ αγοριών-κοριτσιών, ούτε μεταξύ των παιδιών του ενός με του άλλου νηπιαγωγείου.

Παιδαγωγική και διδακτική αξιοποίηση των τηλεοπτικών προτιμήσεων των παιδιών

Έκφραση-Δημιουργία- Γλώσσα

Βασιζόμενοι στην ομαδοποίηση των προτιμήσεων τους (βλ. Β΄ φάση διερεύνησης), καλέσαμε τα παιδιά σε ζευγάρια ή ομάδες να βιώσουν με το σώμα τους, να αναπαραστήσουν την αγαπημένη τους εκπομπή με παντομίμα ή με δραματοποίηση. Επειδή θέλαμε να αξιοποιήσουμε παιδαγωγικά αυτές τις προτιμήσεις, εμπλέκοντας διάφορες γνωστικές περιοχές (Έκφραση-Δημιουργία-Γλώσσα) και επιδιώξεις του ΔΕΠΠΣ (ΥΠΕΠΘ-Π.Ι., 2003), επιδιώξαμε να έχουν τα παιδιά την ευκαιρία να μεταχειριστούν πολλούς και διαφορετικούς εκφραστικούς τρόπους. Επιπλέον, επειδή τα παιδιά αρέσκονται να αναπαριστούν τμήματα προγραμμάτων, «τα καλύτερα» για να τα μοιραστούν ή να ενημερώσουν τους φίλους τους, (Palmer, 2001: 271). Με βασικούς στόχους τα παιδιά: να εκφραστούν με τον αυτοσχεδιασμό και τη μίμηση (ΥΠΕΠΘ-Π.Ι., 2003: 4329), να χρησιμοποιήσουν με ποικίλους τρόπους υλικά, να είναι δημιουργικά (ΥΠΕΠΘ-Π.Ι., 2003:4330) και να εμπλουτίσουν το λεξιλόγιό τους .

Αφού, λοιπόν, χωρίστηκαν σε ζευγάρια και ομάδες προετοίμασαν ανταλλάσσοντας απόψεις και γνώμες, έφτιαξαν το σενάριο τους και διάλεξαν ρόλους, (Friedrich, 2000). Έτσι χρησιμοποίησαν τα στοιχεία του θεάτρου όπως ρόλο, κίνηση, λόγο, χώρο, χρόνο, σύμβολα για να εκφραστούν και να επικοινωνήσουν (ΥΠΕΠΘ-Π.Ι., 2011:269). Πήραν υλικά, υφάσματα, αξεσουάρ, έκαναν πρόβα και μας αναπαρέστησαν την αγαπημένη τους εκπομπή

Παράλληλα εμπλούτισαν το λεξιλόγιό τους, διότι κατά την παραπάνω διαδικασία έμαθαν και χρησιμοποίησαν κατάλληλα νέες λέξεις όπως: εκπομπή-πρόγραμμα-αναπαράσταση. Ως εκ τούτου, κάθε ομάδα παρουσίασε στις υπόλοιπες: τη Ντόρα την εξερευνήτρια, τον Μπεν 10, τους Σούπερ ήρωες (Σπάιντερμαν, Μπάτμαν και Σούπερμαν), το Μπομπ Σφουγγαράκη και τη Μπάρμπυ.

Γλώσσα: Γραπτός και προφορικός λόγος

Εξοικείωση με διάφορους τύπους και είδη κειμένων: Επιδιώξαμε να εξοικειωθούν τα παιδιά με διάφορα είδη κειμένων, επειδή, όπως αναφέρει η Φιλιππάκη-Warburton (2000:39) «οι δραστηριότητες γλώσσας στην επικοινωνιακή προσέγγιση στοχεύουν στην ανάπτυξη ικανοτήτων που είναι απαραίτητες στο μαθητή προκειμένου να κατανοεί και να παράγει αποτελεσματικά πολλών διαφορετικών τύπων κείμενα προφορικού και γραπτού λόγου- κείμενα που θα συναντήσει στο σχολικό και το εξωσχολικό του περιβάλλον» Τη γνώση αυτή και τις ικανότητες αυτού του είδους δεν τις αποκτά κανείς τυχαία, αλλά μέσα από συστηματική διδασκαλία, κατά την οποία η

ανάπτυξη της «γλωσσικής επίγνωσης» είναι αναγκαία. Έτσι, λοιπόν, στην ολομέλεια θέσαμε την ερώτηση: *Ποιος είναι ο αγαπημένος σου ήρωας από αυτούς που βλέπεις στην τηλεόραση;* Η Νηπιαγωγός καταγράφει σε χαρτί του μέτρου. Έτσι δημιουργείται ένα είδος πληροφοριακού κειμένου: *η Λίστα –κατάλογος* . Με φράσεις ή λέξεις σε κάθετη διάταξη, μια προσιτή μορφή κειμένου για τα παιδιά, γιατί η δομή του είναι πολύ απλή και επειδή δίνονται πολλές αφορμές σχεδόν καθημερινά στο νηπιαγωγείο για γραφή καταλόγων (Δαφέρμου κ. συν., 2007). Στη συνέχεια με στόχο την καλλιέργεια ιδιότητας του πολίτη τα παιδιά ψήφισαν τον ήρωα της προτίμησής τους με σκοπό να βρούμε τον αγαπημένο ήρωα της τάξης. Κατόπιν καταμέτρησαν τις ψήφους. Πρώτος ο Batman με 6 ψήφους και δεύτερος ο Spiderman με 5 (τα αγόρια είναι περισσότερα). Ενώ στο άλλο νηπιαγωγείο με περισσότερα κορίτσια στο τμήμα, πρώτη η Barbie.

Αφού ολοκληρώθηκε η λίστα, πήραμε ατομικές συνεντεύξεις από τα παιδιά με σκοπό να διερευνήσουμε τις απόψεις που έχουν σχηματίσει για τους ήρωες που προτιμούν. (βλ. παραπάνω Γ΄ φάση διερεύνησης). Από τα αποτελέσματα της διερεύνησης, διακρίναμε ότι χρειαζόταν να επιμείνουμε και να εμβαθύνουμε, στα χαρακτηριστικά των ηρώων. Γι' αυτό, στη συνέχεια συζητήσαμε στην ολομέλεια για τα χαρακτηριστικά (εξωτερικά-εσωτερικά) του ήρωα, το σύμβολο, τα χρώματα. Κατόπιν σε ζευγάρια ζωγράφισαν τον αγαπημένο ήρωα, προσέχοντας να χρησιμοποιήσουν το σύμβολό του, τα χρώματα να γράψουν το όνομά του, όπως μπορούν.

Έτσι δημιουργήθηκε η ανάγκη για ένα άλλο είδος κειμένου, έναν **πίνακα αναφοράς**, όπου θα μπορούσαμε να βλέπουμε τα ονόματά τους, στο ελληνικό και το λατινικό αλφάβητο, καθώς και μία εικόνα. Ο πίνακας έμεινε αναρτημένος στην τάξη κατά τη διάρκεια όλης της χρονιάς και εμπλούτισε τον περιβάλλοντα γραπτό λόγο.

Διερεύνηση των τρόπων αναπαράστασης των δομικών στοιχείων των ιστοριών στην τηλεόραση: Όπως συμβαίνει στα αφηγηματικά κείμενα έτσι και σε μια παιδική σειρά μπορούμε να διακρίνουμε την υπόθεση (την ιστορία) που θεωρείται η πρώτη ύλη του αφηγήματος από την πλοκή (τη δομή) που αντιπροσωπεύει τη μορφοποιητική παρέμβαση του δημιουργού με την οποία μεταβάλλεται η πρώτη ύλη σε συγκεκριμένο κείμενο (Καψωμένος, 2002) Σε μορφολογικό επίπεδο τα αφηγηματικά στοιχεία που θα αναλύσουμε είναι: το **πλαίσιο** (τόπος, χρόνος, πρωταγωνιστές), το **θέμα** (αρχικό γεγονός που σηματοδοτεί την εξέλιξη της ιστορίας ή ο βασικός στόχος που καλείται να επιτύχει ο κεντρικός πρωταγωνιστής), η **πλοκή** (οι πράξεις στις οποίες προβαίνει ο κεντρικός ήρωας της ιστορίας για την επίτευξη του βασικού του στόχου) και η **επίλυση** (η επίτευξη του στόχου ή η επίλυση του προβλήματος της ιστορίας από τον κεντρικό ήρωα).

Εισαγωγική δράση: μια μέρα πριν η νηπιαγωγός φέρνει στην τάξη καρτέλες με τα ονόματα των ηρώων που προηγούμενα επέλεξαν τα παιδιά. Βρίσκουμε και εκτυπώνουμε μαζί με τα παιδιά, φωτογραφίες των ηρώων από το διαδίκτυο. Όλα μαζί τοποθετούνται σε ένα καλαθάκι για παιχνίδι ταύτισης ήρωα-λέξης. Σε όλη τη διάρκεια δραστηριοτήτων που ακολουθούν τα παιδιά ανατρέχουν στις καρτέλες για να αντιγράψουν, να ψηφίσουν, να δημιουργήσουν μια μικρή ομάδα, ακόμη και να παίξουν στις γωνιές.

Κύρια δράση: παρακολούθηση ταινίας. Από τα δημοφιλή έργα της τάξης επιλέγουμε με ψηφοφορία το δημοφιλέστερο και βλέπουμε ένα επεισόδιο στην τάξη, ώστε να έχουν κοινή εμπειρία. Τα νήπια υποστηρίζονται να αναγνωρίσουν στοιχεία, ενδεχομένως ακόμα και στερεοτυπικά, που χρησιμοποιούνται για να δηλώσουν το είδος του χώρου που διαδραματίζεται η ιστορία, το φύλο, τα συναισθήματα, και τους ρόλους του πρωταγωνιστή, του βοηθού και του ανταγωνιστή. Τα νήπια ενώ έχουν χωριστεί σε πέντε ομάδες τους ζητάμε να παρατηρήσουν προσεκτικά, να συζητήσουν και από κοινού να καταλήξουν πώς είναι αυτές οι αναπαραστάσεις ως προς το ρόλο, αν είναι στερεοτυπικός ή εναλλακτικός (μια γιαγιά με μπαστούνι ή με μηχανάκι),ως προς το συναίσθημα(θετικό ή αρνητικό συναίσθημα ,αξία) και ως προς το θέμα (ρεαλιστικό ή φανταστικό). Για να βγάλουμε τα συμπεράσματα μας, πρέπει να προσέξουμε τα ρούχα, τα αντικείμενα, στα λόγια και στις πράξεις. Τα νήπια χρησιμοποιούν διάφορους εκφραστικούς τρόπους για να α)αναπαραστήσουν τον ήρωα, τις εκφράσεις του προσώπου , τα αντικείμενα που θεωρεί αναγκαία, τα μαγικά αντικείμενα. β) χρησιμοποιώντας τη φωτογραφική μηχανή να τραβήξουν ο ένας τον άλλο ελέγχοντας πως αποτυπώνεται φωτογραφικά ο συμμαθητής-ήρωας. Καθοδηγούνται να λάβουν υπόψη τους την απόστασή από την κάμερα (κοντινό-μεσαίο-μακρινό πλάνο),τις εκφράσεις του προσώπου τις στάσεις του σώματος, το χώρο που πλαισιώνει τον ήρωα . Το ζητούμενο είναι να αποτυπωθεί από τον λήπτη στην φωτογραφία, η έκφραση ή η στάση του

παιδιού που αναπαριστά. Συνεργάζονται για να έχουν κοινό αποτέλεσμα. Κατανοούν με τρόπο άμεσο πως τα μιντιακά προϊόντα κατασκευάζονται με τη χρήση τεχνικών εργαλείων με τα οποία ο καθένας ακόμη κι ένα παιδί μπορεί συμμετέχοντας με ενεργητικό τρόπο να κατασκευάσει το δικό του. Συνειδητοποιούν ότι τα ΜΜΕ είναι μέσο διατύπωσης απόψεων, έκφρασης-μετάδοσης συναισθημάτων και ότι τα προϊόντα τους είναι μια κατασκευασμένη και υποκειμενική δημιουργία (Κούρτη , 2003)

Καταληκτική δράση-Εικαστική αναπαράσταση των αφηγηματικών στοιχείων της ιστορίας από τις πέντε ομάδες και παρουσίασή τους στην ολομέλεια::
Ο πρωταγωνιστής. **Ποιος** είναι. Ποιά είναι τα ιδιαίτερα χαρακτηριστικά του ήρωα. Η εξωτερική του εμφάνιση τα ρούχα, το πρόσωπό του, τα αντικείμενα που χρειάζεται και δείχνουν τις δράσεις του. Το περιβάλλον που κινείται ο ήρωας. Πολύτιμη πληροφορία και χαρακτηριστικό της δράσης του ήρωα. **Πού** αναπτύσσει τη δράση του, σε πόλη ή χωριό, σε περιβάλλον με ανθρώπους ή στη φύση. Ο βοηθός. **Ποιος** τον βοηθάει είναι φίλος του και πολύτιμος στις δυσκολίες. Καλούνται επίσης να επισημάνουν την ύπαρξη του άλλου φύλου στην ιστορία και το ρόλο που έχει. Ο ανταγωνιστής. **Ποιος** είναι και ποια τα χαρακτηριστικά του εχθρού. Οι δευτεραγωνιστές. **Ποιοι** είναι οι άλλοι που πλαισιώνουν την ταινία άνθρωποι ή ζώα που αναλαμβάνουν ρόλους και με όποιο τρόπο συμμετέχουν στην ιστορία. Οι πέντε ομαδικές ζωγραφιές που προκύπτουν παρουσιάζονται από κάθε ομάδα δίνοντας έμφαση στα σημεία που πρέπει κατά τη γνώμη τους να προσέξουμε. Μετά το τέλος της παρουσίασης προχωρήσανε στη σύνθεσή των εργασιών τους σε ενιαίο όλο. Κατασκευάστηκε έτσι η αφίσα της αναπαράστασης.

Καλλιέργεια αλφαβητικών γνώσεων: Δημιουργία του αλφάβητου των ηρώων. Το περιβάλλον της τάξης εμπλουτίζεται με γραπτό λόγο και αναβαθμίζεται εξελικτικά. Τα νήπια έχουν δημιουργήσει ήδη πολλές ζωγραφιές όχι μόνο με τους αγαπημένους πρωταγωνιστές αλλά με όλους τους ρόλους-ήρωες της αγαπημένης τους τηλεοπτικής σειράς. Δημιουργούμε ένα πίνακα χωρισμένο σε εικοσιτέσσερα κελιά. Το κάθε κελί φιλοξενεί ένα γράμμα από το αλφάβητο που θα χρησιμοποιείται σαν αρχικό και θα συμπληρώνεται με τους αγαπημένους μας ήρωες και το όνομά τους. Το ενδιαφέρον τους για να συμπληρώνουν τα κελιά αποδείχτηκε μεγάλο. Ανατρέχουν στις κάρτες με τα ονόματα των ηρώων για να γράψουν, αλλά και στα λεξικά.

Πληροφορική

Θέλοντας να φτιάξουμε κινητές καρτέλες για τον πίνακα αναφοράς με τους αγαπημένους ήρωες (Δαφέρμου κ.ά., 2007) χρησιμοποιήσαμε τον ηλεκτρονικό υπολογιστή της τάξης. Συγκεκριμένα κειμενογράφο και διαδίκτυο. Τα κυριότερα πλεονεκτήματα του διαδικτύου για τη γλωσσική διδασκαλία, θα μπορούσαν να συνοψιστούν σύμφωνα με τον Κουτσογιάννη, (1999:125) σε δύο τομείς κυρίως: α) στις μεγάλες δυνατότητες που παρέχει για δημιουργία πραγματικών περιστάσεων επικοινωνίας και β) στην ευκολία με την οποία μπορεί να εντοπιστεί και ευρεθεί ποικίλο και αυθεντικό γλωσσικό υλικό.

Έτσι, αρχικά γράψαμε τα ονόματα των ηρώων στον κειμενογράφο και τα εκτυπώσαμε. Κατόπιν ψάξαμε στο διαδίκτυο για εικόνες με ήρωες, γράφοντας το όνομά τους στη μηχανή αναζήτησης με τη βοήθεια του πίνακα αναφοράς. Το παιδί εισάγεται στον κόσμο της γραφής ανακαλύπτοντας διάφορα είδη κειμένων (λογότυπα, εικόνες, φωτογραφίες, χάρτες, σχήματα…(Κούρτη, 2003:155). Η νηπιαγωγός χρειάστηκε να εξηγήσει ότι δεν μπορούσαμε να τις εκτυπώσουμε όλες κι ότι έπρεπε να συμφωνήσουν σε 4-5 για κάθε ήρωα. Διάλεξαν μετά από πολλές συζητήσεις- αντιπαραθέσεις μεταξύ τους, αυτές που τους άρεσαν, καθώς και εικόνες με το λογότυπο και το σύμβολο κάθε ήρωα. Τις εκτυπώσαμε, τις πλαστικοποιήσαμε και τις βάλαμε σε ένα καλάθι. Τοποθετήθηκαν στη γωνιά της γραφής (Τάφα, 2001), εμπλούτισαν τον περιβάλλοντα γραπτό λόγο της τάξης καθώς προσέφεραν πολλές δυνατότητες στα παιδιά, σε όλη τη διάρκεια της χρονιάς, για διάφορα παιχνίδια, ατομικά, σε ζευγάρια και ομαδικά (Φωτογραφία 9, 10). Για παράδειγμα «Λέξεις στον αέρα» και «Το μαγικό κουτί» (Γιαννικοπούλου, 1998:161-162).

Μαθηματικά

Σκοπός μας ήταν η δημιουργία του κατάλληλου περιβάλλοντος, μέσα από το οποίο τα παιδιά ήρθαν σε επαφή με φαινόμενα, η οργάνωση των οποίων απαιτεί τις πρώτες μαθηματικές έννοιες, ενώ σημαντικό ρόλο παίζει και η αναγκαιότητα επεξεργασίας αναπαραστάσεων (Καλυδριμίδου,

1999). Πλέον είμαστε έτοιμοι να αρχίσουμε να οργανώνουμε τα δεδομένα μας, ώστε τα παιδιά να αναπτύξουν ικανότητες επεξεργασίας και απόδοσης νοήματος στις πληροφορίες που παίρνουν (Τζεκάκη, 1998). Γι αυτό προχωρήσαμε σε επόμενο είδος κειμένου: *Διάγραμμα* αγαπημένων ηρώων. Στην εικονιστική αναπαράσταση δηλαδή, των τηλεοπτικών προτιμήσεων των παιδιών. Αξιοποιώντας τον ενθουσιασμό για τους αγαπημένους ήρωες και τις εικόνες που είχαμε εκτυπώσει από τον υπολογιστή, η νηπιαγωγός πρότεινε να φτιάξουμε ντόμινο με τους ήρωες. Το ντόμινο, ένα κατεξοχήν παιχνίδι αντιστοίχισης, περιλαμβάνει επίσης τοπολογικές έννοιες γειτνίασης, διάταξης, προβολικές σχέσεις ευθυγράμμισης, όπως και συμβολισμών ή αντιστοίχισης διαφορετικών αναπαραστατικών μορφών (Τζεκάκη, 1998). Τα παιδιά συμμετείχαν στην κατασκευή του. Το τοποθετήσαμε σε ένα κουτί και το έπαιζαν καθ' όλη τη διάρκεια της χρονιάς. Επειδή δεν μπορούσαν να παίζουν όλα τα παιδιά ταυτόχρονα, σκεφτήκαμε κι ένα ακόμη παιχνίδι μνήμης (memory) και παρατηρητικότητας.

Κρίθηκε πλέον απαραίτητο να γίνει αναστοχασμός στον ήρωα. Καταρχήν χωρίσαμε τους ήρωες σε δύο ομάδες ανθρώπους και ζώα ήρωες, χρησιμοποιώντας στεφάνια και τις εικόνες που είχαμε. Μετά τα παιδιά ζωγράφισαν αγαπημένους ήρωες ανθρώπους και ζώα και τους κόλλησαν σε χαρτόνι χωρίζοντας τις δύο ομάδες. Στη συνέχεια, επιδιώξαμε να κλιμακώσουμε ως προς τη δυσκολία τα κριτήρια και τις ιδιότητες και από τα πιο εμφανή να περάσουμε σε περισσότερο αφηρημένα (Τζεκάκη, 1998). Περάσαμε λοιπόν σε επόμενη δραστηριότητα με στόχο: τα παιδιά να παρατηρούν να περιγράφουν να συγκρίνουν και να ταξινομούν/ομαδοποιούν με βάση ορισμένα κοινά γνωρίσματα. Χωρισμός σε δύο κατηγορίες: αγόρια – κορίτσια ήρωες. Ανιχνεύουμε ομοιότητες – διαφορές (διαφυλική διάσταση – άρση στερεοτύπων).

Στην ολομέλεια με συζήτηση, συγκρίναμε τα αγόρια με τα κορίτσια ήρωες όπως παρουσιάζονται στα τηλεοπτικά προγράμματα. Καθώς είναι πολύ σημαντικό για τη μαθηματική σκέψη το να είμαστε σε θέση να συγκρίνουμε (Κουτσουβάνου, 2000) εντοπίσαμε τις ομοιότητες και διαφορές μεταξύ των αγοριών και κοριτσιών ηρώων και κατόπιν τις τοποθετήσαμε σε ένα κατάλληλο διάγραμμα (διάγραμμα Venn). Με αποτέλεσμα τα παιδιά κατά τη διάρκεια της δραστηριότητας να έχουν την ευκαιρία να συνεργαστούν, να αξιολογήσουν, ταξινομήσουν, διατυπώσουν και υποστηρίξουν απόψεις (Χαραλαμπόπουλος, 1999: 50) Ολοκληρώνοντας το διάγραμμά μας και μελετώντας το καταλήξαμε ότι αν και οι ήρωες προβάλλουν τα στερεοτυπικά χαρακτηριστικά του φύλου τους (όμορφα τα κορίτσια, δυνατά τα αγόρια κλπ), εντούτοις αγόρια και κορίτσια ήρωες αναδεικνύουν περισσότερα κοινά χαρακτηριστικά, παρά διαφορές.Το διάγραμμα επίσης εμπλούτισε τον περιβάλλοντα γραπτό λόγο της τάξης και αποτέλεσε αφορμή, τα παιδιά πάμπολλες φορές, να διαβάζουν τις πληροφορίες που έδινε (ΥΠΕΠΘ-ΠΙ, 2011:186) και μεταξύ τους, αλλά και σε επισκέπτες όπως τη Σχολική Σύμβουλο και τους γονείς τους.

Συμπερασματικές διαπιστώσεις

Όπως αναφέρθηκε στην αρχή, στην παρούσα εργασία, διαπραγματευθήκαμε το πρώτο εισαγωγικό τμήμα ενός προγράμματος εκπαίδευσης στα ΜΜΕ, το οποίο αφορούσε τη διερεύνηση των τηλεοπτικών προτιμήσεων παιδιών προσχολικής ηλικίας. Η διερεύνηση αυτή προσέφερε πολλές και ποικίλες ευκαιρίες να αξιοποιηθούν αυτές οι προτιμήσεις συνδεόμενες άμεσα με όλες τις γνωστικές περιοχές και επιδιώξεις του ΔΕΠΠΣ (ΥΠΕΠΘ-ΠΙ, 2003).
Ταυτόχρονα αποτέλεσε ένα άριστο πλαίσιο ανάδυσης του γραμματισμού στο νηπιαγωγείο, αφού έδωσε πολλές αφορμές στα παιδιά να εμπλακούν σε δραστηριότητες ανάγνωσης, γραφής, ομιλίας και ακρόασης, σχετικές με τις εμπειρίες και τα βιώματά τους. Επιπλέον παρείχε μια μοναδική δυνατότητα να εμπλουτιστεί ο χώρος της τάξης με περιβάλλοντα γραπτό λόγο, με τον οποίο τα παιδιά συνδέονταν συγκινησιακά, αφού είχαν εμπλακεί ενεργά στη δημιουργία του.

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Η Συμβολή του Παιχνιδιού και των ΤΠΕ σε ένα Πρόγραμμα Περιβαλλοντικής Εκπαίδευσης με Θέμα την Ενέργεια, σε Μαθητές Προσχολικής Αγωγής

Ασπασία Βασιλάκη

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Περίληψη

Στην παρούσα εργασία αναφέρονται οι άξονες σχεδιασμού ενός προγράμματος Περιβαλλοντικής Εκπαίδευσης με θέμα την Ενέργεια, απευθυνόμενο σε μαθητές προσχολικής ηλικίας. Ως κεντρικός πυρήνας του συνολικού σχεδιασμού τέθηκε η έννοια της αειφόρου ανάπτυξης, ενώ στο επίκεντρο των διδακτικών παρεμβάσεων ήταν το παιχνίδι και η χρήση των Τεχνολογιών της Πληροφορίας και της Επικοινωνίας (Τ.Π.Ε.) στην εκπαίδευση. Στόχος της έρευνας ήταν η αξιολόγηση των μαθησιακών αποτελεσμάτων μετά την εφαρμογή του προγράμματος. Η εξέταση της αποτελεσματικότητάς του, σε μαθητές χωρίς προγενέστερη γνώση της ενέργειας, πραγματοποιήθηκε με τη στρατηγική αντιμετώπισης στόχων- εμποδίων. Τα θετικά αποτελέσματα της έρευνας δείχνουν ότι ο εδικός σχεδιασμός της παρέμβασης, πάνω στις πραγματικές γνωστικές ανάγκες των μαθητών/τριών, παράλληλα με την επιλογή τεχνικών, κοντά στην ιδιαίτερη φύση των παιδιών προσχολικής ηλικίας, συμβάλλουν σημαντικά στην οικοδόμηση εννοιών σχετικά με την ενέργεια και τη διαισθητική κατανόηση της αειφορίας.

Λέξεις κλειδιά: ενέργεια, παιχνίδι, ΤΠΕ, οικοδομισμός, στόχος- εμπόδιο, Περιβαλλοντική Εκπαίδευση, αειφορία, Εκπαίδευση για την Αειφόρο Ανάπτυξη, Φυσικές Επιστήμες

Abstract

The present assignment refers to the designing axes of an Environmental Education project on Energy, addressing preschool pupils. The concept of sustainable development was set as the core of the overall design, while the teaching interventions focused on educational games and the use of ICT in education. The aim of the research was to evaluate the learning outcome after the realization of the project. Its effectiveness, on pupils without previous knowledge of Energy, was examined through the strategy of troubleshooting targets-obstacles. The positive findings of the research indicate that the special intervention design, which was based on the true cognitive needs of the pupils, along with the selection of techniques which are close to the particular nature of preschool children, considerably contribute to constructing ideas about Energy and an intuitive comprehension of sustainability.

Εισαγωγή

Σύμφωνα με την «επίσημη» εκδοχή, όπως έχει αυτή διαμορφωθεί στις διεθνείς διασκέψεις, οι τρεις πυλώνες που αποτυπώνουν την αειφορία είναι η οικονομία, το περιβάλλον και η κοινωνία. «Τα τρία αυτά συστήματα αποτελούν τις τρεις διαστάσεις της αειφόρου ανάπτυξης, τις οποίες συμπληρώνει μια τέταρτη διάσταση εξίσου σημαντική, εκείνη των θεσμών. Οι θεσμοί είναι το πλαίσιο εντός του οποίου λειτουργούν η οικονομία, το περιβάλλον και η κοινωνία, πλαίσιο που διαχειρίζεται τα συστήματα αυτά, διαμεσολαβεί στις μεταξύ τους αντιθέσεις και ασυμβατότητες και διευκολύνει τη σύνθεση, η οποία θα προωθήσει την ανάπτυξη των συστημάτων αυτών στην κατεύθυνση της αειφορίας» (Τσαντίλης, 2003 στο Φλογαΐτη, 2006: 96). Το σχολείο ως βασικός κοινωνικός θεσμός ενσωματώνει στην εκπαίδευση την έννοια της αειφορίας και μετουσιώνεται σε Εκπαίδευση για το Περιβάλλον και την Αειφορία (Ε.Π.Α.). Στο πλαίσιο, όμως αυτό εντάσσεται και η προβληματική για ποιου είδους αειφορία μιλάμε. (Φλογαΐτη, 2006: 157). Στην παρούσα έρευνα και παρέμβαση ως αντικείμενο προβληματισμού και διερεύνησης είναι η αναζήτηση καταστάσεων, στόχων και πρακτικών μέσα από το πρίσμα της κριτικής και της αμφισβήτησης, προκειμένου οι μαθητές ως μελλοντικοί πολίτες να μπορούν να διαμορφώσουν θέσεις και προτάσεις στοχαζόμενοι και αναστοχαζόμενοι κριτικά τις κυρίαρχες κοινωνικές εκδοχές. Μία τέτοια εκδοχή είναι και το λεγόμενο «ενεργειακό ζήτημα» και η σύνδεσή του με την εκπαίδευση.

Η εισαγωγή της διδασκαλίας της έννοιας της ενέργειας ξεκινά μέσω των καινοτόμων αναλυτικών προγραμμάτων τις δεκαετίες '60 και '70, ως απάντηση της εκπαίδευσης στο επείγον κοινωνικό πρόβλημα της εξοικονόμησης ενέργειας που προήλθε από τις μεγάλες πετρελαϊκές κρίσεις της εποχής εκείνης (Ζάρβα, 2010:8). Ως έννοια των φυσικών επιστημών χαρακτηρίζεται (Ζάρβα, ό.π.) από τις πλέον δύσκολες δεδομένου του αφηρημένου και πολυσήμαντου χαρακτήρα της. Στο πλαίσιο της οροθέτησης της εν λόγω έννοιας, η ιδιότητά της να διατηρείται (αρχή διατήρησης της ενέργειας) εισάγει την *Εξοικονόμηση Ενέργειας* ως προσπάθεια εξεύρεσης τρόπων για την ορθολογική χρήση της, χωρίς στη συνέχεια να επηρεαστούν αρνητικά οι παραγωγικές διαδικασίες αλλά και η άνετη διαβίωση του ανθρώπου (Ζάρβα, ό.π.: 11). Έτσι η έννοια των Φυσικών Επιστημών (Φ.Ε.) αποτελεί γνωστικό πεδίο της Περιβαλλοντικής Εκπαίδευσης (Π.Ε.) και συγκριμένα της Ε.Π.Α., όπου έπειτα από δύο δεκαετίες από την Agenda 21 (1992) η διαπίστωση *μεγάλης έλλειψης συνειδητοποίησης για τη στενή σχέση ανάμεσα σε όλες τις ανθρώπινες δραστηριότητες και το περιβάλλον, εξαιτίας της ελλιπούς ή ανακριβούς πληροφόρησης,* μοιάζει σημερινή. […] Συνεπώς, *είναι ανάγκη να αυξηθεί η ευαισθητοποίηση του κοινού για τα προβλήματα περιβάλλοντος και της ανάπτυξης και η ανάμιξή του στην επίλυσή τους. Είναι, επίσης, ανάγκη να εφοδιαστεί το κοινό με ένα αίσθημα προσωπικής περιβαλλοντικής ευθύνης και με μεγαλύτερο ενδιαφέρον και δέσμευση σε σχέση με την αειφορική ανάπτυξη* (Agenda 21, αρχή 36.8).

Σύμφωνα με τα παραπάνω, ο στόχος της συγκεκριμένης διδακτικής παρέμβασης ήταν η συνειδητοποίηση των μαθητών/τριών της αναγκαιότητας Εξοικονόμησης Ενέργειας και η διαισθητική κατανόησης της έννοιας της αειφορίας. Θεωρούμε ότι η εν λόγω συνειδητοποίηση είναι εφικτή ακόμη και σε μαθητές/τριες προσχολικής ηλικίας εφόσον σχεδιάζεται πάνω σε πραγματικές γνωστικές ελλείψεις και συνδυάζεται τεχνικά σε διδακτικά μοντέλα που συνάδουν με την ηλικία αυτή, όπως είναι το παιχνίδι και η χρήση των Τεχνολογιών της Πληροφορίας και της Επικοινωνίας (Τ.Π.Ε.).

Η έννοια της αειφορίας, αντίθετα, εκτός του ότι η κατάκτησή της δεν μπορεί να μετρηθεί αντικειμενικά, καθώς διέπεται από αφηρημένες αρχές, πιστεύουμε ότι μπορεί να διαδοθεί *διαισθητικά* μέσα σε ένα πλαίσιο εργασίας που χαρακτηρίζεται από αυτές τις αρχές. Για παράδειγμα, η αρχή της Ε.Π.Α. κατά την οποία η κριτική και καινοτόμος σκέψη που εκδηλώνεται σε κάθε κατάσταση προωθεί την αλλαγή και την αναδόμηση της κοινωνίας (Φλογαΐτη, 2006: 180), μπορεί να μεταδοθεί στους μαθητές μέσα από ένα αντίστοιχο εκπαιδευτικό πλαίσιο αλλά δεν μπορούμε να είμαστε βέβαιοι ότι η κριτική σκέψη και η κοινωνική αλλαγή που εμπεριέχει έχει κατακτηθεί συνειδητά από τους/τις συμμετέχοντες/ουσες.

Η δομή της εργασίας μας διακρίνεται από δύο κύρια επίπεδα άλλοτε διακριτά και άλλοτε αλληλεξαρτώμενα. Το πρώτο επίπεδο αφορά στο σχεδιασμό του προγράμματος σύμφωνα με συγκεκριμένα μοντέλα Π.Ε.. Το δεύτερο επίπεδο είναι το ερευνητικό, το οποίο στηρίχθηκε σε μοντέλα από τις Φ.Ε.. Η διερευνητική αυτή φάση αφορούσε και την αρχική αξιολόγηση των

γνώσεων των παιδιών προκειμένου ο σχεδιασμός του προγράμματος να βασίζεται στις πραγματικές γνωστικές τους ελλείψεις. Έτσι ανάμεσα στα δύο επίπεδα υπήρχε μία ανατροφοδότηση καθώς το δεύτερο τροφοδοτούσε και προσδιόριζε το πρώτο, ενώ οι στόχοι που προσδιορίζονται στο πρώτο επίπεδο αποτελούσαν και τον πυρήνα των παρεμβάσεων του δευτέρου επιπέδου. Καθώς, όμως, το δεύτερο επίπεδο περιλαμβάνει στρατηγικές συνολικής αξιολόγησης, διατηρεί τον διακριτό του χαρακτήρα και έπεται εκείνου του σχεδιασμού. Έτσι μπορούμε να σχηματοποιήσουμε τα δύο μοντέλα ως εξής (Σχήμα 1):

ΕΠΙΠΕΔΟ 1   ΕΠΙΠΕΔΟ 2
(Περιβαλλοντική Εκπαίδευση)   (Φυσικές Επιστήμες)
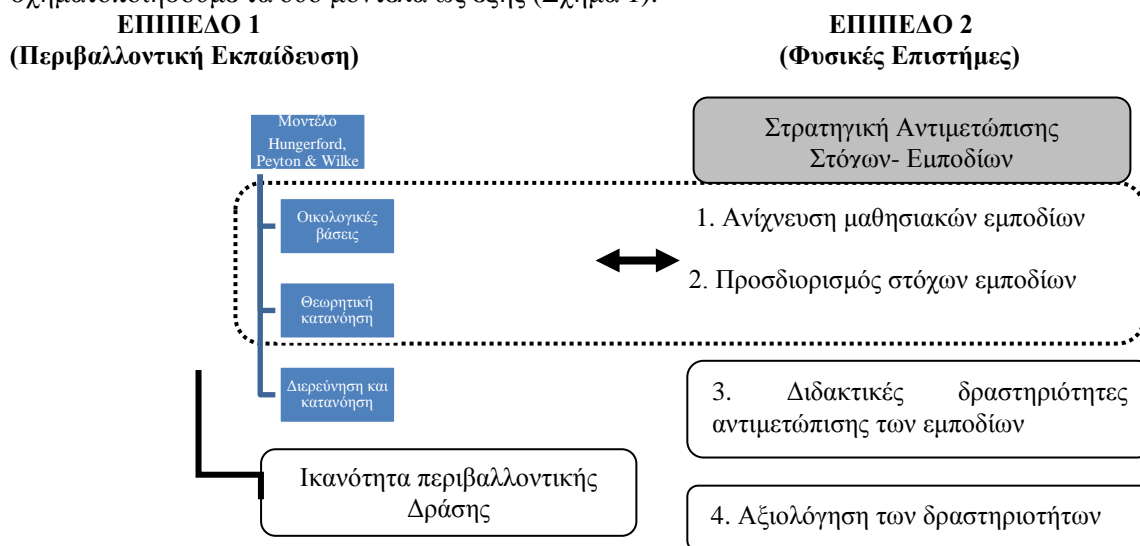
Σχήμα 1

Παρουσίαση του εκπαιδευτικού προγράμματος

Αρχές Σχεδιασμού του προγράμματος
Σχεδιάζοντας ένα πρόγραμμα Π.Ε., βασιστήκαμε στο μοντέλο που συντάχθηκε από τους Hungerford, Peyton και Wilke (στο Φλογαΐτη, 1998) το οποίο συνιστά ένα γενικά καθοδηγητικό πλαίσιο, πάνω στους βασικούς στόχους της Π.Ε., όπως αυτοί διατυπώθηκαν στο Συνέδριο του Βελιγραδίου και επικυρώθηκαν στη Διάσκεψη της Τιφλίδας. Τα στάδια και αντίστοιχα επίπεδα στόχων αφορούν (1) τις οικολογικές βάσεις- επίπεδο στόχων I, (2) τη θεωρητική κατανόηση- προβλήματα και αξίες – επίπεδο στόχων ΙΙ (3) τη διερεύνηση και αξιολόγηση – επίπεδο στόχων ΙΙΙ και (4) την ικανότητα περιβαλλοντικής δράσης- επίπεδο στόχων IV (Φλογαΐτη, 1998:204-211). Οι κατηγορίες των στόχων, οι οποίες συγκροτούν τα δύο πρώτα επίπεδα επικεντρώνονται στην κατάκτηση γνώσεων. Συγκεκριμένα οι «οικολογικές βάσεις» (επίπεδο I) αφορούν σε γνώσεις που σχετίζονται με περιβαλλοντικά θέματα, ενώ η «θεωρητική κατανόηση» (επίπεδο II) σχετίζεται γενικότερα με την ανθρώπινη συμπεριφορά σε σχέση με το περιβάλλον. Οι γνώσεις αυτές δημιουργούν τις συνθήκες ανάπτυξης ικανοτήτων για την περιβαλλοντική διασαφήνιση αξιών (επίπεδο ΙΙΙ), η οποία στη συνέχεια ευνοεί τη δημιουργία ενεργητικής συμμετοχής και δράσης στο πεδίο επίλυσης περιβαλλοντικών προβλημάτων (επίπεδο IV) (Φλογαΐτη, 1998:206).
Σύμφωνα με τα παραπάνω, προσδιορίστηκαν και οι ευρύτεροι στόχοι του προγράμματος, σε ανάλογα επίπεδα:
1. Ως επιδιωκόμενες οικολογικές βάσεις προσδιορίστηκαν οι:
   - Κατανόηση πηγών ενέργειας
   - Σύνδεση ενέργειας με καθημερινότητα
2. Ως στοχευόμενες θεωρητικές κατανοήσεις προσδιορίστηκαν οι:
   - Σύνδεση ενεργειακής συμπεριφοράς με περιβαλλοντικά προβλήματα
   - Ανεύρεση εναλλακτικών λύσεων στα ενεργειακά προβλήματα
   - Συνειδητοποίηση της αναγκαιότητας κινητοποίησης και δράσης για την επίλυση των ενεργειακών προβλημάτων
3. Ως επιδιωκόμενες ικανότητες μέσω της διερεύνησης και της αξιολόγησης σχεδιάστηκαν οι:

- Η αναγνώριση εναλλακτικών μορφών ενέργειας
- Η διασαφήνιση προσωπικών θέσεων σε σχέση με ενεργειακά θέματα και η αυτό-αξιολόγηση προσωπικών στάσεων.

4. Ως στοχευόμενη ικανότητα περιβαλλοντικής δράσης ορίστηκε η:
- Προσωπική τοποθέτηση των εκπαιδευομένων (μαθητών/τριών) έτσι ώστε να δραστηριοποιηθούν πραγματώνοντας στόχους συμβατούς με τις προσωπικές τους πεποιθήσεις, σχετικά με ενεργειακά ζητήματα.

Οι στόχοι που περιγράψαμε θεωρούμε ότι πέρα των δύο πρώτων, που αφορούν στο γνωστικό επίπεδο, δεν μπορούν να αξιολογηθούν με μετρήσιμες πρακτικές καθώς πλησιάζοντας στις αρχές της Ε.Π.Α. Με λέξεις κλειδιά την κριτική, τη δημοκρατία, τις ουμανιστικές αξίες, τη συλλογικότητα, τις συνεργατικές δράσεις, κ.ά. (Φλογαΐτη, 2006: 180-1) διαμορφώνουν αντίστοιχες συνθήκες ατομικής και συλλογικής ανάπτυξης των μαθητευόμενων, οι οποίες μπορούν να συνεκτιμηθούν με μακρο- επίπεδο. Συνεπώς, η διερεύνηση της αποτελεσματικής διδακτικής παρέμβασης πάνω στο θέμα της ενέργειας, εστιάζεται στην παρούσα μελέτη στους δύο πρώτους στόχους με προσδοκώμενα μακρο αποτελέσματα τους δύο τελευταίους, εκτιμώντας πως η βαθύτερη κατανόηση των πρώτων αυξάνει τις πιθανότητες για την ικανή ανάπτυξη των επόμενων.

Μεθοδολογικό πλαίσιο έρευνας

Προκειμένου να διερευνηθούν οι υπάρχουσες νοητικές δομές των μαθητών/τριών πάνω στις οποίες οικοδομήθηκαν *με ακρίβεια* οι οικολογικές βάσεις, οι στάσεις, οι προβληματικές και οι ικανότητες δράσεις -που περιγράφηκαν παραπάνω- βασιστήκαμε στη μεθοδολογία των Φ.Ε. και ειδικότερα εφαρμόσαμε τη *Στρατηγική αντιμετώπισης στόχων- εμποδίων* (Ραβάνης, 1999). Καθώς ο σχεδιασμός αυτός πραγματοποιείται κάτω από ερευνητικές αρχές υιοθετώντας μοντέλα από τις Φ.Ε., εντάξαμε το στάδιο αυτό (σχεδιασμό) στην κουλτούρα της *πολυπλοκότητας* διερευνώντας «περισσότερο τη συνάφεια των ερωτήσεων και λιγότερο την ορθότητά των απαντήσεων» επιδιώκοντας να αναδείξουμε «περισσότερο τα προβλήματα και τους περιορισμούς και λιγότερο τις προτεινόμενες λύσεις» (Mogensen & Mayer, 2009:24). Κάτω από την έννοια αυτή ο σχεδιασμός μας χαρακτηρίζεται περισσότερο από τη θεμελίωση της κριτικής σκέψης, βασική αρχή που διέπει την Ε.Π.Α. (Φλογαΐτη, 2006: 180). Έτσι οι ερωτήσεις που απευθύναμε στα παιδιά είχαν ένα κεντρικό πυρήνα γύρω από την Ενέργεια, που τους επέτρεπε να αναπτύξουν διάλογο προκειμένου να φανερωθούν οι γνωστικοί περιορισμοί της σκέψης τους.

Η επάρκεια των γνώσεων των παιδιών μετρήθηκε με ειδικά ερωτηματολόγια (Javeau, 2000) πριν και μετά την παρέμβαση και η καταγραφή έγινε σε κλίμακα 3 διαβαθμίσεων, όπου θεωρήθηκαν ως:

1. Ανεπαρκείς οι λανθασμένες απαντήσεις των παιδιών,

2. Ενδιάμεσες οι σωστές απαντήσεις χωρίς ορθή ή ολοκληρωμένη επεξήγηση/ αιτιολόγηση και

3. *Επαρκείς* οι απαντήσεις που ήταν σωστές με επαρκή τεκμηρίωση κοντά στην επιστημονική γνώση.

Η κλίμακα αυτή επιλέχθηκε προκειμένου να αποφευχθεί η τυχαιότητα των απαντήσεων. Η παρέμβαση στηρίχθηκε *στο σύνολό της* στη στρατηγική αντιμετώπισης στόχων- εμποδίων, σύμφωνα με τη διδακτική των Φ.Ε. στην προσχολική εκπαίδευση (Ραβάνης, 1999:260-274). Συγκεκριμένα, οι φάσεις μιας τέτοιας στρατηγικής διδακτικής- κοινωνικής αλληλεπίδρασης είναι: 1) ανίχνευση μαθησιακών εμποδίων 2) προσδιορισμός των στόχων εμποδίων 3) διδακτικές δραστηριότητες αντιμετώπισης των εμποδίων και 4) αξιολόγηση των δραστηριοτήτων (Ραβάνης, 1999: 265). Η στρατηγική αυτή εδράζει στην πιαζετική επιστημολογία σχετικά με την ενεργή συμμετοχή των παιδιών στην οικοδόμηση της γνώσης, θέση η οποία αναδεικνύει το σημαντικό παράγοντα της εμπειρίας στη μάθηση. Στο πλαίσιο αυτό της εμπειρίας ο ρόλος της επικοινωνίας μέσα σε ένα πλέγμα διαδικασιών αλληλεπίδρασης μεταξύ εκπαιδευτικού- μαθητών μπορεί να οδηγήσει σε κάποιες σχηματοποιήσεις, η χρήση των οποίων οδηγεί ενδεχομένως σε βελτίωση της αποτελεσματικότητας των διδακτικών πρακτικών (Ραβάνης, 1999: 260-261). Η συμμετοχική παρατήρηση, συνεπώς του εκπαιδευτικού κατά τη διάρκεια της διδακτικής παρέμβασης προκειμένου η αλληλεπιδραστική επικοινωνία σε συνδυασμό με τη διαδικασία ανίχνευσης των μαθησιακών εμποδίων μέσω ερωτηματολογίων να αποτελέσουν τα πεδία αποτελεσματικής

διδασκαλίας, καθιστούν την παρούσα έρευνα με χαρακτηριστικά *μελέτης περίπτωσης* (Cohen & Manion, 1997 στο Γεωργούτσου και ομάδα, 2010:732).

Το δείγμα αποτέλεσαν 18 παιδιά νηπιαγωγείου, με μέσο όρο ηλικίας 5,5 ετών. Η επιλογή του δείγματος αφορά στο σύνολο των μαθητών/τριών νηπιακής ηλικίας σε μία τάξη δημόσιου νηπιαγωγείου το οποίο λειτουργεί σε πρωτεύουσα νομού (αστικό περιβάλλον). Τα ερωτηματολόγια- συνεντεύξεις πραγματοποιήθηκαν ατομικά σε κάθε μαθητή/τρια και οι ερωτήσεις που περιελάμβαναν ήταν γνωστικού τύπου, συνοδευόμενες καθολικά από εικόνες. Οι ερωτήσεις αυτές ήταν οι ίδιες και στο pre-test και στο post-test προκειμένου να γίνει πιο εμφανής η σύγκριση και συνεπώς η αξιολόγηση των απαντήσεων (Γεωργούτσου και ομάδα, 2010: 732).

Άξονες σχεδιασμού των δραστηριοτήτων

Οι δραστηριότητες του προγράμματος σχεδιάστηκαν πάνω σε δύο κύριους άξονες εφαρμογής: τη χρήση παιχνιδιού και την αξιοποίηση των Τ.Π.Ε στην εκπαίδευση.

Ήδη από τον 19ο αιώνα ο Fröbel, στο Education of Man (1887), τονίζει τη σπουδαιότητα του παιδικού παιχνιδιού. Κατά τον Fröbel το παιχνίδι περιγράφεται ως η υπέρτατη φάση στη λειτουργία του παιδιού και υποστηρίζει ότι εξαιτίας αυτού το παιδί οδεύει στη διανοητική ανάπτυξή του. Από την εποχή του Fröbel και μετά το παιχνίδι διαδραματίζει αποφασιστικό ρόλο στην προσχολική εκπαίδευση (Broström στο Αυγητίδου, 2001).

Ωστόσο, το θέμα κυριάρχησε στις επιστημονικές συζητήσεις του προηγούμενου αιώνα, εξαιτίας κυρίως των θεωριών των εξελικτικών βιολόγων, οι οποίοι επηρεάστηκαν από τον Darwin. (Lewis, 1998). Αργότερα, και σύμφωνα με τη θεωρία της ορμής για μάθηση, το παιχνίδι αποτελεί το *μέσο* για μάθηση αλλά και *αυτούσια* μάθηση (Χαραλαμπάκης, 2005). Η άποψη βέβαια για τη μάθηση μέσω παιχνιδιού, τονίστηκε κυρίως στα μέσα της δεκαετίας του '60 και ενισχύθηκε μέσω του μεγάλου ενδιαφέροντος για την προσχολική αγωγή. Η τάση αυτή επανέφερε στο προσκήνιο την ωφελιμιστική άποψη του παιχνιδιού (Πανταζής, 1997).

Στο πλαίσιο όλων των θεωριών για τη μάθηση μέσω παιχνιδιού και βάσει των νεότερων δεδομένων που εντάσσουν το παιχνίδι στον πυρήνα των εκπαιδευτικών δραστηριοτήτων (ΔΕΠΠΣ, 2003), σχεδιάστηκαν ειδικά εκπαιδευτικά παιχνίδια με θέμα την ενέργεια, για μαθητές νηπιαγωγείου, στον πυρήνα του οποίου εντάξαμε οικεία παιχνίδια και επιλέξαμε ειδικά εποπτικά μέσα με σκοπό την προσέγγιση των θεμελιωδών εννοιών ενεργειακών θεμάτων μέσω της βιωματικής μάθησης (Βασιλάκη & Ζωγραφάκης, 2010: 85-86). Ορισμένα από τα παιχνίδια αυτά ήταν διαδραστικό κουκλοθέατρο, κρυμμένος θησαυρός, κρυπτόλεξο, παιχνίδια με καρτέλες και εικόνες, παιχνίδια με φωτοβολταϊκά, κ.ά.

Σχετικά με τον δεύτερο άξονα εφαρμογής, «η δυναμική εξέλιξη των Τ.Π.Ε. και η εισαγωγή του υπολογιστή σε όλους πλέον τους τομείς της ανθρώπινης δραστηριότητας, κατέστησε αναγκαία της εισαγωγή τους και στην εκπαιδευτική διαδικασία» (Γεωργούτσου και ομάδα, 2010: 727). Η εισαγωγή των Τ.Π.Ε. στο πρόγραμμα βασίστηκε πάνω στο μοντέλο του *Οικοδομισμού* ο οποίος – σε αντίθεση με τον συμπεριφορισμό- ενδιαφέρεται για το εσωτερικό του γνωστικού συστήματος, για τη δομή και τη λειτουργία του. Αντιλαμβάνεται τη μάθηση ως μία διαδικασία τροποποίησης γνώσεων. Κατά τον δομικό οικοδομισμό του J. P. Piaget βασικές έννοιες και χαρακτηριστικά της νοήμονος δραστηριότητας είναι η προσαρμογή, η οργάνωση, η αφομοίωση και η συμμόρφωση. Ειδικότερα, θεωρούσε ότι ο οργανισμός παίρνει κάτι από το περιβάλλον και το αφομοιώνει στις υπάρχουσες νοητικές δομές, χωρίς ωστόσο να λαμβάνει παθητικά τα ερεθίσματα αλλά αντίθετα αυτά τροποποιούνται ή αλλάζουν για να ενσωματωθούν στους διαθέσιμους τρόπους σκέψης. Η συμμόρφωση είναι συμπληρωματική διεργασία προσαρμογής στις εξωτερικές απαιτήσεις και σε συνδυασμό με την αφομοίωση ενιαιοποιούν την προσαρμογή (Lloyd, 1998: 11-12).

Παράλληλα, προσανατολισμός στη χρήση των Τ.Π.Ε. στο πρόγραμμα ήταν ο επικοινωνιακός «λόγος» των νέων τεχνολογιών μέσω της *αντίληψης της επικοινωνιακής ικανότητας*, όπου το υποκείμενο είναι ενεργητικό και κατασκευάζει τη γνώση, διατηρώντας την γνωστική τους αυτονομία. Στο μοντέλο αυτό ο ρόλος των νέων τεχνολογιών γίνεται ουσιαστικός, υπηρετώντας τους ευρύτερους διδακτικούς και παιδαγωγικούς στόχους (Μηλιώνης & Μπαλτά, 2001: 355-357). Παραδείγματα εφαρμογών των Τ.Π.Ε. στο πρόγραμμα αποτελούν σχετικά βίντεο, διαφημιστικά σποτ οικολογικών Μ.Κ.Ο., βίντεο και αναζήτηση στο διαδίκτυο.

Καθώς, η αποτελεσματικότητα μιας μεθοδολογίας προσμετράται και από τον χρόνο εφαρμογής των διδακτικών πρακτικών (Κιτσαράς, 2004), *η υπόθεση της έρευνάς μας βασίζεται στην εκτίμηση ότι η επιλογή των παραπάνω εφαρμογών όχι μόνο οδηγεί στην επίτευξη των διδακτικών μας στόχων, όπως αυτοί προσδιορίστηκαν παραπάνω, αλλά συγχρόνως μειώνει και τον απαιτούμενο χρόνο διδακτικής παρέμβασης, γεγονός που αυξάνει την εκτίμηση της αποτελεσματικότητάς τους.*

Σύντομη περιγραφή δραστηριοτήτων διδακτικής παρέμβασης
Η δομή του προγράμματος έτσι όπως βασίστηκε στους παραπάνω άξονες σχεδιασμού περιείχε τις παρακάτω ενδεικτικές δραστηριότητες:
1. Αλληλεπιδραστικό κουκλοθέατρο: όταν ξαφνικά η κα. Φωτεινή, λάμπα ενός σπιτιού, χάνει το φως της στέλνει τον Σπίνο, ένα περαστικό πουλί να βρει την αιτία. Το πουλί ακολουθώντας τα σύρματα φτάνει στο εργοστάσιο της Δ.Ε.Η.. Τα παιδιά το βοηθούν να συνδέσει τα καλώδια, να βρει το δρόμο του και η κα. Φωτεινή λάμπει ξανά.
2. Αλληλεπίδραση παιδιών με μακέτα. Οι μαθητές/τριες είχαν στη διάθεσή τους τα αντικείμενα του κουκλοθέατρου και μέσα σε χρονικά πλαίσια τα τοποθετούσαν στη σειρά συνδέοντας τα αντίστοιχα καλώδια (φωτογραφία 1).
3. Παιχνίδι με καρτέλες εικονικής προσομοίωσης ενεργειακού αποτυπώματος, όπως αυτές διαμορφώθηκαν από το αντίστοιχο διαδραστικό παιχνίδι του WWF.[1]
4. Κρυμμένος θησαυρός. Τα παιδιά με θεματικά αινίγματα προσπαθούσαν να εντοπίσουν τις ηλεκτρικές συσκευές της τάξης τους και να ανακαλύψουν τον «κρυμμένο θησαυρό» της εξοικονόμησης ενέργειας και της ρύθμισης Turn OFF (⏻).
5. Αλληλεπίδραση των παιδιών με το βίντεο Energy, lets save it![2]
6. Αλληλεπίδραση των παιδιών με τα σποτάκια The animals save the planet[3] και με εικονική ανάγνωση του παραμυθιού «Δεν είναι παραμύθι»[4] σχετικά με την ανακύκλωση ηλεκτρικών συσκευών.
7. Παιχνίδια με φωτοβολταϊκά. Οι μαθητές/ τριες έπαιξαν με ηλιακά αυτοκίνητα και ελικόπτερα διερευνώντας την ενεργειακή αυτονομία τους (φωτογραφία 2).
8. Αναζήτηση «ενεργειακών» λέξεων σε κρυπτόλεξα προκειμένου να εμπλουτίσουν το λεξιλόγιό του με επιστημονικούς όρους.

Φωτογραφία 1

Φωτογραφία 2

Αποτελέσματα

Τα αποτελέσματα της ειδικής διδακτικής παρέμβασης, σύμφωνα με την κατηγοριοποίηση που αναπτύχθηκε προηγουμένως[5], παρουσιάζονται στον κάτωθι Πίνακα 1:

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[1] http://www.wwf.gr/footprint/
[2] www.sustenergy.org
[3] Animal Planet TV
[4] http://www.deneinaiparamithi.gr
[5] Βλ. σχ. στην παρούσα εργασία το κεφ. *Β.2. Μεθοδολογικό πλαίσιο έρευνας*

Έλεγχος	Απαντήσεις		
	Επαρκείς	Ενδιάμεσες	Ανεπαρκείς
pre-test	11%	31,76%	57,64%
post-test	62,35%	14,12%	23,53%

Πίνακας 1

Από τη μελέτη του Πίνακα 1 παρατηρούμε ότι η εμφάνιση των επαρκών απαντήσεων στο post-test παρουσιάζει σημαντική αύξηση. Ανάλογα, οι επαρκείς και οι ενδιάμεσες απαντήσεις μειώνονται αισθητά. Βλέποντας συνολικά τη γνωστική εξέλιξη των μαθητών/τριών τοποθετώντας τις απαντήσεις τους σε δύο «πόλους» όπου τον ένα αποτελεί η Ανεπάρκεια Γνώσης και τον άλλο η Γνώση, είτε σε επίπεδο επάρκειας είτε σε ενδιάμεσο επίπεδο, αθροίζοντας αντίστοιχα τις ενδιάμεσες με τις επαρκείς απαντήσεις, παρατηρούμε ότι το ποσοστό των μαθητών/τριών που βρίσκεται γνωστικά κοντά στην επιστημονική αλήθεια προσεγγίζει το 76% ενώ, εκείνο που παραμένει στην «άγνοια» επιστημονικών και καθημερινών γνώσεων είναι το 24% περίπου. Σημειώνοντας ότι στο pre-test το αντίστοιχο ποσοστό επιστημονικής γνώσης μόλις προσέγγιζε το 43%, παρατηρείται αύξηση 79% στην προσπέλαση των γνωστικών «εμποδίων» των μαθητών/τριών (Πίνακας 2).

Έλεγχος	Απαντήσεις	
	Γνώση (επαρκείς & ανεπαρκείς απαντήσεις)	**Ανεπάρκεια γνώσης** (ανεπαρκείς απαντήσεις)
pre-test	42,76%	57,64%
post-test	76,47%	23,53%

Πίνακας 2

Όσον αφορά την ουσιαστική εμπλοκή των μαθητών/τριών στη διδακτική παρέμβαση σημειώνεται η σημαντική αύξηση του ενδιαφέροντός τους για Ενεργειακά θέματα, γεγονός που αποτυπώνεται από τις γνώσεις που μεταφέρουν μετά τη λήξη του προγράμματος στην καθημερινότητα της σχολικής τους ζωής. Στο σημείο αυτό θεωρούμε επιτυχή την επιλογή των διδακτικών τεχνικών (παιχνίδι- Τ.Π.Ε.) καθώς, όχι μόνο διατήρησε το ενδιαφέρον των παιδιών κατά την υλοποίηση της παρέμβασης, αλλά έκανε τους/τις μαθητές/τριες να αγαπήσουν και να αναζητήσουν παρόμοιες δράσεις.

Συμπεράσματα- συζήτηση

Η εφαρμογή του παρόντος προγράμματος Π.Ε. με θέμα την Ενέργεια σε μαθητές/τριες προσχολικής ηλικίας, αποτέλεσε μία ευκαιρία πειραματικής εφαρμογής ενός συνδυασμού θεωρητικών μεθοδολογικών μοντέλων και παιδαγωγικών τεχνικών. Τα θετικά αποτελέσματα της παρέμβασης αποτύπωσαν τη δυναμική τέτοιων συνδυασμών για μια διεπιστημονική παιδαγωγική πρακτική.
Ενώ, το μεγαλύτερο μέρος της παρούσας έρευνας εστιάστηκε στους γνωστικούς στόχους του προγράμματος, οφείλουμε να περιγράψουμε σύντομα τις «καλές πρακτικές» που πραγματοποιήθηκαν παράλληλα, προκειμένου να ενισχυθεί το τρίτο και τέταρτο επίπεδο στόχων κατά τους Hungerford, Peyton και Wilke[6]. Στοχεύοντας δηλαδή στη διερεύνηση και αξιολόγηση προσωπικών στάσεων αλλά, κυρίως, επιδιώκοντας την αύξηση της ικανότητας περιβαλλοντικής δράσης προκειμένου οι εκπαιδευόμενοι/ες να έχουν την ευκαιρία να δραστηριοποιηθούν πραγματώνοντας στόχους συμβατούς με τις προσωπικές τους πεποιθήσεις σχετικά με ενεργειακά ζητήματα, εφαρμόσαμε τις εξής «καλές πρακτικές»:

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[6] Βλ. σχ. στην παρούσα εργασία το κεφ. *Β1. Αρχές σχεδιασμού του προγράμματος*

- Συμμετοχή του σχολείου σε ανταποδοτική ανακύκλωση αποβλήτων μαγειρικών ελαιών (τηγανόλαδα) και αξιοποίησή τους για την παρασκευή βιοκαυσίμων. Καθώς με την πράξη αυτή τα παιδιά συμμετείχαν ενεργά στην έννοια της εναλλακτικής ενέργειας, έπειτα από την ενημέρωσή τους ότι με ένα λίτρο καμένου λαδιού μολύνεται ένα εκατομμύριο λίτρα νερού, για κάθε λίτρο νερού που ανακυκλώναμε η εταιρεία ανακύκλωσης λαδιού που συνεργαστήκαμε προμήθευε το σχολείο συμβολικά με ένα λίτρο πόσιμου νερού. Συνολικά ανακυκλώθηκαν 130 λίτρα λαδιού (περίπου 4 λίτρα/μαθητή-τρια).
- Συμμετοχή του σχολείου σε πρόγραμμα ανακύκλωσης μπαταριών. Ανακυκλώθηκαν 30 κιλά μπαταριών (περίπου 1 κιλό/ μαθητή-τρια).
- Παρακολούθηση του προγράμματος Π.Ε. του Κέντρου Περιβαλλοντικής Εκπαίδευσης (Κ.Π.Ε.) Αρχανών με θέμα «Είμαι η ανακύκλωση που όλα τα μαζεύω και σε κάδο ειδικό τα στέλνω».
- Σχεδιασμός με την ενεργή συμμετοχή των μαθητών/τριών ειδικού περιβαλλοντικού παραμυθιού με θέμα «Οι καλικάτζαροι και το μήνυμα της Γης» για τη χριστουγεννιάτικη γιορτή του σχολείου. Με τον τρόπο αυτό οι μαθητές/τριες έπαιξαν με οικολογικά θέματα και τα επικοινώνησαν στην οικογένειά τους.

Παράλληλα, σημειώνονται πρακτικές για την καλύτερη ενεργειακή *απόδοση* του σχολείου με τη συστηματική ετήσια συντήρηση του καυστήρα, με αλλαγή όλων των κοινών λαμπτήρων με λάμπες εξοικονόμησης ηλεκτρισμού και με τη συμμετοχή του σχολείου στο Διεθνές πρόγραμμα «Οικολογικά Σχολεία» (Eco-schools)[7] και την αντίστοιχη δημιουργία υποστηρικτικού υλικού για γονείς- εκπαιδευτικούς και μαθητές/τριες. Ως αποτέλεσμα της συνολικής αυτής δράσης ήταν και η συμμετοχή του σχολείου στο διεθνή διαγωνισμό U4Energy[8].

Από τα παραπάνω γίνεται αντιληπτό ότι η επιλογή ενός περιβαλλοντικού θέματος μπορεί να δημιουργήσει τις συνθήκες ενός *διεπιστημονικού διαλόγου* και μιας επικοινωνίας ανάμεσα σε φορείς. Πανεπιστήμιο, Μ.Κ.Ο., Κ.Π.Ε., ευρωπαϊκοί φορείς ενώθηκαν με την εφαρμοσμένη παιδαγωγική του σχολείου, αλληλεπίδρασαν μαζί του και έφεραν όλους/ες τους/τις συμμετέχοντες/ουσες πλησιέστερα στις αρχές της Ε.Π.Α. για ένα σχολείο σε αλληλεγγύη με το περιβάλλον, φυσικό και κοινωνικό. Με όχημα την αλληλεγγύη μπορεί να επιτευχθεί η έξοδος από την περιβαλλοντική και κοινωνική κρίση και να διασφαλιστεί η ελευθερία, η ισότητα, η οικολογική βιωσιμότητα και η κοινωνική δικαιοσύνη (Φλογαΐτη, 2006 στο Φαραγγιτάκης και Σπανού, 2006: 731).

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[7] Εθνικός συντονιστής του προγράμματος είναι η Ελληνική Εταιρεία Προστασίας της Φύσης (ΕΕΠΦ).
[8] http://www.u4energy.eu

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Επιχειρώντας το Μετασχηματισμό μιας Σχολικής Μονάδας σε Αειφόρο Σχολείο στο Πλαίσιο Συμμετοχής στο Βραβείο Αειφόρου Σχολείου. Η Περίπτωση ενός Δημοτικού Σχολείου

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Περίληψη
Το αειφόρο σχολείο είναι ένα όραμα που προσανατολίζει στη συνολική αλλαγή της κουλτούρας του σχολείου, καθώς όλα τα εμπλεκόμενα μέλη του επιχειρούν αλλαγές στο παιδαγωγικό, το κοινωνικό/οργανωσιακό, και το τεχνικό επίπεδο λειτουργίας του. Είναι σαφές ότι η οικοδόμηση ενός τέτοιου τύπου σχολείου προϋποθέτει αλλαγές, σε ατομικό και κοινωνικό επίπεδο, αλλά και βαθιές αλλαγές στην εκπαίδευση. Σε μια σχολική μονάδα η οποία προσπαθεί να λειτουργήσει ως αειφόρο σχολείο σημαντική είναι η δημιουργία ενός στοχαστικοκριτικού πλαισίου, μέσα στο οποίο θα σχεδιάζονται και θα υλοποιούνται δράσεις, ως αποτέλεσμα της συνεργασίας μεταξύ των φορέων της εκπαιδευτικής, και της τοπικής κοινότητας. Στηριζόμενοι στις παραπάνω θεωρητικές παραδοχές και στους δείκτες που προτείνονται στο πλαίσιο του Βραβείου Αειφόρου Σχολείου, επιχειρήθηκε ο μετασχηματισμός ενός Δημοτικού Σχολείου σε αειφόρο. Η παρούσα εργασία σκοπό έχει να αναδείξει τις αλλαγές που επιτεύχθηκαν αλλά και τις δυσκολίες που προέκυψαν κατά την προσπάθεια αυτή. Πρόκειται για μια μελέτη περίπτωσης και τα συμπεράσματα που θα παρουσιαστούν προέκυψαν από την επιτόπια παρατήρηση των δράσεων των εκπαιδευτικών της σχολικής μονάδας.

Abstract

Sustainable school is a vision towards the holistic change of school culture, as all the stakeholders are attempting changes in the pedagogical, socio/organizational and technical level. It is more than clear that sustainable school requires changes at individual and social level, as well as radical changes in the whole educational setting. In order for a school community to operate as a sustainable school it is necessary to set a reflective framework for planning and implementing school activities in cooperation with all the agents of the educational and local community. Based upon the aforementioned theoretical principles as well as the indicators of the Sustainable School Prize we launched the transformation of a Primary School into a Sustainable School. The present essay aims to disclose the changes already achieved and the difficulties confronted during the process of transformation. It is about a case study and the results that aroused through participant observation of all the activities of school teachers.

Εισαγωγή

Το αειφόρο σχολείο είναι ένα όραμα που προσανατολίζει εκπαιδευτικούς, μαθητές, γονείς και άλλους εμπλεκόμενους στη συνολική αλλαγή της κουλτούρας του σχολείου. Η βασική ιδέα του αειφόρου σχολείου είναι η ενσωμάτωση των αξιών της αειφορίας στο παιδαγωγικό, το κοινωνικό/οργανωσιακό, και το τεχνικό επίπεδο οργάνωσης και λειτουργίας του. Όπως περιγράφεται στη βιβλιογραφία, το αειφόρο σχολείο είναι ένα σχολείο που στηρίζεται στις σχέσεις αμοιβαίας εμπιστοσύνης και συνεργασίας μεταξύ όλων των εμπλεκόμενων μελών, ενώ ταυτόχρονα είναι ανοιχτό στην κοινότητα δημιουργώντας σχέσεις αλληλεπίδρασης. Είναι το σχολείο που καθίσταται σταδιακά ικανό να αναπτύξει στους μαθητές δεξιότητες, να καλλιεργήσει αξίες της αειφορίας, όπως είναι η αλληλεγγύη, ο σεβασμός στη διαφορετικότητα, η ενσυναίσθηση, η ατομική και συλλογική υπευθυνότητα και τελικά να αναπτύξει την κριτική σκέψη. Καθοριστικό παράγοντα αποτελεί το γεγονός ότι η εκπαίδευση που είναι προσανατολισμένη στην αειφορία δεν αφορά απλώς στη μελέτη των παραμέτρων της ανθρώπινης εξάρτησης από την ποιότητα του περιβάλλοντος, αλλά θέτει και προτάσσει τα ζητήματα της συμμετοχής, της αυτοενδυνάμωσης και της κοινωνικής δικαιοσύνης που εγείρουν τα σύγχρονα κοινωνικά και περιβαλλοντικά ζητήματα (Κάτσενου, 2012). Είναι σαφές ότι η οικοδόμηση ενός σχολείου με τα παραπάνω χαρακτηριστικά προϋποθέτει αλλαγές, όχι μόνο σε ατομικό και κοινωνικό επίπεδο, αλλά και βαθιές, διαρθρωτικές και μακροπρόθεσμες αλλαγές στην εκπαίδευση, που θα επηρεάζουν συνολικά τη φιλοσοφία, το ρόλο και τη λειτουργία του σχολείου (Φλογαΐτη, 2006). Οι ως τώρα σημαντικοί, οικονομικοί και ανθρώπινοι πόροι που έχουν επενδυθεί στα προγράμματα Περιβαλλοντικής Εκπαίδευσης (Π.Ε.), στα Κέντρα Περιβαλλοντικής Εκπαίδευσης (ΚΠΕ) και στην επιμόρφωση των εκπαιδευτικών σχετικά με την Π.Ε. και την Εκπαίδευση για την Αειφόρο Ανάπτυξη, έχουν σημαντική επιρροή στο εκπαιδευτικό σύστημα, αλλά κυρίως στο πεδίο των μεθοδολογικών-διδακτικών προσεγγίσεων. Δυστυχώς όμως έχουν ασήμαντη επίδραση στη συνολική λειτουργία του εκπαιδευτικού συστήματος (Καλαϊτζίδης, 2010). Προφανώς ο μετασχηματισμός του σχολείου σε αειφόρο είναι ένα δύσκολο εγχείρημα, το οποίο προϋποθέτει αλλαγές στην κουλτούρα, όχι μόνο των εμπλεκόμενων στη μαθησιακή διαδικασία, αλλά και της ευρύτερης σχολικής κοινότητας, δηλαδή των εκπαιδευτικών, μαθητών, γονέων, βοηθητικού προσωπικού, αλλά και θεσμικών οργάνων.

Σε μια σχολική μονάδα που προσπαθεί να λειτουργήσει ως αειφόρο σχολείο προϋπόθεση είναι η δημιουργία ενός στοχαστικοκριτικού πλαισίου, μέσα στο οποίο σχεδιάζονται και υλοποιούνται δράσεις που στηρίζονται στη συμμετοχή και τη συνεργασία των φορέων της εκπαιδευτικής και της τοπικής κοινότητας. Οι πρωτοβουλίες που αναλαμβάνονται με στόχο την οικοδόμηση του αειφόρου σχολείου, δεν αφορούν μόνο προγράμματα καινοτόμων δράσεων, αλλά σχετίζονται με τη λειτουργία της σχολικής κοινότητας συνολικά και απαντούν στο αίτημα για τη σύνδεση του σχολείου με τη ζωή και το άνοιγμά του στην κοινωνία(Sterling, 2001,· Tilbury 2004,· Breiting et al., 2005· Gough 2005,· Huckle 2008,· Αγγελίδου & Κρητικού, 2009). Άλλωστε η Εκπαίδευση για το Περιβάλλον και την Αειφορία(ΕΠΑ) προτείνει μια ολιστική προσέγγιση τόσο των σύγχρονων περιβαλλοντικών ζητημάτων, όσο και της ίδιας της παιδαγωγικής διαδικασίας και πρακτικής (Tilbury 1995, Φλογαΐτη και Δασκολιά 2004, Λιαράκου και Φλογαΐτη 2007). Η εφαρμογή της ολιστικής προσέγγισης (whole school approach) (Jensen, 2005) αποτελεί βασική αρχή για να καταστεί το σχολείο αειφόρο, καθώς θέτει ως στόχο να ενοποιήσει όλες τις πλευρές της σχολικής ζωής που επηρεάζουν τη μάθηση, δηλαδή να συνδέσει το επίσημο ΑΠ με το ανεπίσημο και με όλες τις όψεις της σχολικής ζωής, να διασυνδέσει το σχολείο με την κοινότητα, να ενθαρρύνει την ανάπτυξη συνεργασιών και τη δημιουργία δικτύων σε πολλά επίπεδα (Gough 2005, Zachariou and Kadji-Beltran 2009).

Στηριζόμενοι στις παραπάνω θεωρητικές παραδοχές και στους δείκτες που προτείνονται στο πλαίσιο του Βραβείου Αειφόρου Σχολείου (http://www.aeiforosxoleio.gr/deiktes.php) επιχειρήθηκε ο μετασχηματισμός ενός Δημοτικού Σχολείου σε αειφόρο, δηλώνοντας μάλιστα συμμετοχή στο θεσμό του Βραβείου Αειφόρου Σχολείου(ΒΑΣ) (Καλαϊτζίδης και Δηλάρη 2010). Οι δείκτες ή κριτήρια ποιότητας, όπως έχουν οριστεί από την παιδαγωγική επιτροπή του ΒΑΣ, αποτέλεσαν τον οδηγό οργάνωσης των δράσεων του σχολείου. Τα κριτήρια ποιότητας άλλωστε,

σύμφωνα με τους Mogensen and Schnack (2010) προτείνονται ως ένα εργαλείο που αποτυπώνει συνοπτικά τη φιλοσοφία της αειφορίας, λειτουργεί ως αφετηρία και πηγή έμπνευσης για τα σχολεία και μεταφέρει στην πράξη ένα συγκροτημένο σύνολο κοινών στόχων και αξιών. Θεωρήσαμε δηλαδή τους δείκτες, όχι ως δείκτες ελέγχου συμπεριφοριστικού τύπου, αλλά ως στοιχεία που οριοθετούν το πλαίσιο των δράσεών μας, διευκολύνουν στο σχεδιασμό τους και καθοδηγούν όσους εμπλέκονται στο σχολικό περιβάλλον, ενισχύοντάς τους στην ανάληψη πρωτοβουλιών .

Η παρούσα εργασία σκοπό έχει να αναδείξει τις επιτυχημένες πλευρές αλλά και τις δυσκολίες που προέκυψαν στη σχολική μονάδα, κατά τη διάρκεια της προσπάθειας να μετασχηματιστεί σε αειφόρο σχολείο. Πρόκειται για μια μελέτη περίπτωσης. Η ερευνητική μεθοδολογία της μελέτης περίπτωσης (case-study) αναδεικνύει το κοινωνικό πλαίσιο μέσα στο οποίο εμφανίζεται κάποιο φαινόμενο. Θεωρείται συνεπώς κατάλληλο μοντέλο έρευνας στην εκπαίδευση, αφού μία εκπαιδευτική κατάσταση δεν μπορεί να γίνει κατανοητή αν ο ερευνητής δεν την τοποθετήσει μέσα στο πλαίσιο, όπου αυτή εκδηλώνεται(May, 1993). Το πρόβλημα που αντιμετωπίζει συχνά μία μελέτη περίπτωσης είναι σε ποιο βαθμό τα αποτελέσματά της επαληθεύονται σε άλλες ανάλογες περιπτώσεις ή αφορούν μόνο την υπό μελέτη περίπτωση. Είναι γεγονός ότι η συγκεκριμένη μεθοδολογία παρέχει μόνο ενδεικτικά στοιχεία και όχι αποδεικτικά, μπορεί όμως να αποτελέσει έναυσμα για το σχεδιασμό και την πραγματοποίηση ερευνών, ώστε να καταγραφεί η υφιστάμενη κατάσταση και να αναζητηθούν λύσεις. Τα συμπεράσματα που θα παρουσιαστούν προέκυψαν από την παρατήρηση και την καταγραφή των δράσεων των εκπαιδευτικών της σχολικής μονάδας, καθ΄ όλη τη διάρκεια της σχολικής χρονιάς 2011-12, καθώς και από συνεντεύξεις που έγιναν με σκοπό να εκφράσουν την εμπειρία τους.

Οργάνωση των δράσεων - Το πλαίσιο

Το σχολείο είναι 12/θέσιο και στεγάζεται σε ένα κτήριο που εγκαινιάστηκε το 1972, σε μία περιοχή μεσαίου έως χαμηλού κοινωνικοοικονομικού επιπέδου. Φοιτούν 269 μαθητές/τριες, από τους οποίους περίπου 60 είναι παιδιά μεταναστών. Λειτουργεί τμήμα ένταξης με σκοπό την ενίσχυση των μαθητών με μαθησιακές δυσκολίες. Το τμήμα παρακολουθούν, παράλληλα με τα μαθήματα στις τάξεις τους, 16 μαθητές/τριες, προκειμένου να ενισχυθούν κυρίως γνωστικά. Υπάρχει επίσης τμήμα υποδοχής, το οποίο παρακολουθούν 20 αλλοδαποί μαθητές/τριες με χαμηλό επίπεδο ελληνομάθειας. Είναι ολοήμερο σχολείο και δε λειτουργεί με βάση το Ενιαίο Αναλυτικό Εκπαιδευτικό Πρόγραμμα. Στο σχολείο υπηρετούν 28 εκπαιδευτικοί, από τους οποίους οι 17 είναι δάσκαλοι/ες και 9 είναι εκπαιδευτικοί διαφόρων ειδικοτήτων(μουσικής, ξένων γλωσσών, φυσικής αγωγής, θεατρικού παιχνιδιού, εικαστικών). Από αυτούς οι 19 είναι τοποθετημένοι με οργανική θέση στο σχολείο, ένας ήρθε με απόσπαση από άλλο ΠΥΣΠΕ και οι 8 υπηρετούν σε άλλα σχολεία και συμπληρώνουν ωράριο στο πρωινό ή στο ολοήμερο πρόγραμμα. Η διευθύντρια τοποθετήθηκε σε αυτή τη θέση κατά την τρέχουσα σχολική χρονιά 2011-12, αλλά το συγκεκριμένο είναι το σχολείο, στο οποίο είχε οργανική θέση τα τελευταία είκοσι χρόνια.

Η πρόταση να πάρει μέρος το σχολείο στο ΒΑΣ έγινε από τη διευθύντρια σε παιδαγωγική συνεδρίαση του Συλλόγου Διδασκόντων, τον Οκτώβριο. Στο σύνολό τους οι εκπαιδευτικοί εξέφρασαν αρχικά ενδοιασμούς και κάποιες αντιρρήσεις, φοβούμενοι το φόρτο εργασίας που κατά τη γνώμη τους θα προσέθετε η συμμετοχή του σχολείου στο ΒΑΣ. Τελικά δέχθηκαν και σε αυτό συνέβαλαν τα παρακάτω:

- Η διαπίστωση ότι αρκετοί δείκτες αφορούν σε δραστηριότητες που υλοποιούνται ούτως ή άλλως στο σχολείο.

- Η διάθεση της διευθύντριας να διεκπεραιώσει το γραφειοκρατικό μέρος.

- Η πεποίθηση πως όπου χρειαστεί, η διευθύντρια θα προσφέρει την απαιτούμενη βοήθεια, καθώς γνώριζαν ότι ασχολείται με προγράμματα καινοτόμων δράσεων πολλά χρόνια.

- Η διαβεβαίωσή της διευθύντριας ότι δε δεσμεύονται να οργανώσουν και να παρουσιάσουν κάποια εκδήλωση ή κάτι άλλο στο τέλος του σχολικού έτους, παρά μόνο αν ήθελαν και με όποια μορφή ήθελαν.

Να σημειωθεί ότι αφού δέχθηκαν, οι περισσότεροι δήλωσαν: «Δεν μας ενδιαφέρει να προσπαθήσουμε για το πρώτο βραβείο, αλλά χαλαρά να προσπαθήσουμε και ό,τι καταφέρουμε». Μόνο μια εκπαιδευτικός με αρκετή εμπειρία σε προγράμματα ΠΕ δήλωσε ότι θα ήθελε να προσπαθήσουν ακόμα και για την πρώτη θέση.

Η διευθύντρια λοιπόν, αφού άφησε να περάσει ένα εύλογο χρονικό διάστημα, ώστε οι εκπαιδευτικοί να κάνουν τον προγραμματισμό τους, στη δεύτερη παιδαγωγική συνεδρίαση που έγινε για να συζητηθεί το θέμα, το Νοέμβριο, έκανε προτάσεις ως προς τα προγράμματα, καθώς οι δείκτες έδιναν το πλαίσιο σχεδιασμού των καινοτόμων προγραμμάτων. Ακολούθησε συζήτηση στην οποία διαμορφώθηκαν τα προγράμματα που θα αναλάμβαναν τα τμήματα, ανάλογα με το ενδιαφέρον των εκπαιδευτικών. Έτσι, οι δασκάλες των Α΄ και Β΄ τάξεων επέλεξαν να ασχοληθούν με τα τμήματά τους με την επαναχρησιμοποίηση υλικών και την ανακύκλωση. Τα τμήματα Γ1 και Δ2, μετά από επιθυμία των δασκάλων τους επέλεξαν να ασχοληθούν με τον κήπο του σχολείου. Τα τμήματα Γ2 και Δ1 ανέλαβαν πρόγραμμα Αγωγής Υγείας με θέμα «Μεσογειακή Διατροφή». Τέλος τα δυο τμήματα της Ε και τα δύο τμήματα της Στ τάξης ανέλαβαν να ασχοληθούν με ένα τοπικό πρόβλημα, «Το ρέμα της Πικροδάφνης και τη διαχείρισή του», ένα ζήτημα που απασχολούσε έντονα κάποιους από τους εκπαιδευτικούς, οι οποίοι μάλιστα το πρότειναν. Το Στ2 επίσης ασχολήθηκε με την καθαριότητα του σχολείου, καθώς οι μαθητές επέδειξαν προσωπικό ενδιαφέρον και θέλησαν να ασχοληθούν με την καθαριότητα του κτηρίου, αλλά και με την καθημερινή φροντίδα του κήπου. Τέλος ο μουσικός του σχολείου ανέλαβε να εκπονήσει πολιτιστικό πρόγραμμα με πέντε τμήματα, με θέμα την ποίηση του Πολέμη. Ο ίδιος είχε προσωπικό ενδιαφέρον για τον ποιητή, αλλά παράλληλα υπάρχουν στο έργο του ποιήματα, από τα οποία αναδεικνύονται περιβαλλοντικά θέματα. Όπως είναι προφανές οι ομάδες των μαθητών που ανέλαβαν να εκπονήσουν τα προγράμματα ήταν αμιγείς τάξεις. Η επιλογή των θεμάτων έγινε από τους εκπαιδευτικούς με βάση το προσωπικό τους ενδιαφέρον, έπειτα από συζήτηση και συμφωνία στην παιδαγωγική συνεδρίαση του Συλλόγου Διδασκόντων.

Η διευθύντρια που είχε ρόλο συντονιστικό θεώρησε ότι θα ήταν μεγαλύτερο των ενδιαφέρον και η συμμετοχή των εκπαιδευτικών, αν οι ίδιοι επέλεγαν το θέμα που θα επεξεργάζονταν με την τάξη τους. Αρχικός της στόχος ήταν να δημιουργηθούν ομάδες εκπαιδευτικών, που θα μπορούσαν να συνεργαστούν μεταξύ τους ικανοποιητικά και να οργανώσουν τη δουλειά τους. Η βιβλιογραφική επισκόπηση αποδεικνύει ότι το κύριο χαρακτηριστικό του εκπαιδευτικού επαγγέλματος, στα περισσότερα εκπαιδευτικά συστήματα, είναι η απομόνωση και η ατομικιστική παράδοση (Thornton 2006, Bezzina & Testa 2005, Kougioumtzis & Patrinksson 2009). Οι αλλαγές όμως τις οποίες απαιτεί η οικοδόμηση του αειφόρου σχολείου προϋποθέτουν την ανάπτυξη σχέσεων συνεργασίας ανάμεσα σε όλους τους παράγοντες της σχολικής κοινότητας, η οποία χαρακτηρίζεται από την έλλειψη ουσιαστικής επικοινωνίας, συνεργασίας και αλληλεπίδρασης μεταξύ των εκπαιδευτικών, των εκπαιδευτικών με τους μαθητές/τριες, αλλά και μεταξύ των υπόλοιπων εμπλεκομένων. Οι βιβλιογραφικές αναφορές τονίζουν τον καθοριστικό ρόλο των εκπαιδευτικών στη διαμόρφωση του πλαισίου επικοινωνίας της σχολικής κοινότητας και συνήθως αυτοί διαμορφώνουν και τη μορφή επικοινωνίας και λειτουργίας των λοιπών εμπλεκόμενων φορέων. Όταν οι εκπαιδευτικοί δουλεύουν σε επαγγελματική απομόνωση, με περιορισμένη πρωτοβουλία και υπευθυνότητα, είναι δύσκολο να διδάξουν τις έννοιες της συνεργασίας στους μαθητές τους, πολύ περισσότερο να δημιουργήσουν το ήθος εκείνο που θα οδηγήσει στην ανάπτυξη κοινωνικών συλλογικοτήτων. Η απομόνωση πρέπει να δώσει τη θέση της στην ανάπτυξη σχέσεων εμπιστοσύνης, ουσιαστικής επικοινωνίας και συνεργασίας αρχικά μεταξύ των εκπαιδευτικών. Με αυτό το σκεπτικό δημιουργήθηκαν μικρές ομάδες, αποτελούμενες από δύο έως πέντε εκπαιδευτικούς, με σκοπό να συνεργάζονται στην εκπόνηση των προγραμμάτων και να σχεδιάζουν από κοινού δραστηριότητες. Οι ομάδες συστάθηκαν με βάση τα ενδιαφέρον των ίδιων των εκπαιδευτικών ως προς το θέμα που θα ασχοληθούν με την τάξη τους, αλλά σημαντικό ρόλο έπαιξαν και οι προσωπικές τους σχέσεις, όπως είχαν διαμορφωθεί ως εκείνη τη στιγμή. Να επισημανθεί ότι είναι σημαντικό να καλλιεργείται και να αναπτύσσεται η μορφή συνεργασίας, που στηρίζεται σε σχέσεις εμπιστοσύνης, αλληλεκτίμησης και αλληλοσεβασμού. Επειδή όμως αυτές οι σχέσεις οικοδομούνται σε βάθος χρόνου, η αρχή έγινε, με τη δημιουργία μικρών συνεργαζόμενων ομάδων που θα αποτελούσαν σταδιακά κοινότητες μάθησης. Τον πυρήνα των ομάδων αυτών αποτελούσαν εκπαιδευτικοί που είχαν ήδη διαμορφωμένες σχέσεις και είχαν

ενταχθεί επιπλέον ένας έως δυο ακόμα εκπαιδευτικοί, ευελπιστώντας ότι σταδιακά θα ενσωματωθούν στην ομάδα. Η προσπάθεια που έγινε συνέβαλε στο να ξεπεράσουν σε μεγάλο βαθμό τη ατομικιστική παράδοση, όπως τη χαρακτηρίζει ο Hargreaves (1992) καθώς αναπτύχθηκε μια μορφή στενότερης συνεργασίας για την οργάνωση κοινών δράσεων και την υλοποίηση κοινών δραστηριοτήτων. Κάποιες πόρτες αιθουσών διδασκαλίας άνοιξαν, αφήνοντας το περιθώριο σε συναδέλφους να παρακολουθήσουν την υλοποίηση δραστηριοτήτων και να συμμετέχουν. Εφαρμόστηκε κατά κάποιο τρόπο αρχικά η τεχνητή συνεργασία που είναι μια ενδιάμεση μεταβατική περίοδος, αλλά φάνηκε πως έθεσε τις βάσεις για την εγκαθίδρυση μελλοντικής συνεργατικής παράδοσης.

Στο πλαίσιο της ομάδας προτείνονταν δραστηριότητες και κάθε εκπαιδευτικός με το τμήμα του ασχολήθηκε, όποτε θεωρούσε ότι οι υποχρεώσεις που υπαγορεύονται από το αναλυτικό πρόγραμμα του το επιτρέπουν. Σχεδιάστηκαν, συλλογικά ή ανά ομάδα εκπαιδευτικών, δραστηριότητες με δυνατότητα τροποποίησης, ανάλογα με το χρόνο ή τους στόχους του κάθε εκπαιδευτικού. Είναι γεγονός ότι μετά τις διακοπές των Χριστουγέννων άρχισε να αυξάνεται το ενδιαφέρον και αυξήθηκε και ο αριθμός των δραστηριοτήτων που υλοποιήθηκαν μέσα και έξω από την τάξη.

Αποτελέσματα

Ενδιαφέρον έχει ότι οι ομάδες καθαριότητας και φροντίδας του σχολικού κήπου προέκυψαν από το τμήμα που στο παρελθόν είχε τις περισσότερες τιμωρίες, λόγω προβλημάτων συμπεριφοράς των μαθητών. Οι μαθητές της Στ τάξης, που ως τα Χριστούγεννα δημιουργούσαν τα περισσότερα προβλήματα και είχαν υιοθετήσει ρόλο περιθωριακό, μετά από δικό τους ενδιαφέρον, δείχνοντας ενθουσιασμό στην ιδέα να αλλάξει το περιβάλλον του σχολείου, ανέλαβαν να φροντίζουν το σχολικό κήπο και να επιμελούνται την καθαριότητα. Αυτό είχε ως αποτέλεσμα να αλλάξει η συμπεριφορά τους και να μην γίνουν ξανά πρωταγωνιστές δυσάρεστων καταστάσεων.

Ως προς τη συνεργασία των εκπαιδευτικών, ιδιαίτερη συνεργασία αναπτύχθηκε μεταξύ των εκπαιδευτικών των μεγαλύτερων τάξεων, Ε΄ και Στ΄, που ασχολήθηκαν με το ρέμα της Πικροδάφνης και το άνοιγμα του σχολείου στην τοπική κοινότητα. Παρόλο που οι εκπαιδευτικοί σε μεγάλο βαθμό έδειχναν να πιέζονται από το αναλυτικό πρόγραμμα και την ύλη των μαθημάτων, το συγκεκριμένο πρόγραμμα προχώρησε αρκετά και οι μαθητές υλοποίησαν ποικιλία δράσεων. Στην επιτυχή εξέλιξη επέδρασαν διάφοροι παράγοντες όπως: Το γεγονός ότι ασχολήθηκαν με το πρόγραμμα και δυο εκπαιδευτικοί που δεν είχαν την πίεση του αναλυτικού προγράμματος, ο γυμναστής, ο οποίος λειτουργούσε ενισχυτικά και βοηθούσε στις διάφορες δράσεις καθώς και ο δάσκαλος του ολοήμερου που συμπλήρωνε ώρες στο πρωινό πρόγραμμα διδάσκοντας φυσική στο Ε2. Συχνά έπαιρνε την πρωτοβουλία να έρθει νωρίτερα προκειμένου να βοηθήσει στην οργάνωση δραστηριοτήτων σχετικών με το πρόγραμμα ΠΕ. Έτσι και τα τέσσερα τμήματα, των Ε΄ και ΣΤ΄, κατάφεραν να υλοποιήσουν από κοινού ή ξεχωριστά πολλές δραστηριότητες, με την καθοδήγηση των εκπαιδευτικών. Στην προσπάθεια που έγινε να καλλιεργηθεί η συνεργασία μεταξύ σχολείου, οικογένειας, τοπικής κοινωνίας και τοπικής αυτοδιοίκησης απέδωσε περισσότερο η συνεργασία σχολείου με την τοπική αυτοδιοίκηση, καθώς η συγκυρία ήταν ευνοϊκή. Η δημοτική αρχή έδωσε φέτος προτεραιότητα στο περιβαλλοντικό θέμα του ρέματος της Πικροδάφνης. Οργάνωσε δράσεις στις οποίες πήραν μέρος μαθητές και εκπαιδευτικοί του σχολείου, όπως καθαρισμό του ρέματος, δενδροφύτευση της παραρεμάτιας περιοχής, καθώς και ημερίδα που αφορούσε την ενημέρωση της τοπικής κοινωνίας, στην οποία έλαβε μέρος το σχολείο με έκθεση φωτογραφίας και εκπαιδευτικού υλικού που είχαν δημιουργηθεί από τους μαθητές.

Καθώς το σχολικό έτος έφτανε στο τέλος του, κάποιοι εκπαιδευτικοί αισθάνθηκαν να πιέζονται, επειδή δεν είχαν καταφέρει να ολοκληρώσουν τις δραστηριότητες που είχαν προγραμματίσει στο πλαίσιο των καινοτόμων προγραμμάτων, λόγω του φόρτου του αναλυτικού προγράμματος και της ύλης. Χαρακτηριστική είναι η φράση δασκάλας της Α΄ τάξης η οποία αν και είχε διάθεση να υλοποιήσει διάφορες δραστηριότητες, αγανακτισμένη είπε: «Πώς να ολοκληρώσω τις δραστηριότητες που έχω προγραμματίσει όταν Μάιο μήνα, πρέπει να μάθουν τα πρωτάκια να

κλίνουν ρήματα σε –ομαι και να ξέρουν να κάνουν πράξεις μέχρι το 100». Ενδιαφέρον παρουσιάζουν οι παρατηρήσεις εκπαιδευτικών που έγιναν στις συζητήσεις αναστοχασμού της ομάδας τους, μετά την ολοκλήρωση των προγραμμάτων: «Δε βγήκε αυτό που θέλαμε και σκεφτήκαμε αρχικά, αλλά η όλη διαδικασία ήταν και για μας μια εμπειρία. Μας βοήθησε να γνωρίσουμε τι μπορούμε εμείς, αλλά και τι μπορούν οι μαθητές μας». Δασκάλα που είχε την Α΄ τάξη παρατήρησε: «Έπρεπε να σταθούμε λιγότερο στις ασκήσεις εξάσκησης γραφής και ανάγνωσης και να αφήσουμε τα παιδιά να χαρούν και τις άλλες δραστηριότητες».

Στον αντίποδα υπήρξαν εκπαιδευτικοί, οι οποίοι ολοκλήρωσαν πληθώρα δραστηριοτήτων, αλλά δέχτηκαν παράπονα γονέων ότι «έκαναν άλλα πράγματα και δεν ολοκλήρωσαν την ύλη, πώς θα πάνε τα παιδιά στην επόμενη τάξη;» Αυτού του είδους τα προβλήματα χρειάζονται ένα ιδιαίτερο χειρισμό από τους εκπαιδευτικούς, αλλά και εξοικείωση στην αξιοποίηση ευκαιριών για διαθεματική προσέγγιση των διαφόρων ζητημάτων και αξιοποίηση της ευέλικτης ζώνης.

Ένα άλλο θέμα που μας απασχόλησε ήταν το γεγονός ότι οι εκπαιδευτικοί δεν παρακολουθούσαν κατά κανόνα σεμινάρια, ειδικά πολύωρα. Σε σεμινάρια ΚΠΕ δε δήλωσαν συμμετοχή, ενώ σε σεμινάρια 3ωρης διάρκειας που οργανώνονται στη Δ/νση συμμετείχαν πάντα συγκεκριμένοι εκπαιδευτικοί. Θετικά προς αυτή την κατεύθυνση λειτούργησε η παρώθηση από τους πιο πρόθυμους και δραστήριους, οι οποίοι το προέβαλαν και ως ευκαιρία να συναντηθούν και να ανταλλάξουν εμπειρίες. Ο αριθμός όσων συμμετείχαν ήταν μικρός και στο σύνολό τους δεν επιμορφώθηκαν όσο θα έπρεπε. Αντίθετα συμμετείχαν όλοι σε 2ωρες επιμορφωτικές συναντήσεις που προγραμματίζονται στο χώρο του σχολείου.

Άλλα ζητήματα τα οποία αναφέρονται στους δείκτες αειφόρου σχολείου (http://www.aeiforosxoleio.gr/deiktes.php), τα οποία δεν αντιμετωπίστηκαν ικανοποιητικά, ήταν ότι δεν εμπλουτίστηκε το κυλικείο με βιολογικά προϊόντα, καθώς η υπεύθυνη του κυλικείου είχε επιφυλάξεις ως προς την ανταπόκριση των μαθητών, αφού ήδη υπήρχε σημαντική μείωση αγορών. Έγινε προσπάθεια να ενσωματωθούν δραστηριότητες για τον έλεγχο του οικολογικού αποτυπώματος του σχολείου, αλλά η ανταπόκριση των εκπαιδευτικών σε αυτές τις δράσεις δεν ήταν η αναμενόμενη. Οι μετρήσεις που απαιτούνταν να γίνουν για τη μέτρηση των υλικών που ανακυκλώνονται και των απορριμμάτων που καταλήγουν στη χωματερή δεν έγιναν όπως θα έπρεπε, αφού η καθαρίστρια θεωρούσε ότι ήδη υπήρχε πολλή δουλειά και δεν μπορούσε να επιφορτιστεί και με αυτό. Οι εκπαιδευτικοί επίσης δεν ενσωμάτωσαν στην καθημερινή πρακτική την ενίσχυση της ανακύκλωσης από τους μαθητές. Ακόμη δεν έγιναν οι μετρήσεις στην κατανάλωση ηλεκτρικού ρεύματος, λόγω αντικειμενικών δυσκολιών, όμως για να ξεπεραστεί το θέμα υπεβλήθη αίτηση για τοποθέτηση μετρητή κατανάλωσης ενέργειας και έγινε δεκτή.

Να επισημανθεί ότι σημαντική ενίσχυση στην όλη προσπάθεια ήταν το γεγονός της εμπλοκής του Δήμου στο ΒΑΣ. Η δήμαρχος, έπειτα από πρόταση του Συμβουλίου Περιβαλλοντικής Εκπαίδευσης της Ελληνικής Εταιρείας Περιβάλλοντος και Πολιτισμού, υπέγραψε το πρωτόκολλο συνεργασίας και υιοθέτησε το ΒΑΣ. Έτσι δημιουργήθηκε ένα πλαίσιο εξασφάλισης συνεργασίας τόσο μεταξύ του Δήμου και της συγκεκριμένης σχολικής κοινότητας, αλλά και μεταξύ των σχολείων της περιοχής, τα οποία με παρότρυνση της δημοτικής αρχής δήλωσαν συμμετοχή στο ΒΑΣ. Καθώς ο Δήμος θέσπισε τα δικά του βραβεία αειφόρου σχολείου και προώθησε το ΒΑΣ στα σχολεία της περιοχής, δόθηκε η ευκαιρία συνεργασίας διευθυντών και εκπαιδευτικών και οργάνωσης κοινών δράσεων. Επιπλέον η δήμαρχος, διαπιστώνοντας την προσπάθεια να λειτουργήσει το σχολείο ως αειφόρο, πρότεινε να ενταχθεί στο πρόγραμμα «Εξοικονομώ». Αυτό σημαίνει ότι θα εξευρεθούν οι οικονομικοί πόροι να αντικατασταθούν τα μονά τζάμια με διπλά, ώστε να εξασφαλιστεί θερμομόνωση, να γίνουν εργασίες στο λεβητοστάσιο για μείωση των απωλειών θερμότητας και μείωση κατανάλωσης πετρελαίου κλπ.

Διαπιστώσεις

Από την ετήσια παρατήρηση της προσπάθειας μετασχηματισμού της σχολικής μονάδας σε αειφόρο σχολείο οι διαπιστώσεις που προέκυψαν είναι:

- Η προσπάθεια μετασχηματισμού της σχολικής μονάδας σε αειφόρο σχολείο απαιτεί χρόνο, ώστε να εδραιωθεί η σχετική κουλτούρα αρχικά μεταξύ των εκπαιδευτικών και σταδιακά μεταξύ

όλων των εμπλεκόμενων μελών, μαθητών/τριών, γονέων, βοηθητικού προσωπικού. Συνεπώς ένα σχολικό έτος δεν είναι αρκετό. Χρειάζεται βάθος χρόνου για να γίνει ολοκληρωμένη η προσπάθεια και να φανούν τα ουσιαστικά αποτελέσματα.

- Καθοριστικός για την επιτυχία της προσπάθειας είναι ο ρόλος του διευθυντή της σχολικής μονάδας. Ο διευθυντής πρέπει να λειτουργεί υποστηρικτικά προς τους συναδέλφους και να ενισχύει το σχεδιασμό και την υλοποίηση δράσεων προς την κατεύθυνση της αειφορίας. Επίσης θα πρέπει να φροντίζει για την ενημέρωση του συλλόγου γονέων και το άνοιγμα του σχολείου στην τοπική κοινότητα.

- Σημαντικό είναι να υπάρχει συντονιστής στην όλη προσπάθεια, που θα έχει συνολική εικόνα όσων σχεδιάζονται και υλοποιούνται. Αν αυτό το ρόλο δεν αναλάβει ο διευθυντής, που σε μεγάλα σχολεία ίσως δεν έχει το χρόνο, θα πρέπει να είναι ένας εκπαιδευτικός με εμπειρία στην υλοποίηση προγραμμάτων καινοτόμων δράσεων.

- Υπάρχει ανάγκη επιμόρφωσης των εκπαιδευτικών σε θέματα αειφορίας, αλλά και εναλλακτικών διδακτικών τεχνικών. Οι εκπαιδευτικοί διαπιστώνεται ότι ανταποκρίνονται πολύ περισσότερο σε σεμινάρια ενδοσχολικής επιμόρφωσης, ακόμα και εκτός εργασιακού ωραρίου, αρκεί να είναι λίγων ωρών.

- Μεγαλύτερη επιτυχία στην οργάνωση και υλοποίηση των δραστηριοτήτων παρατηρείται όταν έχουν οι ίδιοι οι εκπαιδευτικοί επιλέξει το θέμα με το οποίο θα ασχοληθούν, γιατί αφενός μεταφέρουν το ενδιαφέρον τους και τον ενθουσιασμό τους στους μαθητές και αφετέρου κινητοποιούνται σε μεγαλύτερο βαθμό. Βέβαια σταδιακά θα πρέπει όταν εξοικειωθούν με την υλοποίηση καινοτόμων προγραμμάτων, να δώσουν ευκαιρίες επιλογής θεμάτων από τους μαθητές.

- Οι ειδικότητες γυμναστή, μουσικού, εικαστικών, θεατρικής αγωγής κα, μπορούν να αναλάβουν σημαντικό ρόλο στην όλη προσπάθεια γι΄ αυτό θα πρέπει να εμπλέκονται ενεργά και από την αρχή. Συχνά ανασταλτικός παράγοντας είναι το γεγονός ότι συμπληρώνουν ωράριο σε διαφορετικά σχολεία και δεν καθίσταται εύκολη η εξασφάλιση της συνεργασίας. Ο διευθυντής ή ο συντονιστής του προγράμματος θα πρέπει να φροντίζει ώστε να εξασφαλίζεται η εμπλοκή και η συνεργασία. .

- Σημαντικό εργαλείο για τη βελτίωση της ποιότητας της όλης προσπάθειας είναι η έρευνα δράση (Κάτσενου κ.α., 2010). Δεν υπήρξε όμως ανταπόκριση στην πρόταση οι εκπαιδευτικοί να ενσωματώσουν την έρευνα δράσης στην εκπαιδευτική διαδικασία και να γίνουν οι ίδιοι ερευνητές του έργου τους, κρατώντας ημερολόγιο των δραστηριοτήτων και του τρόπου υλοποίησής τους. Θεωρούν ότι τόσο το αναλυτικό πρόγραμμα, όσο και οι καθημερινές τους υποχρεώσεις, δεν τους αφήνουν πολλά περιθώρια για να ασχοληθούν με άλλα πράγματα.

- Ως παρωθητικός παράγοντας λειτούργησε η συνεργασία με τη δημοτική αρχή, καθώς οικοδομήθηκε μια σχέση αλληλεπίδρασης μαθητών και εκπαιδευτικών με την τοπική κοινότητα και ειδικότερα με τη δημοτική αρχή. Είδαν δηλαδή οι εκπαιδευτικοί και οι μαθητές την κοινότητα ως πηγή μάθησης και χώρο δράσης και πιθανά αν υπάρχει συνέχεια προς αυτή την κατεύθυνση, σταδιακά να οικοδομηθεί η προσωπικότητα του ενεργού πολίτη. Άλλωστε ως αειφόρο σχολείο ορίζεται αυτό που ενδιαφέρεται να αναπτύξει μαθησιακά περιβάλλοντα και μαθησιακές εμπειρίες που θα καταστήσουν ικανούς τους μαθητές να εργασθούν προς την κατεύθυνση της διασφάλισης ποιότητας ζωής (Gough, 2005, σ. 340).

- Μεγάλη απήχηση έχουν θέματα που σχετίζονται με το κτηριακό σε μαθητές με χαμηλή επίδοση στα μαθήματα. Δίνεται έτσι η δυνατότητα σε κάποιους μαθητές/τριες να επιδείξουν δεξιότητες που στο παραδοσιακό σχολείο δεν φαίνονται.

- Οι μαθητές στο σύνολό τους απολαμβάνουν τις δραστηριότητες που υλοποιούνται στο πλαίσιο του ΒΑΣ και θεωρούν σημαντικό ότι αυτές έχουν άμεση σχέση με καταστάσεις που βιώνουν καθημερινά στο άμεσο περιβάλλον τους.

- Επειδή τα χαρακτηριστικά των σχολείων με τον τρόπο που λειτουργούν(ΑΠ, κτηριακό, κα) δεν συνάδουν με τις αρχές της αειφορίας (Παπαδημητρίου, 2010) θα πρέπει, καταρχήν, να αποτελέσουν τα ίδια το αντικείμενο της αλλαγής, προκειμένου στη συνέχεια, να αποτελέσουν σημαντικούς παράγοντες ευρύτερων αλλαγών στην κοινωνία, στο πνεύμα της αειφορίας (Orr 1992, Sterling 1996, 2001, Huckle & Sterling 1996, Huckle 2010). Το όραμα του αειφόρου σχολείου δίνει την ευκαιρία, με πρωτοβουλίες και δράσεις σχεδιασμένες και υλοποιούμενες από

την ίδια τη σχολική κοινότητα να καταστεί το σχολείο ταυτόχρονα στόχος και εργαλείο για την επίτευξη μιας αειφόρου ανάπτυξης στην κοινωνία. Η ως τώρα εμπειρία έχει δείξει ότι οι εκπαιδευτικοί μπορούν να λειτουργούν με επιτυχία και να επιδεικνύουν εντυπωσιακά αποτελέσματα, όταν τους παρέχονται ικανές ευκαιρίες και υποστήριξη (Altrichter κ.ά, 2001). Για το λόγο αυτό θα πρέπει να έχουν την ανάλογη επιμόρφωση και υποστήριξη, ώστε να κινηθούν αποτελεσματικά προς την κατεύθυνση της αειφορίας. Συγκεκριμένα η διοίκηση του σχολείου θα πρέπει αρχικά να θέτει τις αρχές της αειφορίας ως μέρος της πολιτικής και του προγραμματισμού της σχολικής μονάδας (Κωστούλα-Μακράκη, 2010) και στη συνέχεια όλοι οι εμπλεκόμενοι με το σχολείο θεσμικοί φορείς.

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Το Όραμα του Γενικού Λυκείου Καρύστου για την Εκπαίδευση και την Αειφορία

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Περίληψη

Η κοινωνικοοικονομική ανάπτυξη του σύγχρονου κόσμου επέφερε αρνητικές συνέπειες στις σημερινές κοινωνίες, με την περιβαλλοντική κρίση, την εξαθλίωση και τη φτώχεια να προβληματίζουν τον άνθρωπο. Κρίνεται σκόπιμη η αναθεώρηση των αξιών, με κατεύθυνση προς την αειφορία, με αρωγό την εκπαίδευση. Στην παρούσα εργασία, παρουσιάζεται το όραμα του Γενικού Λυκείου Καρύστου προς την αειφορία, στο πλαίσιο της συμμετοχής του στο Διαγωνισμό για το Βραβείο του Αειφόρου Σχολείου, τη σχολική χρονιά 2011-2012. Παρουσιάζονται οι στόχοι του σχολείου και η υλοποίησή τους, μέσω των δράσεων. Σημαντικό κομμάτι της παραπάνω εργασίας αποτελούν η αξιολόγηση της προσπάθειάς μας και τα συμπεράσματα που προκύπτουν. Θα συντελέσουν στην ανατροφοδότηση και την αποτελεσματικότερη οργάνωση ενός σχολείου για την εκπαίδευση και την αειφορία.

Abstract

Modern world socioeconomic development accompanied by a financial and energy crisis and environmental deterioration, has induced a negative impact in contemporary societies. People all over the world express their concern over the aforementioned issues. The reform of living conditions towards sustainability through education is the key action in dealing with these elements. In this paper, the vision of the High school of Karystos towards sustainability is presented. This vision has been emphasized by the participation of the school in the Competition for the Greek sustainable school for the school year 2011-2012. The objectives of the school and their realization through the school's actions are explained. The efforts and the results are evaluated. Both of them will contribute to an effective organization of a real sustainable and educating school and give perpetual feedback to this direction.

Εισαγωγή

Η εποχή στην οποία ζούμε είναι εποχή αντιφάσεων και συγκρούσεων. Οι σύγχρονες κοινωνίες υιοθετούν την αναπτυξιακή ιδεολογία, προσανατολίζονται στη διαρκή αύξηση των οικονομικών εισροών, της δύναμης, του κύρους και της ευημερίας. Ωστόσο, η οικονομική ανάπτυξη, με στόχο την οικονομική μεγέθυνση, βασιζόμενη στο τρίπτυχο «ανάγκη – παραγωγή - κατανάλωση», δημιουργεί ένα φαύλο κύκλο. Είμαστε μέλη μίας κοινωνίας όπου «η οικονομία, η παραγωγή, η κατανάλωση και πολύ περισσότερο τα οικονομικά κριτήρια ανάγονται σε ύψιστη αξία της κοινωνικής ζωής» (Καστοριάδης, 1998).
Αναπόφευκτα ανακύπτουν οι δυσμενείς συνέπειες αυτής της ανάπτυξης. Αυτές είναι η ενεργειακή κρίση (εξάντληση φυσικών πόρων), η μόλυνση του περιβάλλοντος (ραγδαίες κλιματικές αλλαγές), εξαθλίωση, ρατσισμός, ανισότητες και, σε ακραίες περιπτώσεις, πόλεμοι,. «Για πρώτη φορά στην ιστορία της ανθρωπότητας οι αναπτυξιακές δραστηριότητες έχουν αγγίξει περιβαλλοντικά και κοινωνικά όρια με σοβαρές επιπτώσεις στη φύση και την κοινωνία». (Huckle, 2000).
Με βάση τα παραπάνω, κρίνεται αναγκαίο να προσδιοριστεί η αξία της Αειφορίας και ο άνθρωπος να συνειδητοποιήσει την αναγκαιότητα της διαφύλαξης και εξασφάλισης του κόσμου για τις επόμενες γενιές.

Πληθώρα ορισμών έχουν δοθεί για την Αειφορία και την αειφόρο ανάπτυξη. Σύμφωνα με την αναφορά Brundtland: «Η ανάπτυξη είναι αειφόρος, όταν ικανοποιεί τις σύγχρονες ανάγκες, χωρίς να μειώνει τις δυνατότητες των μελλοντικών γενεών να καλύψουν τις δικές τους ανάγκες» (WCED 1987, 43). Έμφαση στη βελτίωση της ποιότητας ζωής δίνεται στον ορισμό που προέρχεται από το *Φροντίζοντας τη Γη: μία Στρατηγική για την Αειφορία των οργανισμών* IUCN, UNEP και WWF (1991), σύμφωνα με τον οποίο αειφόρος ανάπτυξη σημαίνει «βελτίωση της ποιότητας της ζωής του ανθρώπου στο πλαίσιο της φέρουσας ικανότητας των υποστηρικτικών οικοσυστημάτων» (Λιαράκου & Φλογαΐτη, 2007).

Οι τρεις πυλώνες, που ισότιμα στηρίζουν την αειφόρο ανάπτυξη, σύμφωνα με την UNESCO (2005, 14), είναι η κοινωνία, το περιβάλλον και η οικονομία.
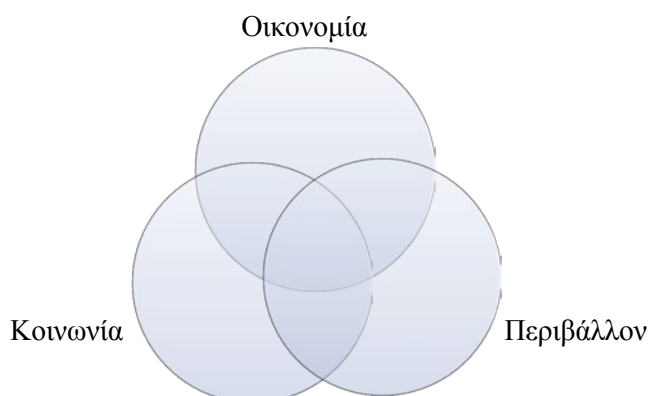
Σχήμα 1: Οι τρεις διαστάσεις της αειφορίας (Λιαράκου & Φλογαΐτη 2007).

Διεθνείς πολιτικοί και οικονομικοί οργανισμοί θέτουν την αειφόρο ανάπτυξη ως παγκόσμιο στόχο και συμφωνούν στο ότι η μάθηση αναγνωρίζεται ως βασικός μοχλός της κοινωνικής αλλαγής που απαιτείται για την πραγμάτωση της αειφορίας. Η εκπαίδευση εισάγεται για πρώτη φορά στην ατζέντα της Επιτροπής για την Αειφόρο Ανάπτυξη, στο πλαίσιο της τέταρτης συνάντησης της UNESCO, το Μάιο του 1996. Η συλλογιστική που αναπτύσσεται είναι ότι «για να αλλάξουν τα μη αειφόρα πρότυπα παραγωγής και κατανάλωσης και ο τρόπος ζωής, είναι σημαντικό να δοθεί έμφαση στο ρόλο της εκπαίδευσης για την αειφόρο ανάπτυξη» (UNESCO-UNEP 1996, παρ. 2-3)

Κυρίως μετά τη Διάσκεψη για το Περιβάλλον και την Ανάπτυξη στο Ρίο (1992) και στο Γιοχάνεσμπουργκ (2002), αποκρυσταλλώνεται η ιδέα για μία «Εκπαίδευση για την Αειφόρο Ανάπτυξη». Το Μάρτιο του 2005 κηρύχθηκε επισήμως η έναρξη της «Δεκαετίας της εκπαίδευσης για την αειφόρο ανάπτυξη (2005-2014)», με σκοπό τον επαναπροσανατολισμό της εκπαίδευσης με βάση την έννοια της αειφόρου ανάπτυξης. Η εκπαίδευση μπορεί να φέρει την αλλαγή και να αποτελέσει καθοριστικό παράγοντα για την παγκόσμια κινητοποίηση προς την αειφορία.

Η Ε.Α.Α. είναι μία δια βίου διαδικασία που ξεκινά στα πρώιμα παιδικά χρόνια και συνεχίζεται μέσω της ανώτατης εκπαίδευσης και της εκπαίδευσης ενηλίκων και ξεπερνά τα όρια της τυπικής εκπαίδευσης. Δεδομένου ότι η μάθηση πραγματοποιείται όσο λαμβάνουμε διάφορους ρόλους στη ζωή μας, η εκπαίδευση για την αειφόρο ανάπτυξη πρέπει να θεωρηθεί ως μία διαδικασία που επεκτείνεται σε όλη μας τη ζωή και πρέπει να εισχωρήσει στα εκπαιδευτικά προγράμματα όλων των επιπέδων. (Στρατηγική της UNECE για την Εκπαίδευση και την Αειφόρο Ανάπτυξη, 2005)

Βασικές αρχές της Ε.Α.Α.

Στην χώρα μας, μία σημαντική εξέλιξη πραγματοποιείται μέσω του «Νέου Προγράμματος Σπουδών του Περιβάλλοντος και της Εκπαίδευσης για την Αειφόρο Ανάπτυξη» (2011). Μάλιστα, επισημαίνεται ότι, σύμφωνα με την UNESCO - UNEP και UNEPE, οι αρχές της Ε.Α.Α. παραπέμπουν σε γνώσεις, δεξιότητες και ικανότητες, στάσεις και συμπεριφορές. Τα παραπάνω εξειδικεύονται σε διδακτικούς και μαθησιακούς στόχους. Ειδικότερα, οι μαθητές/τριες, ως

υπεύθυνοι ενεργοί πολίτες, πρέπει να είναι σε θέση να κατανοούν και να εφαρμόζουν στην καθημερινή ζωή γνώσεις και διαδικασίες σχετικά με :

- τις βασικές ανθρώπινες ανάγκες
- τα ανθρώπινα δικαιώματα
- την αλληλεξάρτηση/αλληλεπίδραση όλων των μορφών ζωής
- την αναγνώριση ότι η παραγωγή ενός προϊόντος ή μίας υπηρεσίας, σε ένα μέρος του πλανήτη, εξαρτάται από τους φυσικούς πόρους σε άλλα μέρη του πλανήτη
- το οικολογικό αποτύπωμα
- την αρχή της πρόληψης

Η εκπαίδευση για την αειφόρο ανάπτυξη επιτρέπει στους ανθρώπους να επεκτείνουν τις γνώσεις τους, τις αξίες και τις ικανότητές τους, να συμμετέχουν στη λήξη αποφάσεων που αφορούν μεθόδους δράσης, ατομικά και συλλογικά, τοπικά και παγκόσμια, ώστε να βελτιωθεί η ποιότητα ζωής ήδη από τώρα, χωρίς να βλαφθεί ο πλανήτης αργότερα. (Education for Sustainable Development, in the School Sector, Report to DfEE/QCA, 1998)

Η ΕΑΑ είναι μετεξέλιξη της περιβαλλοντικής εκπαίδευσης . Η εκπαίδευση για την αειφόρο ανάπτυξη, όμως, καλείται να κάνει την υπέρβαση, να διευρύνει ακόμα περισσότερο το πεδίο (Λιαράκου & Φλογαΐτη, 2007).

Τα χαρακτηριστικά του αειφόρου σχολείου

Ως αειφόρο σχολείο ορίζεται αυτό που φροντίζει για:

- τον εαυτό του (υγεία και ευημερία)
- τους τρίτους
- το περιβάλλον (τοπικό και παγκόσμιο)

(Department for Children, Schools, Families, 2008)

Το αειφόρο σχολείο φροντίζει για την βελτίωσή του σε όλους τους τομείς στο διηνεκές. Προωθεί την αειφόρο ανάπτυξη μέσω των διαδικασιών μάθησης, των αξιών, της λειτουργίας του και μέσω της αλληλεπίδρασης του με την κοινωνία (DCSF, 2008).

Αειφόρο σχολείο είναι εκείνο το σχολείο που όλα τα δομικά και οργανωτικά του στοιχεία, όλες οι λειτουργίες του και όλες οι σχέσεις του σχεδιάζονται και υπάρχουν, για να εξασφαλίζουν την ευημερία της εκπαιδευτικής και της τοπικής κοινότητας. Το σχολείο δηλαδή, στο σύνολό του, λειτουργεί για να εξυπηρετεί τον πολιτισμό, το περιβάλλον και την οικονομία των φυσικών πόρων. (Σχήμα 2)

Η ομαδική εργασία, η ευελιξία, η δημιουργικότητα, η αυτοοργάνωση, η κριτική σκέψη, η συστημική θεώρηση/σκέψη, διαπολιτισμική κατανόηση, ενσυναίσθηση, η συμμετοχή στις διαδικασίες λήψης απόφασης και η ανάληψη δράσης, μετατροπή των εκπαιδευτικών σε ερευνητές και φορείς εκπαιδευτικής και κοινωνικής αλλαγής είναι βασικά σημεία στα οποία στηρίζεται η λειτουργία ενός τέτοιου σχολείου (Αγγελίδου & Κρητικού, 2010).
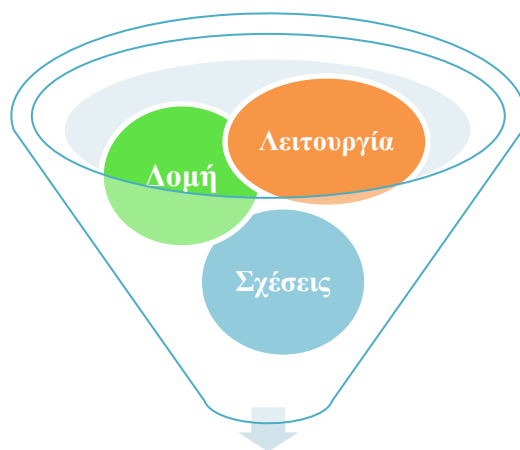
Αειφορία

Σχήμα 2: Το αειφόρο σχολείο.

Το Γενικό Λύκειο Καρύστου

Το όραμα μέσω της συμμετοχής του σχολείου μας για το Βραβείο του Αειφόρου Σχολείου

Η συμμετοχή του σχολείου μας στο φετινό Διαγωνισμό για το Βραβείο του Αειφόρου Σχολείου αποτέλεσε εφαλτήριο, για να επαναπροσδιορίσουμε τον χαρακτήρα και τους στόχους του σχολείου μας. Κάτω από αυτό το πρίσμα και, με βάση το βρετανικό πλάνο για την αειφόρο ανάπτυξη (DCSF 2008) και τη σκιαγράφηση του σχολείου από τις Αγγελίδου και Κρητικού (2010), ορίσαμε επτά παράγοντες που θα συνέβαλαν στη βελτίωση του συνόλου της σχολικής μας μονάδας (Σχήμα 3).


Σχήμα 3: Οι παράγοντες για ένα σχολείο για την Εκπαίδευση και την Αειφορία
Οι στόχοι του σχολείου μας για το σχολικό έτος 2011-12.

- **Παιδαγωγικοί και Διδακτικοί:**

Στόχος μας είναι να δημιουργηθεί μία μικρή «κοινότητα», όπως είναι άλλωστε κάθε σχολείο, ένα κοινωνικό forum. Το σχολικό συγκρότημα πρέπει να ταυτιστεί με έναν κεντρικό δημόσιο χώρο, με μία ανοιχτή αίθουσα μάθησης, πληροφόρησης, ένα κέντρο εργαλείων, μέσων, με μία αγορά αναζητήσεων, ανακαλύψεων και δράσεων. Ο μαθητής, στα πλαίσια της σχολικής κοινότητας και συλλογικότητας, επιλέγει να διαχειρίζεται και να προεκτείνει το αντικείμενο της γνώσης του, πέρα και έξω από τον κορμό της καθιερωμένης διδασκαλίας, μακριά από την καθιερωμένη ιδρυματική αντίληψη του σχολείου-στερεοτύπου.

- **Επίπεδο σχέσεων:**

Ο στόχος αυτός αναφέρεται στην ενδυνάμωση των σχέσεων ανάμεσα σε όλα τα μέλη της σχολικής κοινότητας (Διεύθυνση, εκπαιδευτικοί, μαθητές), αλλά και στη συνεργασία και ουσιαστική σχέση ανάμεσα στο εκπαιδευτικό ίδρυμα, τους γονείς, την τοπική κοινωνία, και την παγκόσμια κοινότητα. Το αειφόρο σχολείο αποτελεί έναν οργανισμό μάθησης και διαπαιδαγώγησης που βασίζεται εξίσου στους παραπάνω παράγοντες και αποτελεί με αυτούς ένα αρμονικό σύνολο, με στόχο να αποτελέσει πρότυπο ενεργούς συμμετοχής μαθητών και αυριανών πολιτών, σε τοπικό και παγκόσμιο επίπεδο. (Σχήμα 4)
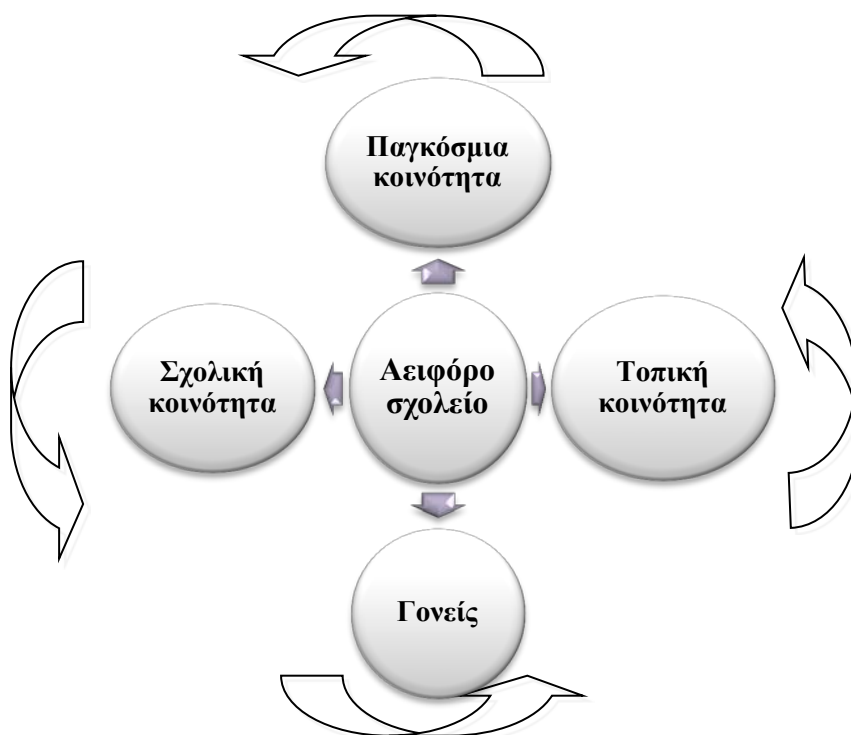
Σχήμα 4: Το επίπεδο των σχέσεων του αειφόρου σχολείο.

- **Εμπλοκή και συμμετοχή:**

Το σχολείο πρέπει να προάγει την κοινωνική συνοχή, παρέχοντας ένα περιβάλλον υποδοχής και αποδοχής που εκτιμά την αξία της συμμετοχής και της συνεισφοράς όλων. Έτσι, αίρονται οι προκαταλήψεις και οι αδικίες σε όλες τους τις μορφές.

- **Κτίρια και περιβάλλοντες χώροι:**

Ο σχεδιασμός, η διαχείριση και η συντήρηση των σχολικών χώρων με τρόπο φιλικό προς το περιβάλλον μπορεί να φέρει τους μαθητές πιο κοντά στον αειφόρο τρόπο διαβίωσης και στη φύση και ν' αποτελέσει γι' αυτά πλούσια πηγή γνώσεων.

- **Μείωση ενεργειακού αποτυπώματος:**

Η μείωση του ενεργειακού αποτυπώματος βασίζεται στην ορθολογική διαχείριση της ενέργειας, του νερού και των απορριμμάτων. Πιο συγκεκριμένα, στόχος είναι η μείωση της κατανάλωσης ενέργειας και του νερού, με την χρήση της αιολικής και ηλιακής ενέργειας, και η συλλογή και

επαναχρησιμοποίηση του βρόχινου νερού. Η διαχείριση και μείωση των απορριμμάτων, σε συνδυασμό με την ανακύκλωση, αποτελούν εξίσου στόχο του αειφόρου σχολείου. Συστήνεται η μείωση, επαναχρησιμοποίηση, επιδιόρθωση και ανακύκλωση των υλικών. Απώτερος σκοπός κρίνεται η εξοικονόμηση πόρων και η οικονομική αυτονομία του σχολείου.

- **Μετακινήσεις:**

Υιοθετούνται οικολογικοί, μη ρυπογόνοι τρόποι μετακίνησης, σύμφωνοι με τις αρχές τις αειφορίας, με στόχο τη μείωση των εκπομπών του οξειδίου του άνθρακα, αλλά και περισσότερο ασφαλείς, με στόχο τη μείωση των ατυχημάτων.

- **Υγιεινή διατροφή:**

Η ανθυγιεινή διατροφή συμβάλλει στην παχυσαρκία και στην ελλειμματική συγκέντρωση των μαθητών. Για το λόγο αυτό, το σχολείο πρέπει να αποτελέσει πρότυπο στην κατανάλωση υγιεινών τροφών που έχουν προέλθει από πηγές που σέβονται τους ηθικούς νόμους της φύσης. Με τον τρόπο αυτό, οι μαθητές αποκομίζουν πολλά διατροφικά οφέλη, ενώ παράλληλα προστατεύεται το περιβάλλον και υποστηρίζονται τοπικοί παραγωγοί και προμηθευτές.

Η υλοποίηση των στόχων μας- Οι δράσεις του σχολείου μας:

- **Παιδαγωγικές και Διδακτικές:**
  1) Ενσωμάτωση, στα μαθήματα του σχολείου, θεμάτων σχετικών με την αειφόρο ανάπτυξη.
  2) Ενσωμάτωση μεθόδων διδασκαλίας με βάση την ενεργό συμμετοχή των μαθητών και την ομαδοσυνεργατική μέθοδο.
  3) Χρήση ΤΠΕ για τη διδασκαλία των μαθημάτων.
  4) Πραγματοποίηση Περιβαλλοντικού και Πολιτιστικού Προγράμματος.
  5) Εκπαιδευτικές και διδακτικές επισκέψεις με σκοπό την περιβαλλοντική, κοινωνική και πολιτιστική ευαισθητοποίηση των μαθητών.

- **Επίπεδο σχέσεων:**
  1) Ουσιαστική συνεργασία ανάμεσα σε όλα τα μέλη της σχολικής κοινότητας.
  2) Ενδυνάμωση των σχέσεων με την τοπική κοινωνία και ανάληψη πρωτοβουλιών από την πλευρά της για τη βελτίωση του σχολικού κτιρίου. Συγκεκριμένα, ύστερα από αίτημα του σχολείου, δόθηκαν χορηγίες, από παράγοντες της τοπικής κοινωνίας, για την αγορά κάδων ανακύκλωσης και κομποστοποιητή (Εικ.1).

Εικόνα 1: Κάδοι ανακύκλωσης (αριστερά) και κομποστοποιητής (δεξιά).

  3) Συνεχής ενημέρωση της τοπικής κοινωνίας των δράσεων του σχολείου μας, μέσα από το ιστολόγιο του σχολείου, την παραγωγή ραδιοφωνικών εκπομπών και τη δημοσίευση σχετικών δελτίων τύπου.

4) Συνεργασία με τοπικούς φορείς και το Δήμαρχο της πόλης, σε θέματα σχετικά με τις ανάγκες του σχολείου μας και περιβαλλοντικά ζητήματα της περιοχής.
5) Συνεργασία με το Σύλλογο Γονέων και Κηδεμόνων.
6) Αξιοποίηση διδακτικού υλικού από την Διεθνή Αμνηστία για τους Πρόσφυγες και προβληματισμός σχετικά με ζητήματα που αφορούν την παγκόσμια κοινότητα, όπως είναι η πολυπολιτισμικότητα, η εκμετάλλευση ευπαθών ομάδων και ο ρατσισμός.

- **Εμπλοκή και συμμετοχή:**
  1) Συνεργασία του σχολείου μας με σχολεία ειδικής αγωγής, στα πλαίσια καλλιτεχνικών εργαστηρίων (Πρόγραμμα ΣΚΕΠ), με αποτέλεσμα την αποδοχή της «διαφορετικότητας», την παγίωση του σεβασμού προς όλες τις κοινωνικές ομάδες, την ελευθερία και τη δημιουργική έκφραση (Εικ.2).
  2) Συμμετοχή του σχολείου μας σε εράνους.

Εικόνα. 2: Καλλιτεχνική σύμπραξη με σχολεία ειδικής αγωγής.

- **Κτίρια και περιβάλλοντες χώροι:**
  1) Αισθητική αναβάθμιση του εσωτερικού του κτιρίου (αναδιάταξη επίπλων, διακόσμηση, βάψιμο) (Εικ. 3)
  2) Δεντροφύτευση (Εικ. 3)
  3) Δημιουργία ανθόκηπου και λαχανόκηπου (Εικ. 4)
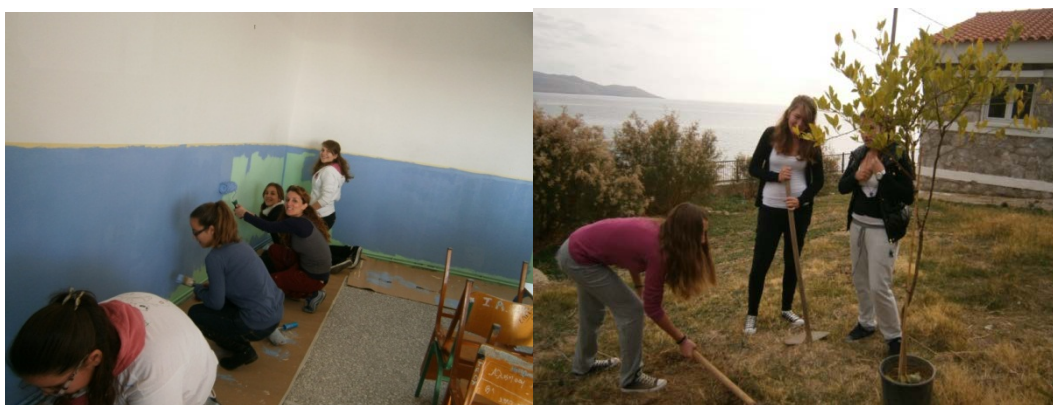
Εικόνα 3: Αισθητική αναβάθμιση και δενδροφύτευση.

Εικόνα 4: Ο ανθόκηπος/λαχανόκηπος του σχολείου μας.

- **Μείωση ενεργειακού αποτυπώματος:**
  1) Στον τομέα της διαχείρισης της ενέργειας, τηρήθηκε ημερολόγιο μετρήσεων κατανάλωσης, χωρίς, ωστόσο, να διακρίνεται αξιοσημείωτη μείωση.
  2) Ενημέρωση και προβληματισμός των μαθητών σχετικά με το ζήτημα της εξοικονόμησης νερού, ύστερα από συνεργασία του σχολείου μας με το Δίκτυο Mesogeios SOS (Πρόγραμμα Watersave).
  3) Διαχωρισμός των απορριμμάτων για χωματερή από τα ανακυκλώσιμα (πλαστικό, χαρτί, αλουμίνιο, μπαταρίες, λαμπτήρες) και τήρηση ημερολογίου μετρήσεων βάρους.

- **Μετακινήσεις:**
Από τους 180 μαθητές του σχολείου μας, 174 χρησιμοποιούν για τη μετακίνησή τους στο σχολικό χώρο τα δύο δημοτικά λεωφορεία, ενώ 5 χρησιμοποιούν Ι.Χ. και ένας μετακινείται με τα πόδια.

- **Υγιεινή διατροφή:**
Με τη δημιουργία του λαχανόκηπου από τους μαθητές, γίνεται κατανοητή η διατροφική αξία τροφίμων που παράγονται από πηγές που σέβονται τους νόμους της φύσης. Ακόμα, οι μαθητές μελετώντας το μέλι, ως κύριο θέμα του Περιβαλλοντικού Προγράμματος, συνεργάστηκαν με το Μελισσοκομικό Σύλλογο Καρύστου και πληροφορήθηκαν για τις ευεργετικές ιδιότητες του μελιού.

Αξιολόγηση των δράσεων σε συνδυασμό με τους στόχους που έχουν τεθεί:

Με το τέλος των μαθημάτων και τη λήξη του διαγωνισμού, το σχολείο μας προέβη σε διαδικασίες αξιολόγησης των πρωτοβουλιών που αναλήφθηκαν, εντόπισε οφέλη, δυσκολίες, εμπόδια και οριοθέτησε βελτιωτικές δράσεις για την επόμενη τριετία.

Οι **παιδαγωγικοί και διδακτικοί** μας στόχοι επιτεύχθηκαν σε αρκετά μεγάλο βαθμό, με τη μαθητοκεντρική μάθηση να κρίνεται αναγκαίο να αποτελεί πάντοτε γνώμονα του χαρακτήρα της εκπαίδευσης.

Οι **σχέσεις** μεταξύ των μελών της σχολικής κοινότητας και του σχολείου με την τοπική κοινωνία έγιναν περισσότερο στέρεες, ύστερα από τη συνεργασία των εμπλεκόμενων μελών. Κρίνεται, απαραίτητη, ωστόσο, η ενεργός συμμετοχή των γονέων στο επίπεδο των σχέσεων που διέπουν το αειφόρο σχολείο. Ακόμη, η υλοποίηση προγραμμάτων Comenius και e-Twinning από την επόμενη σχολική χρονιά, θα συνδράμει στη υιοθέτηση συμπεριφορών πολυπολιτισμικής και παγκόσμιας νοοτροπίας.

Στο επίπεδο της **εμπλοκής**-συμμετοχής, στο επίπεδο του **κτιρίου** και του περιβάλλοντα χώρου, το σχολείο μας κατάφερε να επιτύχει τους στόχους του και δεσμεύεται να κινηθεί προς αυτήν την κατεύθυνση στο μέλλον.

Ωστόσο, σε ό, τι αφορά τη **μείωση του ενεργειακού αποτυπώματος**, θεωρούμε ότι οι στόχοι μας δεν επιτεύχθηκαν πλήρως, δεδομένου, μάλιστα, της πλεονεκτικής γεωγραφικής θέσης του συγκροτήματος, το οποίο εκτείνεται σε παραθαλάσσιο οικόπεδο 17 στρεμμάτων και περιλαμβάνει οχτώ κτίσματα, συνολικού εμβαδού 850 τ.μ.

Γι' αυτό κρίνεται απαραίτητη η οριοθέτηση πρωτοβουλιών και δράσεων προς την κατεύθυνση της μείωσης του ενεργειακού αποτυπώματος. Πιο συγκεκριμένα:

1.   Μία έκταση, αρχικά, ενός στρέμματος μπορεί να μετατραπεί σε εκτροφείο σαλιγκαριών. Η Ευρωπαϊκή Ένωση προσφέρει κάποιες επιδοτήσεις και τα σαλιγκάρια πωλούνται ακριβά στο εξωτερικό, ενισχύοντας την εξαγωγική δραστηριότητα της χώρας. Από την άλλη πλευρά, οι μαθητές μαθαίνουν να εργάζονται μεθοδικά κατά την εκτροφή τους και τη συλλογή τους και μπαίνουν από νωρίς στην παραγωγική διαδικασία (Εικ.5).
http://www.geotechniki.com.gr/ektrofi_saligarion.el.aspx
http://www.saligari-snail.gr/index.php

Εικόνα 5: Χώρος για την εκτροφή σαλιγκαριών ή τη φύτευση αγριαγκινάρας.

2.   Εναλλακτικά, σε τμήμα του περιβάλλοντος χώρου θα μπορούσαν να φυτευτούν αγριαγκινάρες, οι οποίες συλλέγονται και, με την κατάλληλη επεξεργασία, διατίθενται σε pellets. Αν η παραπάνω πρόταση συνδυαστεί με την αντικατάσταση του καυστήρα του πετρελαίου με καυστήρα κατάλληλο για την υποδοχή pellets, τότε μπορεί να επιτευχθεί η εξοικονόμηση πόρων για τις δαπάνες θέρμανσης.

3.   Στη συνέχεια, με τα χρήματα που θα αποφέρει η εκτροφή σαλιγκαριών, εγκαθίστανται θερμοδυναμικά ηλιακά πάνελ (Εικ.6), μέσα σε ένα χρονικό πλαίσιο 12-18 μηνών.   Τα θερμοδυναμικά πάνελ αντικαθιστούν την χρήση του πετρελαίου με την ενέργεια από τον ήλιο ακόμα και σε μέρα με συννεφιά και λειτουργούν από τους -5 βαθμούς Κελσίου και άνω. Έτσι, εξοικονομούνται χρήματα από την αγορά του πανάκριβου πετρελαίου και υπάρχει παροχή θέρμανσης χώρου και νερού χρήσης, ενώ με τα, ήδη υπάρχοντα, διπλά τζάμια εξοικονομείται ενέργεια.

Εικόνα 6: Θερμοδυναμικά πάνελ.

4.   Εν τω μεταξύ, η εκτροφή σαλιγκαριών μπορεί να επεκταθεί σε ένα ακόμα στρέμμα του διαθέσιμου εξωτερικού χώρου του Λυκείου. Με τα επιπλέον χρήματα που θα αποφέρει, καθώς και

με την εξοικονόμηση από την χρήση των πάνελ, θα τοποθετηθούν φωτοβολταϊκά συστήματα για τις, προσανατολισμένες στο νότο,   τρεις κεραμοσκεπές του σχολείου μας (300 τ.μ.) (Εικ.7). Μπορούμε να στήσουμε 3 συστοιχίες των 10 KW, μια επένδυση που θα φτάσει τα 70.000 ευρώ. Το ρεύμα θα χρησιμοποιηθεί, για να καλύψει τις υπόλοιπες ανάγκες του σχολείου μας σε ηλεκτρικό.

Εικόνα 7:Σκεπές του σχολείου για την εγκατάσταση ηλιακών πάνελ και φωτοβολταϊκών.

Ακόμη, μία ενδιαφέρουσα πρόταση για την εξοικονόμηση ενέργειας θα ήταν η εγκατάσταση δαπέδου που παράγει ηλεκτρικό ρεύμα από την κίνηση των ποδιών των μαθητών. Η τεχνολογία αυτή είναι ήδη εγκατεστημένη σε σχολείο του εξωτερικού και επιτρέπει στους 1100 μαθητές να παράγουν ηλεκτρική ενέργεια, κάθε φορά που κινούνται στους διαδρόμους. Στο εν λόγω σχολείο έχει τοποθετηθεί τηλεμετρία για την απόδοση της αντοχής και τις επιδόσεις του συστήματος, με θεαματικά αποτελέσματα. (Εικ. 8) http://www.pavegen.com/student-green-energy.php

Εικόνα 8: Δάπεδο για την παραγωγή ηλεκτρικού ρεύματος.

5. Στον τομέα της εξοικονόμησης νερού θα δημιουργηθεί μεγάλου εμβαδού συλλέκτης νερού που θα οδηγεί τα όμβρια σε δεξαμενή για την ύδρευση. Τα νερά από όλες τις βρύσες συλλέγονται και επαναχρησιμοποιούνται για τις τουαλέτες. Επίσης, μπορούν να εγκατασταθούν βρύσες με φωτοκύτταρα και καζανάκια ελεγχόμενης ροής. Σε βάθος χρόνου και, λόγω του ότι το σχολείο είναι πολύ κοντά στη θάλασσα, θα εγκατασταθεί αφαλατωτής, για να καλυφθούν και οι υπόλοιπες ανάγκες του σχολείου σε νερό. (Εικ.9)

Εικ.9: Το σχολείο δίπλα στη θάλασσα.

Σε ό,τι αφορά τις **μετακινήσεις** των μαθητών, η μεταφορά του 96%, επί του συνόλου των μαθητών, με τα δύο δημοτικά λεωφορεία ελαχιστοποιεί την εκπομπή του διοξειδίου του άνθρακα. Παρ' όλ' αυτά, το σχολείο οφείλει να ωθήσει τους μαθητές στην χρήση οικολογικών μέσων. Για το λόγο αυτό, σε τμήμα του προαύλιου χώρου πρόκειται να εγκατασταθεί stand για την τοποθέτηση ποδηλάτων μαθητών και καθηγητών, με στόχο την καθημερινή χρήση τους. Επιπλέον, καθοριστική θα ήταν η κατασκευή ποδηλατόδρομου, κατά μήκος της παραλίας, ξεκινώντας από την κεντρική πλατεία και καταλήγοντας αρχικά στο ΓΕΛ Καρύστου και, σταδιακά, στα υπόλοιπα σχολεία της περιοχής. Με αυτόν τον τρόπο, οι μαθητές προσέρχονται στο σχολείο με ασφάλεια και παράλληλα μειώνεται η εκπομπή ρύπων.

Η ελλιπής ενημέρωση ίσως αποτέλεσε βασικό παράγοντα για την αδυναμία προώθησης **βιολογικών προϊόντων** στο κυλικείο του σχολείου μας. Αντιλαμβανόμενοι την αδυναμία αυτή, προγραμματίζουμε να εκπονήσουμε, την επόμενη χρονιά, πρόγραμμα Αγωγής Υγείας με θέμα τις διατροφικές συνήθειες των νέων και την παιδική παχυσαρκία, προκειμένου οι μαθητές να ευαισθητοποιηθούν πάνω στο ζήτημα και η υγιεινή διατροφή να γίνει τρόπος ζωής.

Συμπεράσματα

- Το σχολείο μπορεί να αποτελέσει, για τους μαθητές και την κοινωνία, ένα αξιόλογο παράδειγμα πρακτικής προς την αειφορία.

- Η εφαρμογή στην πράξη των αρχών της Ε.Α.Α. δεν είναι εύκολη υπόθεση, κυρίως σε ό, τι αφορά το Λύκειο, καθώς οι μαθητές εστιάζουν στην εισαγωγή τους στην τριτοβάθμια εκπαίδευση. Ενδεικτικό είναι το γεγονός ότι κανένας από τους μαθητές της Γ' Λυκείου δεν εντάχθηκε στην ομάδα που δήλωσε συμμετοχή στο Διαγωνισμό. Δυστυχώς, η εκπαίδευση για την αειφορία σε ηλικίες που είναι πολύ κοντά στον αυριανό πολίτη φαίνεται να συναντά αρκετά εμπόδια.

- Πρόκειται για ένα πλάνο το οποίο δύναται να αποδώσει σε βάθος χρόνου. Η υλοποίηση παρουσιάζει δυσκολίες, καθώς απαιτείται αρχικά κάποιο ποσό χρημάτων, για να ξεκινήσει η εφαρμογή του. Ωστόσο, με την εξοικονόμηση των πρώτων πόρων ξεκινά η υλοποίηση του επόμενου βήματος. Το κάθε βήμα εξαρτάται από το άλλο και τα αποτελέσματά τους θα εμφανιστούν σταδιακά.

- Θεωρείται απαραίτητος ο σωστός σχεδιασμός του εξοπλισμού και ο οργάνωση των βημάτων με σωστή σειρά, για να επιτευχθεί η μέγιστη απόδοση κάθε χρόνο και η επανεπένδυση των εξοικονομούμενων πόρων.

- Παρατηρήθηκε σημαντική αλλαγή στην αυτοεκτίμηση και στη στάση των μαθητών, με εμφανή στοιχεία ευαισθητοποίησης, δραστηριοποίησης και ενεργούς συμμετοχής. Μαθητές με χαμηλές επιδόσεις στα μαθήματά τους, κατόρθωσαν να συνεισφέρουν σημαντικά στις δράσεις και να αισθανθούν αναπόσπαστο και ουσιαστικό κομμάτι της σχολικής κοινότητας.

- Αξιοσημείωτη αλλαγή εντοπίστηκε και στη στάση των καθηγητών, οι οποίοι αποτέλεσαν, και αυτοί, φορείς της αλλαγής. Η επιμόρφωσή τους πάνω σε ζητήματα αειφορίας και στο νέο προσανατολισμό της εκπαίδευσης θεωρείται απαραίτητη.
- Η τοπική κοινωνία αγκάλιασε τις προσπάθειες του σχολείου. Το τελευταίο βρήκε αρωγούς τόσο την ιδιωτική πρωτοβουλία των συμπολιτών (προσφορές προϊόντων που εμπορεύονται, δωρεές κ.α.) όσο και τον δήμο και δημόσιες υπηρεσίες που δραστηριοποιούνται στην περιοχή.
- Αναμφίβολα, η συμμετοχή στο Διαγωνισμό συνέβαλε καθοριστικά στη βελτίωση του σχολείου, ως οργανισμού μάθησης και κοινωνικοποίησης.

Επίλογος

Η κατεύθυνση του εκπαιδευτικού συστήματος προς την αειφορία αποτελεί πραγματικότητα και ανάγκη για το μέλλον. Η κατάκτησή της, ωστόσο, απαιτεί κόπο, ενημέρωση και κατάρτιση των φορέων, ριζικές αλλαγές και συνεργασία, σε πολλά επίπεδα,. Στόχος πρέπει να αποτελέσει η συμφιλίωση του ανθρώπου με το περιβάλλον του (φυσικό, τοπικό, παγκόσμιο), η αυθεντική μάθηση, η συμμετοχική δράση για την επίλυση ζητημάτων, ο μελλοντικός ενεργός πολίτης. Το αειφόρο σχολείο οφείλει να ενδυναμώσει τους νέους με τα κατάλληλα εφόδια, να τους βοηθήσει να χτίσουν ένα λαμπρό και ελπιδοφόρο μέλλον και να δώσει λύσεις στα πιθανά αυριανά προβλήματα.

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Η Συμβολή του Αειφόρου Σχολείου στη Σύγχρονη Κοινωνική και Πολιτική Κρίση

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Περίληψη

Προσεγγίζοντας το αειφόρο σχολείο από την κριτική οπτική της αειφορίας αναδεικνύεται η παιδαγωγική - κοινωνική του διάσταση και μετασχηματίζεται σε ένα δυναμικό σύστημα, το οποίο μπορεί να αλλάζει και να αναπτύσσεται μέσα από συνεργατικές και αναστοχαστικές διεργασίες των μελών του. Στην παρούσα κοινωνικο-οικονομική κρίση το αίτημα για μετασχηματισμό του ρόλου του εκπαιδευτικού από διεκπεραιωτή του αναλυτικού προγράμματος σε αναμορφωτή διανοούμενο είναι περισσότερο επίκαιρο από ποτέ και συναντιέται με την ανάγκη για επαναπροσδιορισμό της έννοιας του ενεργού πολίτη μέσα σε ένα διαρκώς μεταβαλλόμενο πολιτικό και κοινωνικό τοπίο. Η συνεργασία, η αλληλεγγύη και οι συμμετοχικές διαδικασίες στη λήψη αποφάσεων θα πρέπει να δώσουν τη θέση τους στον ατομικισμό και ανταγωνισμό του παραδοσιακού παιδαγωγικού συστήματος, για να υπάρχει μια μεγαλύτερη πιθανότητα οι μαθητές/τριες να εξελιχθούν σε πολίτες ικανούς να μετέχουν σε συλλογικότητες, να διεκδικούν και να περιφρουρούν τα δικαιώματα τους.

Abstract

Approaching sustainable school from the social critical perspective of sustainability the emphasis is on the pedagogical – social dimension. Sustainable school is transforming thus to a dynamic system that can be changed and developed through collaborative and reflective processes of its members. In the current socio-economic crisis teachers should act as transformative intellectuals in order to teach through their example. Within this shifting paradigm collaboration, solidarity and participatory p rocesses in decision – making should replace individualism and competition dominant elements of the traditional pedagogical system in order for the pupils to act participate in commons and stand up for their rights.

Εισαγωγή

Προσεγγίζοντας το αειφόρο σχολείο από την κοινωνικά κριτική οπτική της αειφορίας το θεωρούμε ως «μια διευρυμένη προσέγγιση της εκπαίδευσης» η οποία επιφέρει αλλαγές σε παιδαγωγικό, κοινωνικό/οργανωτικό και τεχνικό/οικονομικό επίπεδο (Posch 1999). Κοινή συνιστώσα των αλλαγών και στα τρία επίπεδα είναι οι συνεργατικές και συμμετοχικές διαδικασίες στη λήψη αποφάσεων και στη χάραξη της εκπαιδευτικής πολιτικής της σχολικής κοινότητας με στόχο τη δημιουργία μιας «κοινότητας μάθησης». Μέσα από την πρακτική και λειτουργία της κοινότητας μάθησης το σχολείο μετατρέπεται σε ένα κοινωνικό σύνολο το οποίο έχει την ικανότητα της «αυτοποίησης» (Coppieters 2005), ένα δυναμικό σύστημα δηλαδή το οποίο μπορεί να αλλάξει και να αναπτυχθεί μέσα από **συνεργατικές και αναστοχαστικές διεργασίες** ανάμεσα στα μέλη του. Κεντρικό σημείο και απαραίτητη προϋπόθεση για τη μετεξέλιξη μιας σχολικής κοινότητας σε αειφόρο κοινότητα μάθησης είναι η ενεργός παρέμβαση όλων των μελών της στη διαμόρφωση των καθημερινών μαθησιακών και κοινωνικών συνθηκών.

Σύμφωνα με τα παραπάνω το σχολείο δεν περιορίζεται στη μετάδοση βασικών δεξιοτήτων και γνώσεων, αλλά στοχεύει στη δημιουργία κριτικά σκεπτόμενων πολιτών στο πλαίσιο μιας

πραγματικά δημοκρατικής κοινωνίας, υπόδειγμα της οποίας θα πρέπει να είναι το αειφόρο σχολείο. Οι σκεπτόμενοι ενεργοί πολίτες δεν είναι δυνατό να έχουν εκπαιδευθεί μέσα σε εκπαιδευτικές κοινότητες οι οποίες δεν παρέχουν το πρότυπο της κοινωνικής οργάνωσης στην οποία στοχεύουν μέσα από τη διδασκαλία τους. Και αν το αίτημα για την αναθεώρηση τόσο του ρόλου του εκπαιδευτικού όσο και του περιεχόμενου της μάθησης στην κατεύθυνση του κοινωνικού μετασχηματισμού ήταν μέχρι τώρα σημαντικά ζητούμενα της κριτικής παιδαγωγικής και του περιβαλλοντικού ζητήματος, σήμερα γίνονται επιτακτικά αιτήματα σε μια περίοδο πολυσήμαντης κρίσης.

Ζούμε μια ιστορική περίοδο όπου κινήσεις πολιτών και συλλογικότητες αναδύονται ως κινήματα διεκδίκησης, αντίστασης και αλληλεγγύης. Η έννοια του ενεργού πολίτη αποκτά ιδιαίτερα βαρύνουσα σημασία καθώς αναζητά ένα νέο προσδιορισμό μέσα σε ένα διαρκώς μεταβαλλόμενο πολιτικό και κοινωνικό τοπίο. Νέες μορφές συλλογικότητας αναδύονται μέσα από την ηλεκτρονική δικτύωση και την παγκοσμιοποιημένη αγορά, ενώ παλιές στενά πολιτικές και ιδεολογικά περιορισμένες συλλογικότητες φαίνεται να μην ανταποκρίνονται στα νέα αιτήματα. Οι πολίτες οι οποίοι θα είναι ουσιαστικά ενεργοί και κριτικά σκεπτόμενοι, δεν θα χειραγωγούνται και θα είναι ικανοί να συμμετέχουν σε κοινωνικά κινήματα, να μοιράζονται συλλογικά οράματα και να συμμετέχουν σε συλλογικές διαδικασίες λήψης απόφασης θα πρέπει να έχουν εκπαιδευθεί μέσα από αντίστοιχες εκπαιδευτικές δομές. Η δομή και οι αρχές του αειφόρου σχολείου μπορούν να διαμορφώσουν μια κοινότητα μάθησης και ενδυνάμωσης μέσα στην οποία οι μαθητές/τριες και μελλοντικοί πολίτες θα βιώσουν πρακτικές δημοκρατικής συλλογικότητας.

Η παρούσα εργασία θα επικεντρωθεί στο ρόλο του εκπαιδευτικού στο αειφόρο σχολείο δεδομένου ότι αποτελεί τον βασικό παράγοντα αλλαγής και μετασχηματισμού του μαθησιακού και κοινωνικού περιβάλλοντος του σχολείου. Θα εξετάσουμε πτυχές του έργου του οι οποίες μπορεί να είναι καθοριστικές για το μετασχηματισμό μιας σχολικής κοινότητας σε αειφόρο, όπως αναλυτικό πρόγραμμα και η συνεργασία με συναδέλφους.

Ο εκπαιδευτικός ως αναμορφωτής διανοούμενος

Το αειφόρο σχολείο προωθεί το πέρασμα από την παθητική αναπαραγωγή πραγματολογικών γνώσεων των κεντρικά σχεδιασμένων αναλυτικών προγραμμάτων στη δημιουργία μαθησιακών καταστάσεων οι οποίες αφορούν τοπικά πλαίσια δράσης, συγκρουσιακά κοινωνικά ζητήματα και κριτική προσέγγιση της υπάρχουσας γνώσης. Με άλλα λόγια ο ρόλος των εκπαιδευτικών δεν περιορίζεται στην απλή διεκπεραίωση των προκαθορισμένων αναλυτικών προγραμμάτων, αλλά οι εκπαιδευτικοί θα πρέπει κατ' αρχήν να θέσουν σοβαρά ερωτήματα σχετικά με το «τι» θα διδάξουν, «πως» θα το διδάξουν και ποιοι είναι οι «γενικοί στόχοι» οι οποίοι θα πρέπει να κατευθύνουν τη διδασκαλία τους. Το αίτημα για το ρόλο του εκπαιδευτικού ως «αναμορφωτή διανοούμενου» (transformative intellectual) φαίνεται να συναντιέται και σε ένα βαθμό να διευρύνει τις αρχές του αειφόρου σχολείου (Aronowitz & Giroux 1993). Ο Giroux (1988) βασιζόμενος στην αντίληψη για το διανοούμενο του Freire και του Gramsi ότι όλοι οι άνθρωποι ανεξάρτητα από την κοινωνική και οικονομική τους θέση μπορούν να λειτουργήσουν ως διανοούμενοι στο βαθμό που συνεχώς ερμηνεύουν και σημασιοδοτούν την εμπειρία τους και τη θέση τους στον κόσμο, υποστηρίζει ότι θα πρέπει να αναθεωρηθούν οι παραδόσεις και οι συνθήκες εκείνες οι οποίες περιορίζουν τους εκπαιδευτικούς από το να είναι ενεργοί και αναστοχαστικοί διανοούμενοι κατά την εκπαιδευτική πράξη. Οι εκπαιδευτικοί θα πρέπει να έχουν τη δυνατότητα να αναστοχαστούν κριτικά γύρω από τα αναλυτικά προγράμματα (φανερά και κρυφά), τη διαμόρφωση της εκπαιδευτικής πολιτικής σε τοπικό και κεντρικό επίπεδο, τη μορφή και το περιεχόμενο των σχολικών κειμένων, αλλά και τις δικές τους προσωπικές ιδεολογίες και τις εργασιακές σχέσεις μέσα στις οποίες δραστηριοποιούνται. Η μάθηση δεν περιορίζεται στη μετάδοση βασικών δεξιοτήτων και γνώσεων, αλλά ο ρόλος του εκπαιδευτικού ως αναμορφωτή διανοούμενου είναι να ανακαλύψει με τους μαθητές και τις μαθήτριες του τις αιτίες των φαινομένων και να δημιουργήσει διασυνδέσεις ανάμεσα σε γεγονότα και καταστάσεις προκειμένου να ερμηνεύσουν κριτικά το πλαίσιο μέσα στο οποίο ζουν.

Οι σκεπτόμενοι ενεργοί πολίτες δεν είναι δυνατό να έχουν εκπαιδευθεί μέσα σε εκπαιδευτικές κοινότητες οι οποίες απαρτίζονται από εκπαιδευτικούς οι οποίοι ως επαγγελματίες δεν παρέχουν το πρότυπο του πολίτη στο οποίο στοχεύουν μέσα από τη διδασκαλία τους. Και αν το αίτημα για την αναθεώρηση τόσο του ρόλου του εκπαιδευτικού όσο και του περιεχόμενου της μάθησης στην κατεύθυνση του κοινωνικού μετασχηματισμού ήταν μέχρι τώρα σημαντικά ζητούμενα της κριτικής εκπαίδευσης, σήμερα γίνονται επιτακτικά αιτήματα, γιατί οι μαθητές/τριες του εκπαιδευτικού που δρα ως αναμορφωτής διανοούμενος είναι εν δυνάμει πολίτες που έχουν την γνώση και τη δύναμη να αγωνιστούν για να κάνουν «την απογοήτευση μη πειστική και την ελπίδα εφικτή» (Giroux 1988, σ.128). Είναι με άλλα λόγια πολίτες που θα έχουν το ήθος να αγωνιστούν και να διεκδικήσουν κοινωνικές και πολιτικές λύσεις, γιατί θα έχουν εκπαιδευθεί μέσα από αντίστοιχες εκπαιδευτικές δομές.

Σχέσεις αναστοχασμού και συνεργασίας

Βασικός στόχος του αειφόρου σχολείου είναι η προσήλωση στη μάθηση για την οποία οι εκπαιδευτικοί νιώθουν υπεύθυνοι και αναζητούν τρόπους για συνεχή βελτίωση των μαθησιακών αποτελεσμάτων. Στο πλαίσιο του αειφόρου σχολείου οι εκπαιδευτικοί δεν είναι απλοί διεκπεραιωτές του αναλυτικού προγράμματος, αλλά εστιάζουν στην αναζήτηση πρακτικών για τη βελτίωση της μάθησης μέσα από συνεργατικές και αναστοχαστικές πρακτικές. Πρακτικές οι οποίες μπορούν να συμβάλλουν στην ανάπτυξη αναστοχαστικών συνομιλιών των εκπαιδευτικών μπορεί να είναι αλληλοπαρατήρηση, ομάδες μελέτης, θεματικές και διεπιστημονικές ομάδες, έρευνα δράσης κ.λ.π. (Dufour 1997). Η συνεργατική αναζήτηση πρακτικών για τη βελτίωση της γνώσης λειτουργεί και στην κατεύθυνση της επαγγελματικής ανάπτυξης για τους ίδιους τους εκπαιδευτικούς, μέσα στο πλαίσιο μιας επαγγελματικής κοινότητας η οποία είναι πρόθυμη να διερευνήσει τη διδακτική πρακτική των μελών της και να ενθαρρύνει τις συνομιλίες των εκπαιδευτικών σε θέματα διδακτικής και μάθησης. Κοινό χαρακτηριστικό όλων των προτεινόμενων πρακτικών είναι η προσήλωση στη συλλογικότητα και στον αναστοχασμό του εκπαιδευτικού έργου.

Οι σχέσεις συνεργατικότητας και αναστοχαστικής επικοινωνίας ανάμεσα στους εκπαιδευτικούς έχουν αναδειχθεί στη σχετική βιβλιογραφία καθοριστικοί παράγοντες για τη λειτουργία του αειφόρου σχολείου (Dufour 1997, Coppieters 2005, Fullan 1995 κ.ά.). Η διάθεση χρόνου για αναστοχασμό και η ανάπτυξη συνεργατικότητας έχει υποστηριχθεί ότι μπορεί να είναι ίσως και «η μοναδική χαρακτηριστική διαφορά ανάμεσα σε παραδοσιακές εκπαιδευτικές δομές και δομές που λειτουργούν ως κοινότητες μάθησης» (Dufour 1997, σ. 10). Οι συνεργατικές μορφές επικοινωνίας ανάμεσα στους εκπαιδευτικούς καθιστούν δημόσια αυτά που μέχρι τώρα έμεναν ιδιωτικά πίσω από τις κλειστές πόρτες διδασκαλίας: στόχοι, στρατηγικές, εκπαιδευτικά υλικά, ερωτήματα και ανησυχίες για τα μαθησιακά αποτελέσματα, τρόποι βελτίωσης της πρακτικής κ.λ.π. (Dufour 2004). Η προσπάθεια υπέρβασης της ατομικιστικής επαγγελματικής παράδοσης από τους εκπαιδευτικούς είναι καθοριστική αν το σχολείο στοχεύει στην ανάπτυξη μιας κοινότητας μάθησης βάση της οποίας είναι οι συνεργατικές σχέσεις. Δεν θα πρέπει να ξεχνάμε ότι ο εκπαιδευτικός διδάσκει με το παράδειγμα του και η συνεργασία είναι κατάσταση την οποία θα πρέπει να εμπνεύσει και όχι να παραγγείλει στους μαθητές/τριες.

Συμπερασματικά

Το αειφόρο σχολείο έχει τις αρχές και τα χαρακτηριστικά για τη διαμόρφωση μελλοντικών πολιτών οι οποίοι θα είναι ουσιαστικά ενεργοί. Ο ανταγωνισμός και ο ατομικισμός των παραδοσιακών εκπαιδευτικών δομών έρχεται σε αντίφαση με το αίτημα για ενεργούς πολίτες. Η συνεργασία, η αλληλεγγύη και οι συμμετοχικές διαδικασίες στη λήψη αποφάσεων θα πρέπει να γίνουν βίωμα των παιδιών από την παιδική τους ηλικία, αν πρόκειται τα παιδιά αυτά να εξελιχθούν σε πολίτες ικανούς να μετέχουν σε συλλογικότητες, να διεκδικούν και να περιφρουρούν τα δικαιώματα τους. Ο ρόλος του εκπαιδευτικού είναι καθοριστικός και δύσκολος

γιατί θα πρέπει να διδάξει με ένα τρόπο που δεν έχει διδαχθεί. Θα πρέπει επίσης να υπερβεί την ενσώματη αντίληψη του επαγγελματισμού ατομικισμού και «ενδημικής αβεβαιότητας» και να γίνει μέτοχος μιας κοινότητας όπου η επαγγελματική ανάπτυξη θα είναι αντίστοιχη και παράλληλη με τη μάθηση των μαθητών/τριών.

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Τοπικές Κοινότητες, Περιβαλλοντικά Προβλήματα και Εκπαίδευση για την Αειφόρο Ανάπτυξη

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Περίληψη

Το ζήτημα της ανάπτυξης των τοπικών κοινοτήτων μέσα από διαδικασίες συμμετοχής σε κοινή δράση, με αφορμή σημαντικά περιβαλλοντικά προβλήματα αναγνωρίστηκε ως κυρίαρχο στις παγκόσμιες διασκέψεις για το περιβάλλον. Είκοσι χρόνια μετά τη διάσκεψη του Ρίο η ανάγκη για συλλογική δράση μέσα από κοινότητες μικρής κλίμακας παραμένει ως ζητούμενο. Η περίπτωση μικρής κοινότητας σε νησί του Αιγαίου που έθεσε ως στόχο την παύση της καύσης των απορριμμάτων σε παρακείμενη χωματερή αποτελεί αντικείμενο της έρευνας. Οι σχέσεις των μελών της κοινότητας, οι διαδικασίες κοινής δράσης και ιδιαίτερα οι μηχανισμοί σχηματισμού συλλογικότητας μέσα από την ενδυνάμωση ατόμων και ομάδας θέτουν το ερευνητικό πλαίσιο. Ερευνάται η συμβολή της μη τυπικής περιβαλλοντικής εκπαίδευσης στην επίτευξη του στόχου. Η έρευνα που άρχισε πρόσφατα εξετάζει σε αυτή την πρώτη φάση την εξέλιξη της «ιστορίας» μέσα από γραπτά κείμενα και προφορικές μαρτυρίες.

Λέξεις κλειδιά: Μη τυπική εκπαίδευση, Ενδυνάμωση, Τοπική κοινότητα, Διαχείριση απορριμμάτων

Abstract

The issue of local communities' development through processes of participation in common action, on the occasion of important environmental problems, was prevalent in the worldwide conferences on the environment. Twenty years after the Rio conference, the need for collective action through small scale communities is a burning issue. The subject of the research is the case of a small community on an Aegean island that set as a target to stop the combustion of waste in the adjacent landfill and achieved it. The relations between the members of the community, the processes of common action and particularly the mechanisms of collectiveness through the empowerment of both individual and community compose the framework of the research. The contribution of non- formal environmental education in the achievement of the goal is inquired. The research that has recently begun examines, at this first phase, the development of the "story" through written texts and oral testimonies.

Key-words: Non-formal education, Empowerment, Local Community, Waste management

Εισαγωγή

Είκοσι χρόνια μετά την παγκόσμια Διάσκεψη του Ρίο για την προστασία της γης, η πραγματικότητα επικυρώνει τη σημασία κειμένων όπως η Ατζέντα 21. Σύμφωνα με το κείμενο αυτό οποιαδήποτε πρακτική για την εφαρμογή της αειφορίας, κρίνεται ως αναποτελεσματική, αν δεν αγκαλιάζει τις τοπικές κοινότητες, τις ανησυχίες και τις φιλοδοξίες τους. Με αυτόν τον τρόπο οι μικρές κοινότητες τοποθετούνται στον πυρήνα της αειφορίας. Η Ατζέντα 21 αναγνώρισε ότι οι περισσότερες προκλήσεις της αειφορίας έχουν τοπική ρίζα, απαιτώντας την εμπλοκή των τοπικών κοινοτήτων για τη βελτίωση της πληροφόρησης και τη συμμετοχή τους στο διάλογο. Τα αποτελέσματα μιας τέτοιας διαδικασίας μέσω κοινοτικών προγραμμάτων εκπαίδευσης μπορούν να συμβάλλουν σε έναν περισσότερο βιώσιμο κόσμο (Tilbury, 2008). Επιπλέον, θεωρείται αναγκαία η

μεταβίβαση της ευθύνης λήψης αποφάσεων και εξουσιών στις πολύ απλούστερες δομές των μικρών τοπικών κοινοτήτων, με στόχο την ανάδειξη της τοπικότητας και του ρόλου της για τις μελλοντικές εξελίξεις. Η Τοπική Agenda 21, στο κεφάλαιο 28 εξειδικεύει τους στόχους του προγράμματος και τις μεθόδους υλοποίησής τους (UN-DESA,1992).

Για την ελληνική πραγματικότητα, ο Δημητρακόπουλος (2005) προτείνει έναν οδηγό για την εφαρμογή της τοπικής Agenda 21 στην Τοπική Αυτοδιοίκηση. Ωστόσο η εφαρμογή της στην πράξη χωλαίνει, ιδιαίτερα σε νησιωτικές περιοχές (Χατζηπαρασκευαΐδης, χ.χ.). Τα αναδυόμενα ερωτήματα σχετίζονται με τα μέσα υποστήριξης της Agenda 21:

- Ποια είναι άραγε εκείνα τα μυστικά μονοπάτια που πρέπει να ακολουθήσουν οι άνθρωποι ώστε να φτάσουν στην επίτευξη της αειφορίας;

- Με ποιο τρόπο οι τοπικές κοινότητες θα εμπλακούν σε διαδικασίες λήψης αποφάσεων;

- Τι ρόλο μπορεί να διαδραματίσει η εκπαίδευση στην περίπτωση αυτή και με ποιους τρόπους οι άνθρωποι μιας κοινότητας επιστρέφουν στην εκπαιδευτική διαδικασία; Ή, τελικά,

- Υπάρχει μια θεμελιώδης σχέση που να συνδέει άμεσα τη διαδικασία αυτή με την Περιβαλλοντική Εκπαίδευση;

Παρά τη σημαντική απόσταση μεταξύ των διαφόρων θεωρητικών σχημάτων και της εφαρμογής τους, κάποια μικρά, αλλά σημαντικά παραδείγματα δείχνουν να φωτίζουν αυτό το δύσβατο δρόμο, επαναφέροντας στη συζήτηση, χαμένες δημοκρατικές διαδικασίες.

Περιβαλλοντικά προβλήματα – διαχείριση απορριμμάτων

Τα παγκόσμια περιβαλλοντικά προβλήματα βαίνουν σταθερά επιδεινούμενα λόγω της διαρκώς αυξανόμενης επίδρασης που ασκούν οι άνθρωποι στους βιογεωχημικούς κύκλους του πλανήτη και στα οικοσυστήματα, αγνοώντας τις φυσικές δυναμικές διεργασίες της γης. Η έρευνα που διεξάγεται παγκοσμίως, η δημοσιοποίησή των προβλημάτων από τα μέσα ενημέρωσης, η αυξανόμενη δημόσια ευαισθητοποίηση, οι εκστρατείες ομάδων πίεσης και οι διεθνείς συμφωνίες φαίνεται να μη συνιστούν ικανές συνθήκες για την επίλυσή τους (Harris, 2004).

Μεταξύ των πολλών περιβαλλοντικών προβλημάτων, αυτό της παραγωγής και απόθεσης ολοένα και μεγαλύτερων ποσοτήτων απορριμμάτων και αποβλήτων εν γένει, θεωρείται ως ένα από τα σοβαρότερα. Οι ρυθμοί παραγωγής τους στις σύγχρονες βιομηχανικές κοινωνίες ξεπερνούν τη δυνατότητα των οικοσυστημάτων να τα αφομοιώσουν γρήγορα με φυσικές διεργασίες, με αποτέλεσμα τη συσσώρευση τεράστιων όγκων, που αποτελούν πλέον μείζον πρόβλημα. Σημαντικό ρόλο για την επιδείνωση της κατάστασης παίζει, μεταξύ άλλων, η αλλαγή καταναλωτικών συμπεριφορών και προτύπων (Σκούλλος, 2003). Η ανεξέλεγκτη απόρριψη τους, λόγω των επικίνδυνων ρύπων που περιέχονται σε αυτά, μπορεί να οδηγήσει σε κατάρρευση οικοσυστημάτων. Οι ρύποι αυτοί είτε εξατμίζονται, είτε φτάνουν σε επιφανειακά ή υπόγεια ύδατα εισχωρώντας τελικά στις τροφικές αλυσίδες μέσω των φυτών (Γεωργόπουλος, 2005).

Στην Ελλάδα το ζήτημα της διαχείρισης των στερεών αποβλήτων κατείχε μία από τις τρεις πρώτες θέσεις στα συχνότερα αναγραφόμενα περιβαλλοντικά προβλήματα στον ελληνικό τύπο (Tsekos & Matthopoulos; 2008). Ωστόσο οι Έλληνες σε αντίθεση με τους υπολοίπους Ευρωπαίους, θεωρούν την αύξηση των παραγόμενων αποβλήτων ως ήσσονος σημασίας ζήτημα (Eurobarometer, 2008). Η διαχείριση των αποβλήτων παραμένει δυσεπίλυτο πρόβλημα, αφού σε μεγάλο βαθμό αυτά αποτίθενται είτε σε ανεξέλεγκτες χωματερές ή σε ελεγχόμενους χώρους υγειονομικής ταφής. Για πολλά χρόνια η καύση των απορριμμάτων, με σκοπό τη μείωση του όγκου τους, αποτέλεσε συνήθη πρακτική στις περισσότερες περιοχές της χώρας, χωρίς να λαμβάνονται υπόψη οι επικίνδυνες για το περιβάλλον και τη δημόσια υγεία επιπτώσεις. Μεταξύ αυτών είναι η παραγωγή διοξινών, όπως τα φουράνια και τα κλοφέν, που ευθύνονται για διάφορα είδη καρκίνου, διαβήτη, καρδιαγγειακές νόσους, επιδράσεις στη λειτουργία του νευρικού συστήματος κ.ά. (Ψωμάς, 2005). Έρευνες που έγιναν σε περιοχές όπου καίγονταν ανεξέλεγκτα στερεά απόβλητα (π.χ. Κουρουπητός, Ταγαράδες) έδειξαν υψηλές συγκεντρώσεις επικίνδυνων τοξικών ουσιών (Martens et al, 1998, Vassiliadou et al.,2009). Η Ευρωπαϊκή Επιτροπή τον Οκτώβριο του 2010 κάλεσε την Ελλάδα να συμμορφωθεί με την προηγούμενη απόφαση. Σύμφωνα με τα πλέον πρόσφατα στοιχεία εξακολουθούν να λειτουργούν περίπου 316 παράνομες

χωματερές και 429 βρίσκονται ακόμα σε διαδικασία αποκατάστασης (Ε.Ε., 2010, Αναφορά IP/10/1417)

Για το ζήτημα της διαχείρισης των αποβλήτων έχουν υπάρξει σε διαφορετικές περιόδους. οργανωμένες αντιδράσεις κοινωνικών ομάδων και κινήσεων μικρής ή μεγαλύτερης κλίμακας. Τέτοιες ήταν π.χ. οι περιπτώσεις του ποταμού Καλαμά στην Ήπειρο, της Χίου, του Βόλου, των Άνω Λιοσίων κ.ά. Οι διαμαρτυρίες αυτές αντικατοπτρίζουν την ανησυχία των τοπικών κοινοτήτων για την εύθραυστη σχέση μεταξύ της ποιότητας των περιορισμένων φυσικών πόρων, του υψηλού βαθμού εξάρτησης από την τοπική οικονομία και της δημόσιας υγείας (Kousis, 2003). Σε αρκετές περιπτώσεις, όπως τις πρόσφατες στο Γραμματικό και την Κερατέα, οι αντιδράσεις των κατοίκων αφορούσαν σε εγκαταστάσεις χώρων υγειονομικής ταφής αποβλήτων στην περιοχή τους. Ένας απλουστευμένος τρόπος ερμηνείας των αντιδράσεων αυτών είναι η επίκληση του φαινομένου NIMBY (Not In My Back Yard), υπονοώντας έτσι τον ατομισμό και τη διαφύλαξη των προσωπικών συμφερόντων των αντιδρώντων. Σχετικές έρευνες όμως δείχνουν ότι οι πολίτες, με αφορμή το πρόβλημα της διαχείρισης των απορριμμάτων θέτουν ζητήματα ισότητας, δικαιοσύνης και έλλειψης εμπιστοσύνης στους κρατικούς αξιωματούχους και τους ειδικούς επιστήμονες (Botetzagias,2009).

Τοπικές κοινότητες και εκπαίδευση για την αειφορία

Αρκετοί ερευνητές όπως π.χ. η Andrea Deri (2005) ή ο Geoff Fagan (2009) αμφισβητούν τη δυνατότητα του τυπικού εκπαιδευτικού συστήματος να λειτουργήσει ενισχυτικά για τις τοπικές κοινότητες. Η τυπική εκπαίδευση υφίσταται κριτική, μεταξύ άλλων, για τη μη εφαρμογή δημοκρατικών διαδικασιών λόγω και της ιεραρχικής δομής της, για την αποτυχία της να προσφέρει ευκαιρίες σε κοινωνικά ευάλωτα και μη προνομιούχα στρώματα και για τον προσανατολισμό της στους κανόνες της αγοράς (Aronowitz & Giroux, 1987, Mc Laren, 1998). Ο David Orr (2004) περισσότερο δηκτικός, αναρωτιέται: "γιατί θέλετε να κάνετε την τυπική εκπαίδευση επαρκέστερη όταν ξέρουμε ότι το λάθος δεν έγκειται σε κάποια ανεπάρκεια της δομής αλλά στο ίδιο το εκπαιδευτικό σύστημα". Σύμφωνα με τον ίδιο συγγραφέα τα σύγχρονα προγράμματα σπουδών περιέχουν ελάχιστα σχετικά με την ενεργό πολιτότητα. Εκτιμά ότι τα επείγοντα περιβαλλοντικά προβλήματα μπορούν να λυθούν μόνο αν περισσότεροι άνθρωποι αποκτήσουν μια καλύτερη ιδέα για το τι σημαίνει να είσαι πολίτης, συμπληρώνοντας ότι αυτό θα έπρεπε να διδάσκεται σε όλες τις βαθμίδες της εκπαίδευσης.

Ως αποτελεσματικότερο, εν αντιθέσει με το προηγούμενο, προτείνεται το μοντέλο της μη-τυπικής εκπαίδευσης ή της μάθησης η οποία βασίζεται στην κοινότητα. Η μη τυπική εκπαίδευση προσφέρει τη δυνατότητα σύνδεσης της πραγματικότητας με την ανάγκη των πολιτών για γνώση και κατανόηση. Όταν ο έλεγχος της προσφερόμενης γνώσης μεταβιβάζεται στο επίπεδο της κοινότητας, οι πολίτες αποκτούν αυτοπεποίθηση, ελέγχουν τον τόπο τους και τη διοίκηση, αναπροσανατολίζοντας έτσι την εκπαίδευση προς την κατεύθυνση της αειφόρου ανάπτυξης. Ο ρόλος των τοπικών κοινοτήτων στο χώρο της εκπαίδευσης θεωρείται σημαντικός για την προώθηση της αειφόρου ανάπτυξης μέσω της συλλογικής διά βίου μάθησης[1]. Η υπευθυνότητα μεταφέρεται από τους επαγγελματίες εκπαιδευτικούς προς τους άλλους πολίτες με τη χρήση νέων τρόπων προσέγγισης της κοινωνικής, οικονομικής και περιβαλλοντικής ανάπτυξης, οι οποίοι, όπως αναφέρει χαρακτηριστικά η Deri (ο.π.) «μπορεί να απειλήσουν το κατεστημένο». Το εκπαιδευτικό σύστημα που προέκυψε από τη βιομηχανική εποχή, αντιστέκεται στην ιδέα αυτή ή την αγνοεί. Η μετάβαση από την εκπαίδευση στη μάθηση γίνεται πιο εμφατική όταν ο έλεγχος του τι και πώς θα διδαχθεί αποκεντρώνεται και μεταβιβάζεται σταδιακά στο επίπεδο της κοινότητας. Παράλληλα, μια μαθητοκεντρική κουλτούρα προσφέρει αυτοπεποίθηση στους πολίτες κάνοντάς τους ικανούς να ελέγχουν τον τόπο τους και την αυτοδιοίκηση. Όταν η μάθηση έχει εγγενή κίνητρα (π.χ. επίλυση τοπικών προβλημάτων, ή αναζήτηση πιο βιώσιμων λύσεων), ο

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[1] **Διά βίου μάθηση:** Μια συνειδητή και συνεχής μαθησιακή διαδικασία, από τη γέννηση ως το θάνατο, προκειμένου να ξανα-μαθευτεί και να ξε-μαθευτεί η υπάρχουσα γνώση και να δομηθεί νέα γνώση με τη χρήση κάθε είδους μάθησης (τυπικής-μη τυπικής-άτυπης).

μετασχηματισμός ενός ανθρώπου σε δια βίου μαθητή γίνεται με ταχείς ρυθμούς. Αν οι εξωσχολικές μαθησιακές ευκαιρίες δεν αναγνωρίζονται απλώς, αλλά νομιμοποιούνται και ενθαρρύνονται, ο νέος αυτός θεσμός μπορεί να γίνει ανταγωνιστικός. Με αυτό τον τρόπο η εκπαίδευση μπορεί να αναπροσανατολιστεί στη βιώσιμη ανάπτυξη Deri (ο.π.).

Η εκπαίδευση που αφορά σε περιβαλλοντικά ζητήματα θα πρέπει να στηρίζεται σε πρωτοβουλίες των κατοίκων των τοπικών κοινοτήτων, ερευνώντας τα τοπικά προβλήματα. Όσο περισσότερο διαφορετικά είναι τα κοινοτικά προγράμματα εκπαίδευσης, τόσο περισσότεροι δεσμεύονται από το τοπικό πλαίσιο και κατευθύνονται από την κοινοτική γνώση. Οι παρεχόμενες ευκαιρίες συμβάλλουν στη βελτίωση της πληροφόρησης, την πρόσκληση για συμμετοχή, την καλλιέργεια ηγετικής ικανότητας και την ενθάρρυνση της δημοκρατικής λήψης αποφάσεων ως τμήμα μιας διαδικασίας δια βίου μάθησης. Κλειδί για μια τέτοιας μορφής κοινοτική συμμετοχή αποτελεί η μεταβίβαση του ελέγχου της διαδικασίας μάθησης στους ίδιους τους εκπαιδευόμενους. Αφετηρία της διαδικασίας αυτής μπορεί να αποτελέσει ο προσδιορισμός των προβλημάτων και να καταλήξει στην αναζήτηση λύσεων και την ανάπτυξη δράσης. Αυτό επιτρέπει στους εκπαιδευόμενους να γίνουν περισσότερο "μετασχηματιστικά σκεπτόμενοι" ικανοί να σκεφτούν το μέλλον, να διαπραγματευτούν, και να αναλάβουν δράση αυτενεργώντας. (Tilbury, 2008).

Παρότι η υποστήριξη από τις κυβερνήσεις είναι σημαντική, οι τοπικές κοινότητές, μέσω των εκπαιδευτικών προγραμμάτων που μπορούν να διοργανώσουν, αποκτούν τη δυνατότητα να παροτρύνουν αποτελεσματικότερα τους ανθρώπους για συμμετοχή και δράση. Τα κοινοτικά προγράμματα εκπαίδευσης μπορούν να εξοπλίσουν ανθρώπους όλων των γενεών με δεξιότητες που εκτείνονται πέρα από την τυπική εκπαίδευση, να καλλιεργήσουν ατομικές και συλλογικές ικανότητες για συμμετοχή και δράση προς ένα περισσότερο βιώσιμο μέλλον (Robottom, 2004).

Ο Fagan (1996) προτείνει έναν αναπροσανατολισμό προς την εκπαίδευση εκείνη που δεν είναι ουδέτερη και θεωρείται κατάλληλη για την Ατζέντα 21. Ένα είδος εκπαίδευσης που έχει δεσμευτικά δημοκρατικό και διαπραγματευτικό σκοπό και βοηθά στην επίλυση προβλημάτων, στην καλύτερη κατανόηση των ζητημάτων και την εποικοδομητική στοχαστική δράση. Η βασισμένη στη δράση εκπαίδευση αντιμετωπίζει τους ανθρώπους με την πραγματικότητα της τοπικότητας τους, αξιολογεί αυτό που συμβαίνει αληθινά στο στενό τους περιβάλλον και τους βοηθά να απαιτήσουν αλλαγή και να αναλάβουν δράση. Η προσέγγιση αυτή επιμένει σε νέους ορισμούς της γνώσης και συνδέει τη γνώση με την εφαρμογή της. Δέχεται ότι οι τοπικοί πληθυσμοί, οι γονείς και οι νέοι είναι απολύτως ικανοί να αφομοιώσουν τη βοήθεια και την υποστήριξή που τους δίνεται για μάθηση με αυτό τον τρόπο. Επιδιώκει την αποδοχή του είδους της γνώσης, που παράγεται και επικυρώνεται. Αντιτίθεται στη λογική της μοναδικής κατοχής της γνώσης από τους διανοούμενους και της κυριαρχίας της εκπαιδευτικής ιεραρχίας στη μάθηση. Αυτός ο αναπροσδιορισμός της εκπαιδευτικής διαδικασίας θεωρείται ως ο μόνος τρόπος για να επιστρέψει η μεγάλη πλειοψηφία των ενηλίκων και των νέων στην εκπαίδευση. Η αποτελεσματική συμμετοχή τους σε μια τέτοια εκπαιδευτική διαδικασία έχει σημασία και σκοπό για αυτούς και συμβάλλει στην εφαρμογή της αειφορίας.

Οι πολίτες, μέσω διαδικασιών ενδυνάμωσης (empowerment), οικοδόμησης ικανότητας (capacity building) και διατύπωσης του δικού τους λόγου (discourse), οργανώνονται, απελευθερώνονται και διεκδικούν καλύτερη ποιότητα ζωής (Fagan, 2009). Με αυτό τον τρόπο μπορεί να καταλήξουν στη δράση ή την Πράξη, με τον τρόπο που χρησιμοποιεί τον όρο ο Φρέιρε (2005), δηλαδή το συνδυασμό ακτιβισμού και σοβαρής διανοητικής δραστηριότητας.

Η έννοια της ενδυνάμωσης

Για τον ορισμό της ενδυνάμωσης θα πρέπει να λαμβάνεται υπόψη το εκάστοτε πλαίσιο στο οποίο αυτή εξετάζεται. Τα πεδία εξέτασής της είναι πολλά και διαφορετικά. Ο όρος συναντάται στην ψυχολογία, στην εκπαίδευση, στην κοινοτική ανάπτυξη, στα οικονομικά, στα κοινωνικά κινήματα και τις οργανώσεις, και σε ακόμη περισσότερα και διαφορετικά πεδία. Είναι ευκολότερο σύμφωνα με τον Rappaport (1984) να ορίσει κανείς την ενδυνάμωση μέσω της απουσίας της, παρά να εξηγήσει ή να ορίσει την έννοια αυτή. Ωστόσο ο ίδιος συγγραφέας όρισε την ενδυνάμωση

(Rappaport, ο.π.) ως: *το μηχανισμό με τον οποίο άνθρωποι, οργανισμοί και κοινότητες αποκτούν κυριότητα στη ζωή τους.* Με αυτόν τον ορισμό η ενδυνάμωση εξετάζεται ως διαδικασία η οποία συμβαίνει σε πολλαπλά κοινωνικά επίπεδα ανάλυσης (ατομικό, κοινοτικό και επίπεδο οργάνωσης).

Ο Zimmerman (1984) αποφεύγει να δώσει ένα συγκεκριμένο ορισμό θεωρώντας ότι με έναν τέτοιο τρόπο η έννοια της ενδυνάμωσης τυποποιείται δημιουργώντας αντιφάσεις για την ίδια τη σύλληψή της. Θεωρεί ότι ο Rappaport με τον προηγούμενο ορισμό δεν παρέχει λεπτομέρειες σχετικά με τη διαδικασία που διαπερνά τα διάφορα επίπεδα ανάλυσης.. Αυτοί οι θεμελιώδεις ορισμοί θεωρούν ως βασικά συστατικά του οικοδομήματος της ενδυνάμωσης τη συλλογικότητα για την επίτευξη στόχων, τις προσπάθειες για πρόσβαση στους πόρους και μία κριτική κατανόηση του κοινωνικοπολιτικού περιβάλλοντος. Εφαρμόζοντας αυτό το γενικό πλαίσιο σε ένα οργανωτικό επίπεδο ανάλυσης προϋποτίθεται ότι η ενδυνάμωση μπορεί να περιλαμβάνει οργανωτικές διαδικασίες και δομές που τονίζουν τη συμμετοχή των μελών και βελτιώνουν την οργανωτική αποτελεσματικότητα για την επίτευξη των στόχων. Στο κοινοτικό επίπεδο ανάλυσης η ενδυνάμωση μπορεί να αναφέρεται στη συλλογική δράση για τη βελτίωση της ποιότητας ζωής σε μια κοινότητα και στις διασυνδέσεις μεταξύ των οργανισμών της κοινότητας. Η οργανωτική και η κοινοτική ενδυνάμωση εντούτοις δεν είναι απλά η συνάθροιση πολλών ενδυναμωμένων ατόμων (Zimmerman,ο.π.).

Επικριτικός στην έννοια της ατομικής ενδυνάμωσης εμφανίζεται ο Fagan (2009), όταν αυτή προβάλλει ως μοναδική αξία τον ατομισμό, θεωρώντας ότι η αντίληψη αυτή ως περιοριστική αποτυγχάνει να αναγνωρίσει την ανάγκη των ανθρώπων να αναζητήσουν την ταυτότητα και την ασφάλεια στο κοινοτικό ανήκειν. Πιστεύει ότι αυτός ο ατομικιστικός καθορισμός της ενδυνάμωσης εναρμονίζεται με το φιλελεύθερο παράδειγμα της αυτοπραγμάτωσης (self-actualisation), ένα περιορισμένο είδος ενδυνάμωσης, που στοχεύει μόνο στην ατομική εκπλήρωση, και αφετέρου, περιορίζει την πιθανότητα εφαρμογής της δράσης της ενδυνάμωσης σε ολόκληρες κοινότητες. Η ατομική ενδυνάμωση μέσα στα όρια του κοινού καλού μπορεί να χρησιμοποιηθεί ως βάση της αξίας στην οποία πραγματοποιείται. Σημαντικό στοιχείο σε αυτή την περίπτωση αποτελεί η ανάγκη να περιληφθεί και η ενδυνάμωση και η κοινότητα σε οποιοδήποτε ορισμό εργασίας, με τρόπο ώστε η ατομική φιλοδοξία και η ταυτότητα να μπορούν να ενθαρρυνθούν και να ενισχυθούν αλλά μέσα σε ένα πλαίσιο που να εξασφαλίζει την ενδυνάμωση στην ηθική θέση της μέσα στα όρια του κοινού αγαθού (Fagan, op. cit.).

Τη σχέση ατομικής-κοινοτικής ενδυνάμωσης αναπτύσσει η Riger (1993) δηλαδή το συνδυασμό της ατομικής (κυριότητα, έλεγχος) με τη "συλλογική" (κοινότητα, οικογένεια και ανήκειν) ενδυνάμωση. Υποστηρίζει ότι η ιδεολογική και θεσμική αλλαγή είναι απαραίτητη για να επιτρέψει την αποτελεσματική συμμετοχή στην πολιτική διαδικασία. Διαφορετικά, το να περιμένεις είναι σαν να οικοδομείς μια "λανθάνουσα συνείδηση" - την αφελή πεποίθηση ότι η αυτό-ενδυνάμωση θα οδηγήσει απαραιτήτως στην αλλαγή.

Το ζήτημα της αλλαγής σε ατομικό επίπεδο θέτουν και οι Page & Czuba (1999), θεωρώντας ότι αποτελεί τη γέφυρα για τη συνδεσιμότητα της κοινότητας και την κοινωνική αλλαγή. Για τη δημιουργία της αλλαγής πρέπει να αλλάξουμε ατομικά ώστε να είμαστε ικανοί συμμετέχοντες στην επίλυση των σύνθετων ζητημάτων που αντιμετωπίζουμε. Αυτή η σύνθεση ατομικής και συλλογικής αλλαγής μας δίνει τη δυνατότητα να κατανοήσουμε τη διαδικασία της ενδυνάμωσης. Πρόκειται για μια κρίσιμη μετάβαση ή διασύνδεση μεταξύ του ατομικού και του κοινοτικού ή του κοινωνικού που μπορούν να γίνουν ανεκτίμητα για τους ανθρώπους και τις κοινότητες. Η ενδυνάμωση αντιμετωπίζεται ως πολυεπίπεδη κοινωνική διεργασία που βοηθά τους ανθρώπους να αποκτήσουν έλεγχο στη ζωή τους και καλλιεργεί τη δύναμη που χρειάζονται ώστε να τη χρησιμοποιήσουν στη ζωή τους, στην κοινότητά τους και στην κοινωνία, δρώντας για θέματα που θεωρούνται σημαντικά. Οι διαστάσεις που λαμβάνει μπορεί να είναι η κοινωνική, η ψυχολογική, η οικονομική και άλλες. Συμβαίνει επίσης σε διαφορετικά επίπεδα όπως το ατομικό, το ομαδικό και το κοινοτικό. Είναι εξ ορισμού μια κοινωνική διεργασία η οποία συμβαίνει σε συνάρτηση με τους άλλους, αφού το άτομο και η κοινότητα είναι θεμελιωδώς συνδεδεμένα Page & Czuba (1999)

Το Cornell Empowerment Group (1989), στο Foulke et al (2000)   δίνει έναν ορισμό της ενδυνάμωσης που αφορά στην κοινότητα κάνοντας λόγο για το ρόλο της εκπαίδευσης:

Η ενδυνάμωση είναι μια σκόπιμη, προοδευτικά συνεχής διαδικασία στο επίκεντρο της τοπικής κοινότητας, που περιλαμβάνει αμοιβαίο σεβασμό, κριτικό στοχασμό, φροντίδα και συμμετοχή στην ομάδα, μέσω της οποίας οι άνθρωποι που υπολείπονται μιας ίσης κατανομής πόρων αποκτούν μεγαλύτερη πρόσβαση και ασκούν έλεγχο σε αυτούς τους πόρους.
διασαφηνίζοντας ότι: Ως πόρους θεωρούμε την πολιτική ισχύ, την αγοραστική δύναμη, την πληροφόρηση, την κοινωνική στήριξη και τις δεξιότητες που προέρχονται από την εκπαίδευση, μαζί με τη συνακόλουθη κοινωνική κατάσταση.

Κοινοτική ενδυνάμωση

Ενδυναμωμένη κοινότητα είναι αυτή που καταβάλλει προσπάθειες βελτίωσης των αντιδράσεων της απέναντι σε απειλές για την ποιότητα ζωής των μελών της και που παρέχει ευκαιρίες για συμμετοχή. Η δομή και οι σχέσεις μεταξύ των οργανισμών της κοινότητας και των αντιπροσωπειών της βοηθά στον καθορισμό της έκτασης στην οποία ενδυναμώνεται μια κοινότητα. Μια ενδυναμωμένη κοινότητα περιλαμβάνει διασυνδεδεμένους οργανισμούς, π.χ. συνασπισμούς που είναι ενδυναμωμένοι ή που ενδυναμώνονται. Αυτό απαιτεί προσβασιμότητα στους πόρους για όλα τα μέλη της κοινότητας και ίσες ευκαιρίες συμμετοχής. Οι διαδικασίες ενδυνάμωσης σε μια κοινότητα περιλαμβάνουν επίσης ένα ανοιχτό σύστημα διακυβέρνησης που λαμβάνει σοβαρά υπόψη τις στάσεις και τις ανησυχίες των μελών της και περιλαμβάνει ισχυρή ηγεσία που αναζητά συμβουλές και βοήθεια από τα μέλη της κοινότητας (Zimmerman, in Rappaport, 2000).
Ένα παράδειγμα ενδυνάμωσης της κοινότητας παρέχεται από τους O'Sullivan, Waugh & Espeland (1984). Αναφέρεται σε μελέτη περίπτωσης επιτυχούς προσπάθειας μιας αυτόχθονης Αμερικάνικης κοινότητας να σταματήσει την μετεγκατάστασή των μελών της. Η ομοσπονδιακή κυβέρνηση αποφάσισε την κατασκευή ενός φράγματος που θα πλημμύριζε τη γη της φυλής τους. Οι Ινδιάνοι του Φορτ Μακντάουελ Γιαβαπάι, μιας κοινότητας μόνο 350 ατόμων, πάλεψαν με τα συμφέροντα των εταιρειών και τις αντιπροσωπίες της ομοσπονδιακής κυβέρνησης για να εμποδίσουν το έργο. Οι προσπάθειές τους περιέλαβαν την αξιοποίηση μελετών της κοινότητας για την ψυχολογική επιρροή της μετεγκατάστασης, τη συνένωση με περιβαλλοντικές ομάδες και την εκμετάλλευση των μέσων ώστε να σταματήσουν τα σχέδια για την κατασκευή του φράγματος. Η περίπτωση αυτή αποτελεί παράδειγμα ενδυνάμωσης της κοινότητας γιατί τονίζει την πρόσβαση στα μέσα, τους συνασπισμούς μεταξύ οργανισμών και την κριτική ενημέρωση των κατοίκων με στόχο την επιρροή των αιτίων που προκάλεσαν το γεγονός.
Ο Zimmerman (1995) σημειώνει ότι η ενδυνάμωση είναι μια χωρίς τέλος κατασκευή, που μπορεί να μη γίνεται πλήρως αντιληπτή ως μια απλή λειτουργικότητα, με ομοιόμορφη εφαρμογή, επειδή μέσω της φύσης της παίρνει διάφορες μορφές σε ξεχωριστούς πληθυσμούς πλαίσια και χρόνους. Σε τελική ανάλυση η θεωρία της ενδυνάμωσης είναι μια προσπάθεια για παροχή ενός εννοιολογικού πλαισίου κατανόησης των διαδικασιών και των αποτελεσμάτων που συνδέονται με την αδιάκοπη μάχη που δίνουμε για να φέρουμε τη ζωή μας, τους οργανισμούς και τις κοινότητες πιο κοντά στα ιδανικά μας. Όσο πλησιέστερη είναι η αντιστοιχία μεταξύ των στόχων μας, της αίσθησης επίτευξής τους και της επιτυχίας των προσπαθειών μας, τόσο περισσότερο πλησιάζουμε στην ενδυνάμωση.
Στο κείμενο της Agenta 21 χρησιμοποιείται ο όρος της ενδυνάμωσης με αναφορά στις τοπικές κοινότητες μέσω της μορφής της αντιπροσωπευτικής εξουσίας και της υπευθυνότητας (Κεφ. 3.5.a). Γίνονται επίσης ειδικές αναφορές για την ενδυνάμωση του γυναικείου πληθυσμού (Κεφ. 5.16, 5.48), των παιδιών και της νεολαίας (Κεφ.25.14.c)

Αντικείμενο της έρευνας και ερευνητικές υποθέσεις

Η έρευνα αφορά στην περίπτωση ενός μικρού χωριού της Ικαρίας. Το χωριό ονομάζεται Καταφύγι και οι 100 περίπου κάτοικοι του αντέδρασαν στην καύση των απορριμμάτων του Δήμου της ευρύτερης περιοχής με συνολικό πληθυσμό 3.400 κατοίκους. Τα απορρίμματα καίγονταν σε χωματερή σε μικρή απόσταση από το χωριό για περισσότερο από 30 χρόνια, αδιάκοπα. Μετά από διαδικασίες ενημέρωσης, οργάνωσης και εκτίμησης του προβλήματος, διεκδίκησαν συλλογικά το δικαίωμα στην προστασία του τοπικού περιβάλλοντος και της υγείας τους, επιτυγχάνοντας με αγώνες την παύση της καύσης. Συγκεκριμένα, μετά από συνεχείς αναποτελεσματικές διαβουλεύσεις με φορείς (Δήμος και Πολιτεία), έγγραφες διαμαρτυρίες σε υπηρεσίες, συνελεύσεις κ.λ.π. οι κάτοικοι κατέλαβαν την είσοδο του Χώρου Ανεξέλεγκτης Διάθεσης Αποβλήτων (ΧΑΔΑ) τον Ιανουάριο του 2008, απαιτώντας να σταματήσει η καύση των απορριμμάτων. Αφορμή υπήρξε η δημοσιοποίηση των αποτελεσμάτων έρευνας του Δημόκριτου (Εργαστήριο Φασματομετρίας Μάζας και Ανάλυσης Διοξινών, ΕΦΑΜΑΔ 07/109-11/2007) που ανέφερε σχετικά υψηλές συγκεντρώσεις διοξινών και πολυχλωριωμένων διφαινυλίων σε δείγματα γάλακτος, τυριού και κρέατος, από αιγοπρόβατα που έβοσκαν σε περιοχές κοντά στη χωματερή. Παράλληλα, ενημερώθηκαν οι κάτοικοι και άλλων περιοχών του νησιού οι οποίοι ευαισθητοποιούμενοι συμπαραστάθηκαν, αφού το ίδιο πρόβλημα της καύσης σε χωματερές υπήρχε και στους άλλους δύο Δήμους της Ικαρίας. Οι κινητοποιήσεις των κατοίκων του χωριού με κορύφωση την κατάληψη του ΧΑΔΑ ανέδειξαν το σοβαρό πρόβλημα της διάθεσης των απορριμμάτων αναπτύσσοντας έναν σχετικό προβληματισμό στην ευρύτερη κοινότητα του νησιού. Θέματα όπως ανακύκλωση, δημιουργία Χώρου Υγειονομικής Ταφής Υπολειμμάτων (ΧΥΤΥ) τέθηκαν στις καθημερινές συζητήσεις των πολιτών. Ως πρώτο αποτέλεσμα της πίεσης που ασκήθηκε ήταν η λήψη απόφασης από το Δήμο για οριστική παύση της καύσης. Τον Ιούνιο του 2009 η Δημοτική αρχή, μετά από δημόσια συνέλευση αποφάσισε την εφαρμογή προγράμματος ανακύκλωσης, για πρώτη φορά στο νησί.

Η κοινότητα έχει επιδείξει και στο παρελθόν ανάλογη στάση αντιτασσόμενη στην εγκατάσταση λατομείου στην περιοχή. Χαρακτηρίζεται επίσης για τη συλλογικότητα των μελών της και την κοινή δράση τους σε πολιτιστικές και άλλες εκδηλώσεις.

Η έρευνα έχει ως σκοπό τη διερεύνηση των μηχανισμών συλλογικής διεκδίκησης και δράσης που οδήγησαν στην αντιμετώπιση του σοβαρού αυτού περιβαλλοντικού προβλήματος. Ένας από τους βασικούς άξονες της ερευνητικής υπόθεσης είναι η σχέση των μελών της κοινότητας με την εκπαίδευση εν γένει (τυπική, μη τυπική, άτυπη)[2] και ο βαθμός επίδρασής της στην προαναφερόμενη διαδικασία. Παράλληλα εξετάζεται ιστορικά η πορεία της τοπικής κοινότητας και των σχέσεων των μελών της σχετικά και με την ευρύτερη κοινωνική μετεξέλιξη της κοινωνίας του νησιού. Η συμβολή της περιβαλλοντικής ευαισθητοποίησης στην ανάπτυξη κοινωνικών κινημάτων, υπό το πρίσμα της εκπαίδευσης αποτελεί επίσης τμήμα της έρευνας. Επιμέρους ζητήματα όπως π.χ. πιθανές συγκρούσεις, εντάσεις, ύπαρξη ηγεμονικού λόγου ή ηγετών, όπως και. η ύπαρξη προηγούμενης εμπειρίας από συμμετοχή σε άλλες διεκδικητικές δράσεις για περιβαλλοντικά ή και άλλα ζητήματα διερευνώνται. Μέσω της επεξεργασίας του προφίλ τμήματος των συμμετεχόντων κατοίκων του χωριού στη δράση αυτή, διερευνάται, αν υπάρχει, «συνομιλία» της Περιβαλλοντικής Εκπαίδευσης με τα κοινωνικά κινήματα.

[2.1]**Τυπική εκπαίδευση:** το ιεραρχημένο, δομημένο και οργανωμένο χρονικά σε βαθμίδες εκπαιδευτικό σύστημα, από την πρωτοβάθμια έως το πανεπιστήμιο, που περιλαμβάνει τόσο τις γενικές ακαδημαϊκές σπουδές όσο και τα εξειδικευμένα προγράμματα και θεσμούς ολοκληρωμένης επαγγελματικής και τεχνικής εκπαίδευσης

[2.2]**Μη τυπική εκπαίδευση:** οποιαδήποτε οργανωμένη εκπαιδευτική δραστηριότητα εκτός του τυπικού εκπαιδευτικού συστήματος, που απευθύνεται σε συγκεκριμένους εκπαιδευόμενους και έχει συγκεκριμένους εκπαιδευτικούς στόχους.

[2.3]**Άτυπη εκπαίδευση:** η διαδικασία με την οποία κάθε άτομο, σε όλη τη διάρκεια της ζωής του, μαθαίνει και αποκτά στάσεις, αξίες, ικανότητες – δεξιότητες και γνώσεις, από την καθημερινή εμπειρία και τις επιδράσεις που δέχεται από το περιβάλλον του.
(Jeffs & Smith, 1990)

Από την εξέλιξη της έρευνας προκύπτουν ερωτήματα, οι απαντήσεις των οποίων είναι πιθανόν να σχετίζονται με την άποψη του Fagan (1996) ότι η απαιτούμενη για την Ατζέντα 21 εκπαίδευση «...είναι εμποτισμένη στην πολιτική της δικαιοσύνης και της ισότητας και...βοηθά στην επίλυση προβλημάτων, την καλύτερη κατανόηση των ζητημάτων και την εποικοδομητική στοχαστική δράση». Το είδος της εκπαίδευσης αυτής, όπως προαναφέρθηκε, θεωρείται κατά πολύ διαφορετικό από αυτό της τυπικής εκπαίδευσης. Οι έως τώρα συζητήσεις με τους εμπλεκόμενους σε αυτή τη σημαντική ιστορία για τη ζωή τους δείχνουν να υποστηρίζουν το λόγο του ίδιου συγγραφέα «...Η βασισμένη στη δράση εκπαίδευση αντιμετωπίζει τους ανθρώπους με την πραγματικότητα της τοπικότητας τους, την αξιολόγηση αυτού που συμβαίνει αληθινά στο στενό τους περιβάλλον και τους βοηθά να απαιτήσουν αλλαγή και να αναλάβουν δράση». Οι κάτοικοι αυτής της μικρής κοινότητας είναι στη μεγάλη τους πλειοψηφία κτηνοτρόφοι, γεωργοί και εργάτες, χαμηλού μορφωτικού επιπέδου.

Μεθοδολογία

Αφετηρία για την έρευνα που άρχισε πρόσφατα αποτέλεσε η μελέτη πρωτογενών πηγών τις οποίες αποτελούν επίσημα και ανεπίσημα έγγραφα. Η ταξινόμησή τους έγινε καταρχήν με χρονολογική σειρά, στο βαθμό που κατέστη δυνατό, ώστε να προκύψει μια πρώτη «αποκάλυψη» της ιστορίας. Στη συνέχεια έγινε διαχωρισμός μεταξύ επισήμων και ανεπισήμων εγγράφων. Επίσημα έγγραφα αποτελούν το βιβλίο πρακτικών του συλλόγου του χωριού, η αλληλογραφία με διάφορους φορείς (Δήμος, Νομαρχία, Περιφέρεια, Αρχαιολογική Υπηρεσία, Εισαγγελία κ.λ.π.) και τα πρακτικά του Δημοτικού Συμβουλίου. Ανεπίσημα έγγραφα θεωρούνται οι ανακοινώσεις-καταγγελίες μέσω διαδικτύου, αφισών κ.ά, οι ανακοινώσεις των ανοιχτών συνελεύσεων και τα χιουμοριστικά κείμενα (ποιήματα, παραφράσεις τραγουδιών κ.ά.) που προέκυψαν από τους συμμετέχοντες στην κατάληψη. Εκτός από τα έγγραφα, σημαντικές πληροφορίες για την έρευνα δίνονται από οπτικό υλικό όπως βίντεο και φωτογραφίες. Η χρήση του πρωτογενούς αυτού υλικού με σκοπό την επακόλουθη ανάλυση του περιεχόμενου λόγου του θεωρείται σημαντική, λόγω του βασικού της πλεονεκτήματος που είναι η πλήρης απουσία επιρροής του ερευνητή στα δεδομένα. Επιπλέον δίνεται η δυνατότητα σύλληψης όσο το δυνατόν μεγαλύτερης μεταβλητότητας στις αναφορές. Αυτό συμβαίνει πολύ συχνά στην ανάλυση λόγου, όταν δηλαδή οι αναλυτές λόγου εργάζονται με καταγραφές και ντοκουμέντα, που δεν προέρχονται από τις επαφές του ίδιου του ερευνητή με τους συμμετέχοντες (Webb κ.ά. 1966, στο Potter & Wetherell, 2009). Τα τεκμήρια που προαναφέρθηκαν αποτελούν στοιχεία του κοινωνικού ιστού στη δημιουργία των οποίων ο ερευνητής δεν έπαιξε κανένα ρόλο. Η συλλογή των διαφόρων τεκμηρίων, η καταγραφή αλληλεπιδράσεων και ο συνδυασμός τους στη συνέχεια με κατευθυντικές συνεντεύξεις παρέχουν πληρέστερη ιδέα για το πώς οργανώνονται οι γλωσσικές πρακτικές των συμμετεχόντων απ' ότι με τη χρήση μόνο μιας πηγής (Potter & Wetherell, 2009).
Η μεθοδολογία που πρόκειται να εφαρμοστεί στη συνέχεια της έρευνας είναι η βιογραφική προσέγγιση, η οποία είναι κλινική μέθοδος και ως τέτοια ενδιαφέρεται για την παρέμβαση και την κοινωνική αλλαγή. Με τη βιογραφική έρευνα προσπαθούμε να συλλάβουμε αυτό που δεν υπάρχει ακόμα, αλλά είναι παρόν στον ορίζοντα του δυνατού (Πανταζής, 2004). Η βιογραφική έρευνα αποτελεί δυνητική προσέγγιση του ανθρώπινου βιώματος και εντάσσεται στην κατηγορία των μεθόδων δράσης όταν σκοπεύει στη σύνδεση της θεωρίας με την πολιτική και κοινωνική πρακτική. Ο αφηγηματικός λόγος ενδιαφέρει λόγω του ότι προσεγγίζει την ουσία της ζωής του ατόμου ως το σύνολο των κοινωνικών του σχέσεων. Ενδιαφέρεται για την κατανόηση των ψυχοκοινωνικών φαινομένων από τη σκοπιά των δρώντων υποκειμένων μέσω της συμμετοχής στην κατανόηση της ζωής τους. Η προφορική ιστορία, σύμφωνα με τον Thompson (2002) μπορεί να γίνει μέσο για το μετασχηματισμό τόσο του περιεχομένου, όσο και του σκοπού της ιστορίας. Μπορεί να αλλάξει τον προσανατολισμό της ιστορίας και να ανοίξει νέες περιοχές έρευνας, να σπάσει τους φραγμούς μεταξύ των γενεών, μεταξύ των εκπαιδευτικών ιδρυμάτων και του έξω κόσμου. Μπορεί τελικά «...να δώσει πάλι μια κεντρική θέση στους ανθρώπους που δημιούργησαν

και βίωσαν την ιστορία». Οι αφηγήσεις ζωής (προφορική ιστορία), μέσω των οποίων μαθαίνουμε πως τα άτομα κατανοούν, ερμηνεύουν και καθορίζουν τον περιβάλλοντα κόσμο, ενώ οι συνθήκες παραγωγής του παραπέμπουν στην επικοινωνιακή σχέση μεταξύ του «αφηγητή» και του «ακροατή» (Πανταζής,ο.π.). Η μορφή του υλικού μπορεί να είναι αφηγήσεις ζωής (life stories) ή και ιστορίες ζωής (life histories), αν και σύμφωνα με τον Roberts (2002) είναι δύσκολο να διατηρηθεί μια τέτοια εμφανής διάκριση στην πράξη. Ωστόσο, μέσω ενός συνδυασμού των μεθόδων αυτών γίνεται κατανοητή η ατομική ζωή μέσα στο κοινωνικό πλαίσιό της. Ως μεθοδολογικό εργαλείο για τη βιογραφική έρευνα χρησιμοποιείται η συνέντευξη σε βάθος, η οποία αποτελεί το κύριο σώμα του βιογραφικού υλικού. Ο Ναυρίδης (1995) θεωρεί τη μη παρεμβατική ερευνητική συνέντευξη ως ημι-δομημένη και όχι ως μη-δομημένη, αφού και σε αυτήν την περίπτωση ο ερευνητής έχει μια προκατασκευασμένη άποψη σχετικά με το τι ενδιαφέρεται να μάθει. Οι απαντήσεις που δίνονται δεν εξετάζονται ως προς τη συνέπεια του συμμετέχοντα, αφού αυτή θεωρείται λιγότερο χρήσιμη για την ανάλυση από ότι η μεταβλητότητα. Όλες οι συνεντεύξεις απομαγνητοφωνούνται. Αντικείμενο ανάλυσης αποτελούν και οι ερωτήσεις που θέτει ο ερευνητής, ο οποίος θεωρείται ενεργός συμμετέχων και όχι «ομιλών ερωτηματολόγιο» (Potter & Wetherell, 2007). Προϋπόθεση για μια ειλικρινή και έντιμη τέτοια διαδικασία είναι σύμφωνα πάλι με τον Thompson (2002) το ενδιαφέρον και ο σεβασμός του ερευνητή προς την προσωπικότητα κάθε ανθρώπου, η ελαστικότητα στη συμπεριφορά του προς αυτούς, η ενσυναίσθηση και η συμπάθεια για την οπτική γωνία υπό την οποία βλέπουν τα πράγματα και τελικά: «…η προθυμία του να κάτσει ήσυχα να τους ακούσει ». Η δειγματοληψία και η αντιπροσωπευτικότητα γίνεται με ποιοτικά κριτήρια και είναι σκόπιμη, όχι τυχαία.

Ο ερευνητής

Το κίνητρο για τη συγκεκριμένη έρευνα συνδέεται άμεσα με τα προσωπικά ενδιαφέροντα, τις αγωνίες και τα βιώματα του ερευνητή. Η συμμετοχή σε περιβαλλοντικά κινήματα και η παράλληλη ενασχόληση με την Περιβαλλοντική εκπαίδευση συνέβαλλε στην ανάπτυξη προβληματισμού σχετικά με την εφαρμογή της αειφορίας με αφετηρία την κοινωνική της διάσταση. Επιπλέον η προσωπική συμμετοχή σε κάποιες από τις πρώτες μεγάλες ανοιχτές συνελεύσεις και η βιωματική σχέση με τους συντελεστές της υπό εξέταση υπόθεσης γέννησαν τα πρώτα ερωτήματα. Η ανάγκη για μελέτη της συλλογικότητας και της δράσης μιας κοινωνικής ομάδας που αγωνιά για την επίλυση περιβαλλοντικών προβλημάτων είναι πηγαία και προκύπτει από την προσωπική διάθεση για κοινωνική αλλαγή, μέσω συλλογικών διαδικασιών. Η σχέση με τους κατοίκους της κοινότητας προκάλεσε κάποιους αρχικούς ενδοιασμούς σχετικά και με την υποτιθέμενη «ουδετερότητα» και την «απόσταση» του ερευνητή από το προς εξέταση αντικείμενο. Αυτοί οι προβληματισμοί σχετίζονται με την ηθική και τη δεοντολογία. Ο Tierney (1994) στηρίζει την άποψη της άμεσης επαφής του ερευνητή με τα προς μελέτη υποκείμενα, θεωρώντας ότι η εμπλοκή και η προσωπική σχέση με αυτά είναι αναγκαστική. Στην περίπτωση του περιβαλλοντικού ακτιβισμού, όπου η έρευνα ταυτίζεται με τον ερευνητή, σύμφωνα με την Malone (2006), ο ρόλος του (ερευνητή) θεωρείται κρίσιμος, αφού, χρησιμοποιώντας τις δεξιότητες και τη γνώση του υποστηρίζει τις δράσεις που έχουν άμεσο όφελος για το περιβάλλον. Συγκεκριμένα: « εφόσον ο σκοπός της περιβαλλοντικής εκπαίδευσης είναι να αναπτύξουν τα άτομα και οι κοινότητες τη γνώση, τις στάσεις και τις δεξιότητες ώστε να συμμετέχουν ενεργά στο έργο της επίλυσης των περιβαλλοντικών προβλημάτων μέσω της κοινωνικής τους δράσης, τότε οι ερευνητές της περιβαλλοντικής εκπαίδευσης πρέπει να χρησιμοποιούν τον επαγγελματικό-επιστημονικό τους ρόλο ώστε να υποστηρίζουν τους παραπάνω σκοπούς». Προ(σ)καλεί με αυτό τον τρόπο τους ερευνητές της περιβαλλοντικής εκπαίδευσης να κινηθούν έξω από τον ακαδημαϊσμό, να αναπτύξουν συνεργασίες με τις κοινότητες και να εμπλακούν άμεσα στον περιβαλλοντικό ακτιβισμό. Σύμφωνα με μια άλλη προσέγγιση ο ερευνητής, μέσω της έρευνας, δεν αναζητά τίποτα άλλο παρά τον εαυτό του, ως το πρώτο αντικείμενο της έρευνάς του (Barus-Michel, 1995). Από εδώ προκύπτει ένας εύστοχος παραλληλισμός με την ιστορία του Οιδίποδα ο οποίος είναι ταυτόχρονα η απάντηση και ο ερευνητής αλλά μένει έξω από την απάντησή του. Ο Οιδίποδας δεν ξέρει ότι αυτό που ψάχνει είναι ο ίδιος του ο εαυτός. Σύμφωνα με αυτή την

προσέγγιση υπάρχουν τρία θεμελιώδη ερωτήματα που τίθενται από κάθε έρευνα: «από πού έρχομαι;» (καταγωγή), «ποιος είμαι;» (φύση) και «πού πάω;» (προορισμός). Ο ερευνητής για να φτάσει τη διαφορά, τον άλλο, τον ξένο που διατείνεται ότι ερευνά, πρέπει να περάσει από την αναγνώριση αυτού που ο ίδιος είναι μέσα στην έρευνά του. Ο ερευνητής είναι κύριος της έρευνας αλλά υπόκειται στα ερευνητικά του μέσα. Τελικά η φιλοδοξία κάθε ερευνητή είναι η δημιουργία του εαυτού του μέσα στην έρευνα. Ένα ναρκισσιστικό όνειρο, που επιδοκιμάζεται από την επιστήμη.

Ανάλυση-Σχολιασμός πρωτογενούς υλικού

Εδώ θα παρουσιαστούν κάποια πρώτα ευρήματα από την ανάλυση που έγινε στα κείμενα και στις πρώτες συνεντεύξεις. Αρχικό ζητούμενο αποτελεί η καταγραφή της «ιστορίας» μέσα από κείμενα, προσωπικές μαρτυρίες των πρωταγωνιστών, φωτογραφίες και βίντεο. Διευκρινίζεται ότι το τμήμα της έρευνας που αφορά στη βιογραφική προσέγγιση θα αποτελέσει το αμέσως επόμενο στάδιο της, άρα δεν παρουσιάζεται σε αυτό το κείμενο. Η έρευνα που μόλις άρχισε έχει αναδείξει ένα σημαντικό τμήμα της «ιστορίας». Η προσπάθεια που γίνεται έχει ως αρχικό στόχο την παρακολούθηση της εξέλιξής της, με συνεχείς παράλληλες ματιές στα ερευνητικά ερωτήματα που έχουν τεθεί. Τα γραπτά κείμενα που συλλέχθηκαν, αφού ταξινομήθηκαν με τον τρόπο που περιγράφεται σε προηγούμενη παράγραφο έχουν αρχίσει να «μιλούν». Ο συνδυασμός τους με μαρτυρίες των πρωταγωνιστών της ιστορίας παρέχουν την πληροφόρηση εκείνη που θεωρείται απαραίτητη για την κατανόηση όσο το δυνατόν περισσότερων πτυχών την «ιστορίας». Με τον τρόπο αυτό μπορούμε να αποκτήσουμε πληρέστερη ιδέα των καταστάσεων, απ’ ότι με τη χρήση μιας μόνο πηγής (Potter & Whetherell, 2007, σ.225).

Μετά την επαναλαμβανόμενη ανάγνωση των τεκμηρίων παρατηρούμε μια διατυπωμένη αγωνία από τους κατοίκους, συνδυασμένη με ένα αίσθημα αδικίας λόγω της εγκατάλειψης του χωριού τους από τις Τοπικές Αρχές. Οι πρώτες διαμαρτυρίες για τους κινδύνους από την καύση στη χωματερή, κυρίως για τον κίνδυνο πυρκαγιάς διατυπώνονται εγγράφως με αλλεπάλληλα έγγραφα προς το Δήμο από το 1998. Οι διαμαρτυρίες αυτές έχουν βάση, αφού η γύρω περιοχή έχει υποστεί ανεπανόρθωτες καταστροφές από παλιότερες πυρκαγιές το 1974 και το 1977 που οφείλονταν στην καύση των σκουπιδιών.

⇒ Α(55-οικιακά) : *Πάντα τα σκουπίδια μας απασχολούσανε γιατί καίγανε. Και βέβαια φοβόμαστε για φωτιές* (2-1-2012)

⇒ Β(67-συνταξιούχος): *το Καταφύγι επί μισό αιώνα είναι σκουπιδότοπος σε τρία διαφορετικά σημεία: στη Φυρινάσπα, στα Χάλαυρα, στην εκκλησία του αγίου Νικόλα και εδώ. Με μεγάλο κόστος. Με τρεις τεράστιες φωτιές που ρήμαξαν το σύμπαν εδώ* (21-4-2012)

⇒ Γ (56-οικοδόμος): *Κάψαν το Φάρο κάψανε...Τη Φιρινάσπα όλη, Τη Δάσα...Γύρω γύρω κάηκε πολλές φορές. Ερχότανε η πυροσβεστική απάνω και έκανε μηνύσεις. Και από κει ένα μεγάλο μέρος ξεκίνησε η φασαρία,. από τις φωτιές.* (2-1-2012)

(αποσπάσματα από συνεντεύξεις)

⇒ *...Η υποβάθμιση των χωριών που γειτονεύουν με το σκουπιδότοπο είναι γεγονός. Θα πρέπει να υπογραμμίσουμε ότι μιλάμε για χωριά που εδώ και χρόνια κοινό τους γνώρισμα έχει γίνει η εγκατάλειψη κάθε μορφής*

⇒ *...ο κίνδυνος για το ξέσπασμα φωτιάς είναι μεγάλος και άμεσος. Στην πραγματικότητα ολόκληρη η περιοχή του Καταφυγίου που αποτελεί και τον τελευταίο δασικό πνεύμονα της νότιας Ικαρίας απειλείται με ολοκληρωτική καταστροφή*

(από έγγραφη διαμαρτυρία προς το Δήμο, 17-11-1998)

Σημείωση: Για κάθε έναν/μία από τους συμμετέχοντες/ουσες στις συνεντεύξεις αναφέρεται ένα αρχικό γράμμα (δεν αντιστοιχεί στο πραγματικό του/της όνομα), η ηλικία και η ιδιότητα-επάγγελμα. Το αρχικό γράμμα Ε αντιστοιχεί στον ερευνητή. Τα ονόματα που αναφέρονται από κάποιους δεν είναι τα πραγματικά

Ο κίνδυνος για την υγεία

Ένα ζήτημα που τίθεται εξαρχής είναι αυτό της απειλής της υγείας των κατοίκων. Στα πρώτα έγγραφα υπάρχουν τέτοιες αναφορές, χωρίς βέβαια να γίνεται λόγος για τους κινδύνους από την παραγωγή διοξινών. Μετά την ανακοίνωση των οριακών τιμών διοξινών, παρατηρούμε δύο ειδών αντιδράσεις: Η πρώτη σχετίζεται με το φόβο των κατοίκων για την υγεία τους συνδυασμένη με οργή και η δεύτερη με τη διάθεση να μάθουν, να πληροφορηθούν επίσημα για τους κινδύνους από την καύση των σκουπιδιών. Παράλληλα εκφράζονται ανησυχίες για τις περιουσίες, την κτηνοτροφία, τις καλλιέργειες, το φυσικό περιβάλλον, τον πολιτισμό (αφού η χωματερή βρίσκεται μέσα σε οριοθετημένη αρχαιολογική περιοχή) και τον τουρισμό.

⇒ *...Σήμερα μαθαίνουμε ότι οι διοξίνες απειλούν τη ζωή μας. Δεν μπορούμε να μείνουμε αδιάφοροι και ανεκτικοί. Δεν μπορούμε να μείνουμε άλλο αδιάφοροι και ανεκτικοί. Κάτι τέτοιο μας καθιστά συνένοχους στην ολοκληρωτική καταστροφή που συντελείται γύρω μας, στον τόπο που ζούμε*

⇒ *...Έχουμε υποχρέωση και καθήκον να παραδώσουμε καλύτερο από κάθε άποψη τον τόπο που ζούμε στις επόμενες γενιές..*

(αποσπάσματα απόφασης, Γενικής Συνέλευσης, 5-11-2007)

⇒ *Ο ΧΑΔΑ βρίσκεται σε οριοθετημένη περιοχή η οποία είναι κηρυγμένη ως αρχαιολογικός χώρος (ΦΕΚ 1031,12-11-1996). Ο ΧΑΔΑ βρίσκεται σε μικρότερη απόσταση των 500 μέτρων από κατοικήσιμες περιοχές και οικισμούς (Καταφύγι, Τσουρέδο, Μαυρικάτο) με άμεσους κίνδυνους στη ζωή των κατοίκων, των ζώων, των καλλιεργειών. Πρόσφατα αποτελέσματα μετρήσεων προσδιορισμού συγκεντρώσεων διοξινών σε δείγματα ζωικής προέλευσης από απόσταση 5000 μ. από τη χωματερή έδειξαν ότι είναι υψηλότερα από τις τιμές που ανιχνεύονται συνήθως (εντός των μεγίστων επιτρεπτών ορίων) και ότι διαφαίνεται μια αυξητική τάση της επιβάρυνσης των διοξινών σε περιοχές κοντά στη χωματερή. Ο ΧΑΔΑ είναι ορατός από τη θάλασσα και από τον επαρχιακό δρόμο που συνδέει το αεροδρόμιο Της Ικαρίας και τον αναπτυσσόμενο τουριστικά οικισμό του Φάρου με την πόλη του Αγ. Κηρύκου*

(απόσπασμα από επιστολή του συλλόγου προς Δήμο)

Νομαρχία, Αρχαιολογική υπηρεσία, Περιφέρεια, 8-1-2008)

Τα θέματα της υγείας θεωρούνται πρωταρχικού ενδιαφέροντος για τους συμμετέχοντες στο περιβαλλοντικό κίνημα, περισσότερο και από αυτά της διατήρησης της άγριας φύσης. Υποκινητικό παράγοντα φαίνεται να αποτελεί μια επιθυμία για την προστασία της προσωπικής τους υγείας και της υγείας των οικογενειών τους και των μελλοντικών γενεών έναντι κάποιας αντιληπτής απειλή. Ωστόσο, η κριτική που υφίσταται το περιβαλλοντικό κίνημα μερικές φορές εστιάζεται στο γεγονός ότι οι ανησυχίες για την υγεία τους χρησιμοποιούνται ως προπέτασμα καπνού για την κάλυψη του φόβου ότι οι χωματερές θα καταστρέψουν την αξία των περιουσιών τους (Freudenberg & Steinsapir, 1991). Η Κούση σημειώνει σχετικά ότι οι ομάδες που διαμαρτύρονται για το τόσο συχνά τιθέμενο ζήτημα της διαχείρισης απορριμμάτων,

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αντικατοπτρίζουν την ανησυχία για την εύθραυστη σχέση μεταξύ της ποιότητας των τοπικών φυσικών πόρων, της τοπικής οικονομίας και της δημόσιας υγείας (Kousis, 2003). Σε άλλη αναφορά της σχετικά με τις απόψεις και τις αξίες για το περιβάλλον, η Κούση (2005) σημειώνει το διαχωρισμό μεταξύ βιολογικής και κοινωνικοοικονομικής διάστασης. Η πρώτη επικεντρώνεται στην υγεία, τη θνησιμότητα και τη διατροφή στο παρόν και την επιβίωση στο μέλλον, ενώ η δεύτερη έχει ως επίκεντρο την κατανομή πόρων και κινδύνων .

⇒ Β*(67-συνταξιούχος): Όταν είναι νοτιά πήγαινε η κάπνα, έγλυφε το έδαφος, ανέβαινε στο ύψωμα εκεί που σου 'δειξα, εδώ είναι 300 μέτρα ο ΧΑΔΑ από εδώ, κι έπεφτε μέσα. Αυτό εδώ πέρα ήτανε σα να ήτανε μία ομίχλη. Κλειδώναμε την πόρτα του σπιτιού και φεύγαμε. Και μάλιστα είμαστε και ανυποψίαστοι. Και κάποια στιγμή ήρθε ο Δ. και μας λέει «ξέρετε τι είναι αυτό;» και μας έβαλε σε υποψίες. Εγώ για να 'μαι ειλικρινής δεν είχα και εμπειρία από αυτά.* (21-4-2012)

⇒ *Α: (55-οικιακά): Το ΄78 οι ανθρώποι δεν ξέρανε...*

Γ: (56-οικοδόμος): Ούτε σήμερα δεν ξέρουνε

Α: Τι σημαίνει, (χαμηλόφωνα) τι σημαίνει αυτό το πράγμα, δεν θέλω να το σκεφτώ ακριβώς. (2-1-2012)

⇒ *Α (55-οικιακά): Ναι, αλλά δεν μπορείς..., όταν λες κάποιον το συζητάς, εκατό τοις εκατό καρκινογόνες ουσίες τις έχεις καταπιεί για 20-30 χρόνια μπορείς να το φανταστείς αυτό να το ζεις και να' σαι ένα μέρος αυτουνού, μπορείς να ζήσεις με αυτή τη σκέψη; Βαριά μέταλλα μέσα στα πάντα. Να θαρρείς πως δίνεις καθαρό φαι στα παιδιά σου, που τρως κι εσύ; Και να βρεθείς δηλητηριασμένος; Και όχι μόνο αυτό. Και να το ξέρουνε, γιατί έχουν ήδη λάβει χαρτιά απ' την Ευρωπαϊκή Ένωση και το γνωρίζουνε και καίνε; Οι ίδιοι οι Καριώτες που μεγάλωσαν μαζί τους; Να μην υπολογίζουνε τη ζωή; Είναι ένα πράμα τόσο μεγάλο να μπει μες στο μυαλό που προτιμάς να το διώξεις. Είπαμε μιανού που ήρθε να δει το σκουπιδότοπο που ήταν απ' τη Σάμο ή απ' τη Μυτιλήνη. Ηπήγαμε οι γυναίκες κοντά και τούπαμε έχουμε μια ελπίδα: να πάμε εμείς πριν τα παιδιά μας. Τα βλέπεις εδώ; τα' χετε δηλητηριάσει…*(2-1-2012)

(αποσπάσματα από συνεντεύξεις)

Η «επιστροφή» στην εκπαίδευση

$\Rightarrow$ *Ε: Οργανώθηκε λοιπόν τέτοια συζήτηση ενημερωτική...*

Β*(67-συνταξιούχος): Ναι ενημερωτική*

Ε: Ήταν όλο το χωριό εκεί;

Β: Τρία χωριά...

Ε: Και πώς έγινε, αυτό με ενδιαφέρει λιγάκι, πώς έγινε αυτή η διαδικασία; Θα 'ρθουν κάποιοι άνθρωποι που γνωρίζουν να μας ενημερώσουν...

Β: Όχι όχι . Καταρχήν πήγαμε και συζητήσαμε με τους συλλόγους. Και τους είπαμε ότι η κατάσταση έχει φτάσει σε τέτοιο σημείο που αν το αφήσουμε έτσι υποθηκεύεται η ζωή, η ζωή των παιδιών μας, οι περιουσίες μας και τα ζώα που βόσκουν εδώ δηλητηριάζονται, αυτό μπαίνει μέσα στη διατροφική αλυσίδα... Δηλαδή κάναμε μία κουβέντα να κατανοήσει ο κόσμος πρώτα πρώτα τι του συμβαίνει γιατί μέχρι τότε δυσφορούσε ο κόσμος, αλλά χωρίς να έχει και τη γνώση «τι είναι αυτό που εισπνέω, τι είναι αυτό που εισπνέουν τα ζώα, ποιες είναι οι συνέπειες από αυτή την ιστορία».

(21-4-2012)

$\Rightarrow$ Δ (32-εκπαιδευτικός): *...έχω κάνει και μία ολόκληρη δουλειά και παρουσίασα κάποια πράγματα σε μία πρώτη συνέλευση που έγινε. Όπου εκεί πέρα έμαθε κι ο κόσμος ότι η ατελής καύση δεν συνοδεύεται κατ ανάγκη με οπτικά φαινόμενα . Δηλαδή άμα δεις μια χωματερή δε χρειάζεται να βλέπεις καπνό για να παράγονται διοξίνες. Μπορεί βαθιά στη χωματερή να υπάρχει ατελής καύση και να βγαίνουν αυτά. Γενικώς τα τελευταία χρόνια στην Ελλάδα άρχισε αυτή η γνώση να γίνεται κτήμα του κόσμου. Ο κόσμος κατοικούσε χρόνια κοντά στις χωματερές και ουσιαστικά την τελευταία δεκαετία άρχισαν να δημιουργούνται τέτοια...*(8-4-2012)

$\Rightarrow$ Ε:*…και εκλαϊκεύεται η απόφαση για να καταλάβει ο κόσμος τι σημαίνει αυτό;*

Β*(67-συνταξιούχος): Ναι. Τι σημαίνει διοξίνες, φουράνια κ.λ.π. Ήταν μία καλή συνέλευση με συμμετοχή κόσμου. Κράτησε δυο τρεις ώρες η κουβέντα. Ο κόσμος έκανε δεκάδες ερωτήσεις για να μάθει τι σημαίνουν αυτά Μας ενημέρωσαν ο Νίκος και η Δήμητρα ως χημικός, σαν ειδικοί αυτοί* (21-4-2012)

(αποσπάσματα από συνεντεύξεις)

Οι κάτοικοι του χωριού «επιστρέφουν στην εκπαίδευση», φράση που χρησιμοποιείται από τον Fagan(2009). Το γεγονός αυτό συνοδεύεται από έναν ισχυρό συμβολισμό: χρησιμοποιούν για τις συνελεύσεις τους ως χώρο το Δημοτικό Σχολείο του χωριού, που δεν λειτουργεί για πολλά χρόνια. Αυτός είναι ο χώρος συνάθροισής τους, το ορμητήριό τους, η εκκλησία του Δήμου τους. Οι συμμετέχοντες συζητούν, ακούν ο ένας το λόγο του άλλου, παίρνουν αποφάσεις και ενδυναμώνονται.

⇒   *Α (55-οικιακά):Τότε που πήραν φωτιά τα σκουπίδια κάμαμε κατευθείαν συνέλευση κάτω εδώ στο σχολείο, ευρεθήκαμε όλοι οι χωριανοί πιάσαμε και μιλούσαμε κι ήτανε ένας ξένος, δικηγόρος. Είδε τι ηγίνουντα, τρέχαμε κάναμε κι αυτά κι όταν βρέθηκε στη συνέλευση που ήτανε οι χωριανοί και συζητούσαμε, είπε της Χ μετά: «το 'χω διαβάσει αυτό μα δεν το 'χω δει στην πράξη». (γέλια παρατεταμένα) η δημοκρατία! Πιστεύω ότι είναι πολύ βασικό να μπορέσει να έχουνε μέρος αθρώποι να συγκεντρώνονται να μιλάνε. ...Αλλά προ πάντος να μιλάνε. (2-1-2012)*

⇒   *Δ (32-εκπαιδευτικός): ...αρχίζουν και σηκώνουν το χέρι, ακόμα και αυτός που δεν είχε ποτέ μπει σε μια τέτοια διαδικασία σε χώρο που τον παρακολουθούν πολλοί. Και μάλιστα, κι αυτό πάλι είναι ενδιαφέρον, έβλεπες τον ίδιο κόσμο να κατεβαίνει πια στα Δημοτικά Συμβούλια, έξω πια απ' το χωριό του, με πολύ μεγάλο ακροατήριο και να παίρνουν το λόγο άνθρωποι που δεν τον είχαν πάρει ποτέ. κι εδώ βέβαια μετράει αυτό έτσι; Μπορούσε να πει τρεις λέξεις στη σειρά, αλλά είχε τον τρόπο να τις πει. Και σήκωνε το χέρι του η Γ, ο οποιοσδήποτε. Άνθρωποι που ποτέ σε ακροατήριο εκτός του χωριού δεν θα βγαίνανε να τοποθετηθούνε. (8-4-2012)*

⇒   *Δ: ...Η Μαρία του Δημήτρη. Μία πρόταση μπορεί να έλεγε ο καθένας, αλλά ήταν τόσο πυκνή. Από τα βιώματά τους. Μπορεί να μην είχαν... ούτε ρήτορες να ήταν ούτε τίποτα. Αλλά αυτό το πράγμα ξεκίναγε από το χωριό. Καταλάβαινε ο άλλος ότι εδώ ρε παιδί μου με αυτούς τους ανθρώπους θα συζητήσω θα ενωθώ και θα παλέψω για την αλήθεια μου... Εγώ αυτό νομίζω είναι σου λέω που μου αποτυπώθηκε: στις στιγμές που έβλεπες κόσμο που ποτέ δε θα είχε το κουράγιο να σταθεί μπροστά σε τρακόσα άτομα και να φωνάξει το δίκιο του. Δηλαδή αν με ρωτήσεις τι μου έχει μείνει, μου έχουν μείνει αυτές οι στιγμές που έπαιρναν άνθρωποι το λόγο μέσα στην αίθουσα του Δημοτικού Συμβουλίου με 300-400 άτομα ... (8-4-2012)*

(αποσπάσματα από συνεντεύξεις)

Η έρευνα συνεχίζεται προσανατολισμένη στα αρχικά της ερευνητικά ερωτήματα, με τη φιλοδοξία να δώσει απαντήσεις σε κάποια από αυτά. Η βιογραφική έρευνα θα αποτελέσει στη συνέχεια τη βασική μέθοδο. Οι συνεντεύξεις με τον τρόπο που περιγράφηκε θα αποτελέσουν τα ερευνητικά εργαλεία για τη συνέχεια,. Το ζήτημα της διαχείρισης των απορριμμάτων παραμένει σταθερά στην επικαιρότητα για το νησί της Ικαρίας. Η χωματερή του Καταφυγίου έχει πάψει να λειτουργεί με βάση την απόφαση 47720/5201/30-12-2010 της Γενικής Γραμματέως της Περιφέρειας Βορείου Αιγαίου.

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Τεχνολογία - Ερευνητικές Εργασίες - Ο Δρόμος προς το Αειφόρο Σχολείο

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Περίληψη

Το 2011 αντικαταστάθηκε το μάθημα της Τεχνολογίας της Α΄ Λυκείου από τις Ερευνητικές Εργασίες. Αν και τα δυο 'μαθήματα' έχουν πολλά κοινά στοιχεία ως προς τη μεθοδολογία, την έλλειψη αναλυτικού προγράμματος, την απομάκρυνση από το δασκαλοκεντρικό διδακτικό μοντέλο με την υιοθέτηση εναλλακτικού ρόλου για τον εκπαιδευτικό και τον μαθητή, οι Ερευνητικές Εργασίες δημιουργούν τις προϋποθέσεις για την αλλαγή του σχολείου σε «Αειφόρο». Οι διαφορές συνίστανται στο ευρύτερο πεδίο επιλογής θεμάτων, την αξιοποίηση της τοπικής κοινότητας ως πεδίου έρευνας, τη στενή συνεργασία των δύο εκπαιδευτικών, που θα 'διδάξουν' το μάθημα, αλλά και την ευρύτερη συνεργασία όλων των εκπαιδευτικών του σχολείου. 'Πιέζουν' προς μια αλλαγή νοοτροπίας και αποτελούν πηγή διάχυσης αλλαγών στο **παιδαγωγικό** και **κοινωνικό/οργανωσιακό** επίπεδο του σχολείου, παρέχοντας τη δυνατότητα για αλλαγές και στο **τεχνικό /οικονομικό** και γενικότερα δημιουργώντας μια νέα κουλτούρα που μετεξελίσσει τις παραδοσιακές σχολικές κοινότητες σε Αειφόρο Σχολείο.

Abstract

In 2011 the subject of Technology was replaced by the Research Essays. Although the two subjects have many things in common such as the methodology, the lack of a strict curriculum, the abolishment of the teacher-centered model and the adoption of an alternative role for both teachers and pupils, it is only the Research Essays that set the basis for the transformation of a school into a sustainable school. Their differences should be sought in the choice of the topic, the engagement of the local community as a field of research, teachers' close collaboration (either as tutors of the subject or as members of the school community). Research Essays claim for a change of school mentality and they infuse school community with changes at pedagogical and socio/organizational levels, as well as at technical/economic aspect. In general, Research Essays contribute to the shift of traditional school community into the alternative mode of Sustainable School.

Εισαγωγή

Η εκπαίδευση είναι ο παράγοντας, που διαμορφώνει την κουλτούρα του ατόμου και συμβάλλει στη διαδικασία της κοινωνικοποίησής του (Fotopoulos, 2003). Έχει τη δυνατότητα να επηρεάζει τη νοοτροπία του, να βοηθά την καλλιέργεια κριτικής σκέψης, την αφύπνιση της συνείδησης του και την ενδυνάμωση της λήψης αποφάσεων (UNECE, 2005). Όπως αναφέρεται από τη Ζαχαρίου (2008), η καθιέρωση της ως κεντρικής συνιστώσας για την επίτευξη ενός βιώσιμου κόσμου, αναγνωρίστηκε μέσα από μια σειρά διεθνών διασκέψεων και διακηρύξεων (Ρίο, 1992; Θεσσαλονίκη, 1997; Γιοχάνεσμπουργκ, 2002; MIO-ESCD,1998; UNCED, 1992; Unesco, 2002).
Ο εκσυγχρονισμός της εκπαίδευσης με την εισαγωγή εκπαιδευτικών καινοτομιών, δηλαδή παρεμβάσεων ευρύτερης έκτασης, που στηρίζονται σε πρωτοπόρες και πρωτότυπες παιδαγωγικές αρχές και ιδέες και οι οποίες εφαρμοζόμενες επιφέρουν σημαντικές αλλαγές στη νοοτροπία, στις πρακτικές, στους ρόλους και στη γενικότερη κουλτούρα του σχολείου (Ματσαγγούρας, 2011), πιστεύεται ότι, επιφέρουν ποιοτική αναβάθμιση του σχολείου, καθώς οι μαθητές εφοδιάζονται με νέες γνώσεις, δεξιότητες και αξίες (Μαυρογιώργος, 1987).

Στο πλαίσιο της αναβάθμισης του σχολείου, το 1997 εισάγεται στο αναλυτικό πρόγραμμα της Α΄ Λυκείου το 'μάθημα' της Τεχνολογίας. Για την τότε συγκυρία είναι μια καινοτομία, γιατί το αναλυτικό του πρόγραμμα αποτελείται από ένα πλαίσιο κατάλληλων δραστηριοτήτων με στόχο την ανάληψη πρωτοβουλίας και δημιουργικότητας από τους μαθητές και όχι από συγκεκριμένη ύλη. Ο μαθητής 'μαθαίνει πώς να μαθαίνει' εργαζόμενος μόνος του ή σε ομάδα, εξοικειώνεται με την τεχνολογική έρευνα, επιλύει στοιχειώδη ερευνητικά προβλήματα, που θα επιλέξει και γράφει μια εργασία με την οποία περιγράφει τις ερευνητικές του δραστηριότητες στην πράξη. Ο ρόλος του καθηγητή αλλάζει, δεν είναι αυτός που μεταδίδει γνώση, αλλά γίνεται διευκολυντής και σύμβουλος του μαθητή σε εκπαιδευτικές διαδικασίες στις οποίες επίκεντρο και κύριος υπεύθυνος είναι ο ίδιος ο μαθητής (Ηλιάδης & Βούτσινος, 1997).

Το 2011 παύει να διδάσκεται το μάθημα της Τεχνολογίας στην Α΄ Λυκείου και στα πλαίσια του 'Νέου Λυκείου' εισάγονται στο πρόγραμμα της Α΄ Λυκείου των ΓΕΛ και ΕΠΑΛ οι Ερευνητικές Εργασίες (ΕΕ). Το 2012 εισάγονται και στη Β΄ Λυκείου.

Οι ΕΕ θεωρούνται και αυτές καινοτομία γιατί στηρίζονται σε τέσσερις παιδαγωγικές αρχές: 1. Την αρχή της Διερευνητικής Προσέγγισης της Μάθησης, 2. Την αρχή της Διεπιστημονικής Συνεργασίας των Καθηγητών, 3. Την αρχή της Διαφοροποίησης του Περιεχομένου, της Διαδικασίας και του Πλαισίου της Μάθησης και 4. Την αρχή της Διεπιστημονικότητας. Η συντονισμένη εφαρμογή των αρχών αυτών οδηγεί σε αλλαγή του ρόλου του εκπαιδευτικού και των μαθητών στο πλαίσιο της μαθησιακής διαδικασίας, καθιερώνει νέες εκπαιδευτικές πρακτικές διερεύνησης και συνεργασίας, δημιουργεί μια νέα εκπαιδευτική κουλτούρα, που ενθαρρύνει ακόμη περισσότερο την πρωτοβουλία, την επιλογή, τον πειραματισμό, την ατομική και ομαδική ευθύνη (Ματσαγγούρας, 2011).

Με την παρούσα εισήγηση επιχειρείται αφενός η σύγκριση των δυο 'μαθημάτων' σε επίπεδο αναλυτικού προγράμματος, μεθόδων διδασκαλίας, διδακτικών τεχνικών, ερευνητικών εργαλείων, ρόλου εκπαιδευτικού και μαθητών, σχέσεων που αναπτύσσονται μέσα στη σχολική κοινότητα και έξω από αυτή (οικογένεια, τοπική κοινότητα) και αφετέρου η αιτιολόγηση της άποψης ότι, οι διαφορές τους είναι αυτές που καθιστούν τις ΕΕ ένα μέσο για την υλοποίηση των στόχων του «αειφόρου» σχολείου.

Τεχνολογία – Ερευνητικές Εργασίες

Με μια πρώτη ματιά θα μπορούσε κάποιος να πει ότι, και τα δυο 'μαθήματα' εισήγαγαν παρόμοια καινοτόμα στοιχεία στο σχολείο, όπως η αλλαγή του ρόλου του καθηγητή, του τρόπου μάθησης του μαθητή, της διεπιστημονικότητας και της ομαδικής συνεργασίας των μαθητών. Όμως εκτός από τον κοινό τόπο των δυο μαθημάτων υπάρχουν και διαφορές, κάποιες από τις οποίες θα ήταν σκόπιμο να επισημανθούν:

• **Πεδία** επιλογής θεμάτων.

Στην Τεχνολογία το θέμα της έρευνας αντλείται από το χώρο της Τεχνολογίας, δηλαδή τον τομέα της γνώσης που ασχολείται με την εφαρμοσμένη επιστήμη, τις εφευρέσεις, την ανάπτυξη και πρακτική αξιοποίηση επιστημονικών γνώσεων και μεθόδων, κυρίως στους χώρους της μηχανικής, της βιομηχανίας κλπ (Μπαμπινιώτης, 2012). Η έρευνα μπορεί να αναφέρεται σε βελτίωση βιομηχανικών προϊόντων, βιομηχανικών διαδικασιών παραγωγής, στην προστασία του περιβάλλοντος κλπ. (Ηλιάδης & Βούτσινος, 1997).

Στις ΕΕ το θέμα της έρευνας προέρχεται από τέσσερα γνωστικά πεδία: 1. Ανθρωπιστικές και κοινωνικές επιστήμες 2. Φυσικές επιστήμες, μαθηματικά και τεχνολογία 3. Τέχνες και πολιτισμός και 4. Περιβάλλον και αειφορία ή και ο συνδυασμός κάποιων από αυτά (Ματσαγγούρας, 2011).

Στις ΕΕ η αναγκαία σύνδεση με το αναλυτικό εισάγει απαραίτητα τη διαθεματικότητα και τη συνεργασία των εκπαιδευτικών των διαφορετικών ειδικοτήτων. Στην Τεχνολογία δεν είναι απαραίτητη προϋπόθεση η σύνδεση με το αναλυτικό πρόγραμμα, αλλά μπορεί να προκύψει στην πορεία της έρευνας.

- **Κριτήρια επιλογής των θεμάτων**

Κριτήρια επιλογής των θεμάτων στην Τεχνολογία είναι τα ενδιαφέροντα των μαθητών στο χώρο της τεχνολογίας, η επικαιρότητα και η ύπαρξη εργαστηρίου Τεχνολογίας, το οποίο θεωρείται απαραίτητο (Ηλιάδης & Βούτσινος, 1997). Στις ΕΕ κριτήριο επιλογής του θέματος είναι τα γενικότερα ενδιαφέροντα των μαθητών, η επικαιρότητα, η τοπικότητα, η σύνδεση με το αναλυτικό, τα ενδιαφέροντα και οι ιδιαίτερες γνώσεις των εκπαιδευτικών, όπως επίσης και ο εξοπλισμός του σχολείου (Ματσαγγούρας, 2011).

- **Τρόπος επιλογής των θεμάτων**

Η τελική έγκριση του θέματος της Τεχνολογίας, με το οποίο θα ασχοληθεί κάθε μαθητής ή ομάδα μαθητών, δίνεται από τον εκπαιδευτικό. Στην περίπτωση όμως των ΕΕ η διαδικασία επιλογής του θέματος είναι πολυπαραγοντική και συνεργατική. Συγκεκριμένα οι εκπαιδευτικοί, αφού επιλέξουν μαζί με τους μαθητές τα θέματα, κάνουν συγκεκριμένη πρόταση, που περιέχει το θέμα, σκοπό-στόχους και μεθοδολογία, στο Σύλλογο Διδασκόντων. Ο Σύλλογος Διδασκόντων, αφού ενημερωθεί, μπορεί να προτείνει τροποποιήσεις και στο τέλος να εγκρίνει τα θέματα, τη μεθοδολογία και τους εκπαιδευτικούς που θα την υλοποιήσουν. Ορίζεται δε ένας εκπαιδευτικός, συνήθως ο υποδιευθυντής, για να συντονίζει και να διευκολύνει την υλοποίησή τους (Ματσαγγούρας, 2011). Η διαδικασία αυτή προϋποθέτει επιμορφωμένους στις ΕΕ εκπαιδευτικούς, οι οποίοι συνεργάζονται, ανταλλάσουν απόψεις και καταθέτουν προτάσεις, τις οποίες μπορούν να τεκμηριώσουν από επιστημονική και παιδαγωγική άποψη.

- **Αριθμός και ειδικότητες εκπαιδευτικών**

Το μάθημα της Τεχνολογίας 'διδάσκεται' από ένα εκπαιδευτικό τεχνολόγο, ο οποίος με τις επιστημονικές και παιδαγωγικές του γνώσεις συντονίζει και καθοδηγεί τις διαφορετικές ομάδες του τμήματος.

Στις ΕΕ εμπλέκονται δυο εκπαιδευτικοί, διαφορετικών ειδικοτήτων, εκ των οποίων ο ένας θα πρέπει να είναι τεχνολόγος. Αυτό σημαίνει ότι οι ΕΕ είναι κατά βάση διεπιστημονικής φύσης και ως τέτοιες δεν αποτελούν αποκλειστικότητα συγκεκριμένων μαθημάτων και ειδικοτήτων, αλλά πεδίο συνεργασίας μαθημάτων και εκπαιδευτικών (Ματσαγγούρας, 2011). Οι δυο εκπαιδευτικοί θα πρέπει να συνεργαστούν σε όλες τις φάσεις του σχεδιασμού και της υλοποίησης της ΕΕ, να αξιοποιήσουν το διαφορετικό επιστημονικό τους υπόβαθρο, την παιδαγωγική τους κατάρτιση και τα ιδιαίτερα ταλέντα τους ώστε συνεργαζόμενοι να καθοδηγούν κάθε ομάδα και να συντονίζουν τη συνεργασία των ομάδων μέσα στο τμήμα ενδιαφέροντος.

- **Υλοποίηση**

Στην Τεχνολογία οι μαθητές/τριες ενός τμήματος εργάζονται μόνοι τους ή σε ομάδες και έχουν διαφορετικά θέματα. Κατά τη διάρκεια του σχολικού έτους κάθε μαθητής ή ομάδα οργανώνει σεμινάρια για να ενημερώσει την τάξη και τον εκπαιδευτικό για την πορεία της έρευνάς του/της, τα ευρήματα και τα τυχόν προβλήματα, που προέκυψαν κατά την υλοποίηση της έρευνας. Οι συμμαθητές/τριες όπως και ο διδάσκων μπορούν να υποβάλλουν ερωτήσεις και η όλη διαδικασία έχει σκοπό, εκτός από την ενημέρωση και τον προβληματισμό, την αξιολόγηση του μαθητή/τριας ή της ομάδας (Ηλιάδης & Βούτσινος, 1997).

Στην περίπτωση των ΕΕ κάθε τμήμα ενδιαφέροντος αποτελείται από παιδιά ενός τμήματος ή από μαθητές διαφορετικών τμημάτων της ίδιας τάξης (τμήμα ενδιαφέροντος), τα οποία χωρίζονται σε ομάδες και ασχολούνται με το ίδιο θέμα. Κάθε ομάδα ασχολείται με τη δική της προγραμματισμένη εργασία και σε τακτά διαστήματα όλες οι ομάδες συναντώνται και παρουσιάζουν στην ολομέλεια του τμήματος ενδιαφέροντος τις διαφορετικές διαστάσεις του θέματος ή τα υποθέματα με τα οποία ασχολείται η ομάδα τους, ώστε να βρουν και να αποκαταστήσουν την εσωτερική τους συνοχή (Ματσαγγούρας, 2011). Η έννοια της ομαδοσυνεργατικότητας αφορά όλο το Τμήμα Ενδιαφέροντος και ο τρόπος λειτουργίας των ομάδων οδηγεί στη συλλογικότητα του τμήματος, ενώ στην Τεχνολογία οι δεσμοί των ομάδων είναι χαλαροί και η λειτουργία τους δεν συμβάλλει σημαντικά στη συνοχή της τάξης.

- **Ο ρόλος του/των εκπαιδευτικού/ών**

Στην Τεχνολογία ο εκπαιδευτικός από την αρχή και μέχρι το τέλος της υλοποίησης της εργασίας εμψυχώνει, συντονίζει, καθοδηγεί και διευκολύνει τους μαθητές/τριες του στον ίδιο βαθμό.

Στις ΕΕ οι εκπαιδευτικοί ακολουθούν συνήθως την προσέγγιση της φθίνουσας καθοδήγησης, θέτοντας τα ερωτήματα και αφήνοντας τους μαθητές να επιλέξουν τα βήματα και τις δράσεις της έρευνας, τις οποίες ολοκληρώνουν με την καθοδήγησή τους, όταν αυτό κρίνεται αναγκαίο (Ματσαγγούρας, 2011).

- **Αξιολόγηση**

Όπως αναφέρουν οι Ηλιάδης & Βούτσινος (1997), στην Τεχνολογία οι μαθητές αξιολογούνται για τη συμμετοχή στη διαδικασία της έρευνας, την ποιότητα της ερευνητικής διαδικασίας που πραγματοποιούν, τη γραπτή εργασία, στην οποία περιλαμβάνονται οι ερευνητικές δραστηριότητες, την έκταση των πηγών πληροφόρησης που αξιοποίησαν για τις παρουσιάσεις της εργασίας στα σεμινάρια ενημέρωσης, την τελική παρουσίαση της εργασίας τους στους συμμαθητές τους και το τέχνημα. Επιπλέον, όπως αναφέρεται στο ΠΔ 50/ΦΕΚ 81/τ. Α/08-05-08, Άρθρο 7 «…για τον έλεγχο της κατά μάθημα επίδοσης και επιμέλειας των μαθητών κατά τη διάρκεια των τετραμήνων, εκτός της προφορικής εξέτασης, διενεργούνται ποικίλες ενδιάμεσες γραπτές εξετάσεις. Αυτές είναι: α) Οι ολιγόλεπτες γραπτές δοκιμασίες διάρκειας 10 έως 15 λεπτών, που αποτελούν εναλλακτικό τρόπο εξέτασης των μαθητών στο μάθημα της ημέρας…». Οι ερωτήσεις των ολιγόλεπτων εξετάσεων αφορούν τη μεθοδολογία της έρευνας.

Στις ΕΕ αξιολογείται η Συλλογική Εργασία της Ομάδας, η Λειτουργικότητα της Ομάδας και η Συμβολή των Μελών. Η έμφαση κατά την αξιολόγηση της συλλογικής Ερευνητικής Εργασίας, που προέκυψε από την έρευνα της ομάδας, στρέφεται γύρω από τέσσερις τομείς, οι οποίοι καλύπτουν (α) τη διαδικασία της έρευνας, (β) το περιεχόμενο της Ερευνητικής Έκθεσης (research report), (γ) τη γλώσσα και τη δομή της Ερευνητικής Έκθεσης και (δ) τη δημόσια παρουσίαση της Ερευνητικής Εργασίας (Ματσαγγούρας, 2011). Η διαφοροποιημένη συμβολή των μελών της ομάδας στο κοινό αποτέλεσμα εκφράζεται στη διαφοροποίηση της ατομικής βαθμολόγησης των μελών, η οποία αποτυπώνεται στο προσωπικό ημερολόγιο και στον ατομικό φάκελο και την προσωπική εκτίμηση του εκπαιδευτικού.

Η βαθμολογία κάθε μαθητή/τριας γίνεται με βάση τον ομαδικό και ατομικό φάκελο, το προσωπικό ημερολόγιο, την προσωπική άποψη των υπευθύνων εκπαιδευτικών, το τέχνημα και τη δημόσια παρουσίαση. Στο τέλος του τετραμήνου το Λύκειο οργανώνει ειδική «ημερίδα», όπου κάθε τμήμα ενδιαφέροντος παρουσιάζει ταυτόχρονα σε διαφορετικούς χώρους, στη σχολική κοινότητα -και όπου είναι δυνατόν και κρίνεται σκόπιμο- στους γονείς και σε μέλη της τοπικής κοινότητας τις εργασίες τους και ακολουθεί σχετική συζήτηση. Η συνολική παρουσίαση της ΕΕ, ο λόγος των μαθητών και η συμμετοχή τους στη συζήτηση με σκέψεις επιχειρήματα, ερωτήματα, σκέψεις και απόψεις αποτελούν ένα επιπλέον στοιχείο για την αξιολόγηση των ομάδων και των μελών τους (Ματσαγγούρας, 2011).

Παρατηρούμε ότι αν και στα δυο 'μαθήματα' αξιολογείται η μεθοδολογία της έρευνας και η γραπτή εργασία, στη μεν Τεχνολογία δίνεται ιδιαίτερη έμφαση στη μεθοδολογία που ακολουθήθηκε, ενώ στις ΕΕ δίνεται έμφαση στον τρόπο που λειτούργησαν οι ομάδες (ομαδικός φάκελος, ετεροαξιολόγηση) αλλά και τα άτομα (ατομικός φάκελος, αυτοαξιολόγηση)

Αειφόρο Σχολείο – Ερευνητικές Εργασίες

Η εκπαίδευση και το σχολείο παίζουν καθοριστικό ρόλο στην προώθηση της αειφόρου ανάπτυξης στην κοινωνία (Φλογαΐτη κ.ά., 2009), γιατί η εκπαίδευση αποτελεί ουσιαστικό εργαλείο για τη χρηστή διακυβέρνηση, την τεκμηριωμένη λήψη αποφάσεων και την προώθηση της δημοκρατίας. Η εκπαίδευση για την αειφόρο ανάπτυξη αναπτύσσει και ενισχύει την ικανότητα των ατόμων, των ομάδων, κοινοτήτων, οργανισμών και χωρών ώστε να προβούν σε κρίσεις και επιλογές υπέρ της αειφόρου ανάπτυξης (Unece, 2005). Όμως, για να αποτελέσει το σχολείο σημαντικό παράγοντα ευρύτερων αλλαγών στην κοινωνία στο πνεύμα της αειφορίας χρειάζεται καταρχήν να αποτελέσει το ίδιο αντικείμενο αυτής της αλλαγής (Orr, 1992; Sterling,1996; Sterling,2002) και να επιδιώξει την ενσωμάτωση των αρχών της αειφόρου ανάπτυξης στη βάση της συνολικής κουλτούρας που εκφράζει (Jensen, 2005).

Αν και το «αειφόρο» σχολείο αποτελεί ακόμα έννοια αδιαμόρφωτη και πολύ καινούρια (Ζαχαρίου κ.ά, 2008), θα μπορούσε να ορισθεί ως το σχολείο που ενδιαφέρεται να αναπτύξει μαθησιακά

περιβάλλοντα και μαθησιακές εμπειρίες που θα καταστήσουν ικανούς τους μαθητές να εργαστούν προς την κατεύθυνση της διασφάλισης ποιότητας ζωής (Gough, 2005).

Όπως αναφέρεται από τους Φλογαΐτη *κ.ά.* (2009)**,** οι Ali Kham (1996), Posch (1998) και οι Φλογαΐτη & Δασκολιά (2004), υποστηρίζουν ότι, η εφαρμογή αυτής της ολιστικής προσέγγισης βασίζεται στην παραδοχή ότι, η αειφορία δεν μπορεί παρά να διαπερνά όλα τα επίπεδα λειτουργίας του σχολείου τόσο σε **παιδαγωγικό** όσο και σε **κοινωνικό/οργανωσιακό** και σε **τεχνικό /οικονομικό** επίπεδο**.**

Η διεπιστημονικότητα και ο ομαδοσυνεργατικός τρόπος, με τον οποίο προσεγγίζουν τη μάθηση η Τεχνολογία και οι ΕΕ, αποτελούν ιδανικό πλαίσιο για τη φυσική ανάπτυξη των ποικίλων ικανοτήτων των μαθητών, του συλλογικού πνεύματος, της κατανόησης σύνθετων και πολύπλοκων σχέσεων, της ανάπτυξη κριτικής σκέψης και ανάληψης ενεργής δράσης, εξυπηρετώντας παράλληλα το παιδαγωγικό πλαίσιο λειτουργίας του **Αειφόρου Σχολείου**.

Όμως οι '**διαφορές**' των ΕΕ σε σχέση με την Τεχνολογία είναι αυτές που δημιουργούν μια ιδιαίτερη κουλτούρα στο σχολείο αλλά και τις προϋποθέσεις για την αλλαγή του σχολείου σε «Αειφόρο».

Το πεδίο επιλογής θεμάτων στις ΕΕ είναι σαφώς ευρύτερο και δίνει την ευχέρεια στους μαθητές να ασχοληθούν μεταξύ άλλων και με ζητήματα όπως τα ανθρώπινα δικαιώματα, η ειρήνη, η διεθνής ασφάλεια, η διαπολιτισμικότητα, η υγεία, η κοινωνική συνοχή, η κυριαρχία και η φτώχεια, που σύμφωνα με τη Unece (2005) αποτελούν βασικά ζητήματα ενασχόλησης του σχολείου, που προσβλέπει στην προώθηση της Αειφόρου Ανάπτυξης.

Η αξιοποίηση της τοπικής κοινότητας ως πεδίου έρευνας, ενισχύει το ενδιαφέρον των παιδιών για την έρευνα και τα προτρέπει να κρίνουν, να προτείνουν λύσεις και να δράσουν. Παράλληλα προωθείται η σχέση και η αλληλεπίδραση του σχολείου με την τοπική κοινωνία. Η εκπαιδευτική διαδικασία μεταφέρεται από το σχολείο στην κοινότητα και ενισχύει τη διάθεση των μαθητών να δράσουν ουσιαστικά κριτικά και δημιουργικά στο χώρο (Ζαχαρίου κ.ά, 2008). Η ίδια συγγραφέας αναφέρει ότι: «…οι Edvardsen και Nedergard (όπως αναφέρεται στον Uzell, 1999) θεωρούν ότι, η τοπική κοινότητα αποτελεί το πιο σημαντικό πεδίο οικουμενικής δράσης, γι' αυτό και η προώθηση της εκπαίδευσης στο χώρο αποτελεί βασική προϋπόθεση για τη λειτουργία του Αειφόρου Σχολείου.»

Η υλοποίηση ΕΕ προϋποθέτει τη συνεργασία δυο εκπαιδευτικών διαφορετικών κλάδων. Όπως αναφέρεται από το Ματσαγγούρα (2011): «…η συνεργασία εκπαιδευτικών, μετά τις πρώτες δυσκολίες, εισπράττεται θετικά από τους εμπλεκόμενους εκπαιδευτικούς, οι οποίοι αισθάνονται ότι, μετά τη συνεργασία, έχουν τη δυνατότητα να διδάξουν σε μεγαλύτερο βάθος θέματα που κινητοποιούν τους μαθητές (βλ. Edgerton 1990). …η συνεργασία των εκπαιδευτικών παράγει νέα γι' αυτούς γνώση, οδηγεί σε επεξεργασμένες προτάσεις και επιλογές κατά τη λήψη αποφάσεων και την επίλυση προβλημάτων. … μετατρέπει το σχολείο σε κοινότητα μάθησης και επαγγελματικής ανάπτυξης, η οποία λειτουργεί ως μία μορφή διαρκούς ενδο-σχολικής επιμόρφωσης, με σημαντικά οφέλη για τους ίδιους τους εκπαιδευτικούς, τη σχολική μονάδα και, κυρίως, τους μαθητές (βλ. Morrissey 2000, Achinstein 2002 Annenberg Institute for School Reform 2004).»

Η εμπλοκή όλων των εκπαιδευτικών στην έγκριση των θεμάτων, όπως επίσης και η βοήθεια που παρέχεται από το συντονιστή, δημιουργούν πνεύμα συνεργασίας ανάμεσα στους εκπαιδευτικούς του σχολείου, αλλά και την ανάγκη ενημέρωσης και επιμόρφωσης σχετικά με τα προτεινόμενα θέματα και τον τρόπο υλοποίησης των ερευνών στην τάξη. Η επικοινωνία τους, οι γνώσεις και η εμπειρία, που μεταφέρεται μέσα στο σύλλογο καθηγητών, τους ωθεί να βελτιώσουν τις μεθόδους διδασκαλίας, τους **ο**δηγεί στην επαγγελματική τους ανάπτυξη, δημιουργώντας σταδιακά μια νέα κουλτούρα στο σχολείο. Σίγουρα η αλλαγή αυτή δεν είναι δυνατόν να γίνει σε μικρό χρονικό διάστημα. Δημιουργούνται όμως οι προϋποθέσεις να αλλάξει το σχολείο σε κοινωνικό/οργανωσιακό επίπεδο έτσι ώστε να αποκτήσει τη λειτουργία του Αειφόρου.

Σύμφωνα με τον Καλαϊτζίδη (2012), στο πλαίσιο των Ερευνητικών Εργασιών οι μαθητές/τριες έχουν τη δυνατότητα να προσεγγίσουν ερευνητικά μια μεγάλη ποικιλία θεμάτων. Το πιο κοντινό, το πιο προσιτό και εύκολα διαχειρίσιμο ζήτημα είναι το Αειφόρο Σχολείο, το οποίο τους επιτρέπει να πραγματοποιήσουν έρευνα στο σχολείο που φοιτούν και ως αποτέλεσμα αυτής της έρευνας να προκύψουν προτάσεις και δράσεις που θα αφορούν την εξοικονόμηση νερού και ενέργειας,

δημιουργία σχολικού κήπου, διαχείριση απορριμμάτων και ανακύκλωση κά. Με τον τρόπο αυτό οι ΕΕ μπορούν να συμβάλλουν και στη βελτίωση στο τεχνικό/οικονομικό επίπεδο του Αειφόρου Σχολείου.

Συμπεράσματα

Συμπερασματικά λοιπόν, θα μπορούσε να λεχθεί ότι, αν και η Τεχνολογία και οι ΕΕ έχουν πολλά κοινά στοιχεία ως προς τη μεθοδολογία, την έλλειψη αναλυτικού προγράμματος, την απομάκρυνση από το δασκαλοκεντρικό διδακτικό μοντέλο με την υιοθέτηση εναλλακτικού ρόλου για τον εκπαιδευτικό και τον μαθητή, έχουν διαφορετική 'φιλοσοφία'. Η πρώτη δίνει έμφαση στη μεθοδολογία της έρευνας, ενώ η δεύτερη χρησιμοποιεί τη μεθοδολογία με σκοπό οι μαθητές να αποκτήσουν κριτική και πολιτική σκέψη, οι εκπαιδευτικοί να βγουν από τη 'μοναξιά' της τάξης τους και να εξελιχθούν προσωπικά και επαγγελματικά, μέσα από ένα σχολείο που ανοίγεται στην τοπική κοινωνία και όπου σχολείο και τοπική κοινότητα αποτελούν πεδίο έρευνας. Οι ΕΕ δεν αλλάζουν το σχολείο, αλλά 'πιέζουν' προς μια αλλαγή νοοτροπίας και δημιουργούν τις προϋποθέσεις για να γίνει το σχολείο οργανισμός μάθησης και ανάπτυξης. Αποτελούν πηγή διάχυσης αλλαγών στο **παιδαγωγικό** και **κοινωνικό/οργανωσιακό** επίπεδο του σχολείου, παρέχοντας τη δυνατότητα για αλλαγές και στο **τεχνικό /οικονομικό** του επίπεδο και γενικότερα δημιουργώντας μια νέα κουλτούρα που μετεξελίσσει τις παραδοσιακές σχολικές κοινότητες σε Αειφόρο Σχολείο. Σε περιπτώσεις δε, όπου οι σχολικές κοινότητες έχουν ήδη ενσωματώσει πολλές από τις αρχές του αειφόρου σχολείου, το πλαίσιο του Αειφόρου Σχολείου θα είναι αυτό, που θα στηρίξει την εφαρμογή των ΕΕ και θα βρει άλλη μια δίοδο έμπνευσης και δημιουργίας ενδιαφερουσών μαθησιακών καταστάσεων.

Τέλος θα πρέπει να επισημανθεί ότι αν και οι ΕΕ είναι καινοτομία, δεν περιλαμβάνονται στις 'καινοτόμες δράσεις' του σχολείου. Αυτό σημαίνει ότι, έχουν ενταχθεί στο αναλυτικό πρόγραμμα και 'διδάσκονται' υποχρεωτικά δύο ώρες την βδομάδα, όπως συνέβαινε και με την Τεχνολογία. Τις έχουν ανάθεση όλες οι ειδικότητες των εκπαιδευτικών και όχι μόνο οι Τεχνολόγοι, όπως στην Τεχνολογία. Η ανάθεση σε όλες τις ειδικότητες προκύπτει από την ευρύτητα του πεδίου της επιλογής των θεμάτων. Ιδιαίτερη ευχέρεια στη μεθοδολογία έρευνας έχουν οι Τεχνολόγοι εκπαιδευτικοί, οι οποίοι δίδασκαν την Τεχνολογία. Όμως δεν αρκεί αυτό, γιατί οι διαφορές των ΕΕ από την Τεχνολογία, όπως προαναφέρθηκαν, σε παιδαγωγικό και κοινωνικό/οργανωσιακό, προϋποθέτει επιμόρφωση των εκπαιδευτικών, συνεχή ανατροφοδότηση και σταδιακή αλλαγή της συνολικής κουλτούρας της σχολικής κοινότητας.

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Μελέτη Περίπτωσης του 2ου 6θεσιου Πρότυπου Πειραματικού Δημοτικού Σχολείου Ρόδου ως Αειφόρο Σχολείο

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Περίληψη

Το θέμα μας διαπραγματεύεται την μελέτη περίπτωσης του 2ου Πειραματικού Δημοτικού Σχολείου του Π.Τ.Δ.Ε, ως αειφόρο σχολείο. Το σχολείο μας συμμετείχε στο διαγωνισμό «αειφόρο σχολείο», αφενός έχοντας υπόψιν πώς το Αειφόρο Σχολείο είναι μια δυναμικά συνεχώς εξελισσόμενη έννοια, αφού πρόκειται για την πιο καινοτόμο εκπαιδευτική μεταρρύθμιση των τελευταίων χρόνων σε παγκόσμιο επίπεδο και αφετέρου ακολουθώντας την να ξεπεράσουμε την περιφερειακή ενσωμάτωση καινοτομιών, αφού στη σχολική μας μονάδα τα τελευταία περίπου δέκα χρόνια υλοποιείται πληθώρα προγραμμάτων , είτε συνεργαζόμενοι με τους εκάστοτε υπεύθυνους περιβαλλοντικής εκπαίδευσης, αγωγής υγείας και πολιτιστικών θεμάτων, είτε με το Πανεπιστήμιο Αιγαίου, είτε πολλές φορές αυτόνομα ως σχολείο. Σκοπός μας, να εξετάσουμε, πώς η Εκπαίδευση μαζί με την κοινωνία μπορούν αμοιβαία να συμβάλουν στη διαμόρφωση συμπεριφορών προσανατολισμένων στην αειφορία ώστε οι μαθητές μας έχοντας , τις γνώσεις , τις δεξιότητες και τις αξίες που απαιτούνται για την αειφόρο διαχείριση θεμάτων που αφορούν το περιβάλλον να αποκτήσουν στάσεις και να περάσουν σε δράσεις ως Περιβαλλοντικά «εγγράμματοι» Πολίτες ,Mc Claren 1989, Marcinkowski (1991) στη βάση της υιοθέτησης μιας νέας περιβαλλοντικής συμπεριφοράς βασισμένης στη διατήρηση του περιβάλλοντος και στη βελτίωση της ποιότητας ζωής.
Μέσα από την δημοσίευση των αποτελεσμάτων της εφαρμογής του αειφόρου σχολείου στην τοπική κοινωνία της Ρόδου, θα αναδειχθεί στην πράξη, αν είναι αυτό, που στοχεύει στη διαμόρφωση περιβαλλοντικά υπεύθυνων και εγγράμματων πολιτών .
Για να επιτύχουμε το στόχο μας προσπαθήσαμε να υιοθετήσουμε ποικίλες μεθόδους βιωματικής (Φλογαΐτη, 1998)και ενεργητικής μάθησης.

Abstract

Our topic focuses on the case study of the 2nd Pilot Primary School of Rhodes. This school works under the Department of Pedagogy and Elementary Education, of the University of the Aegean. The school holds the title of "sustainable school".
Our school participated in the contest of "sustainable school". The first reason for that was that the sustainable school is a dynamic and evolving concept, since it is linked to the most innovative educational reform of recent years, world wide. The second was to overpass the prefectural level of innovations, as over the last 10 years plenty of programs are carried out in our school. These were held either, in cooperation with environmental education, health promotion and cultural issues consultants, or in cooperation with the University of the Aegean, or even by the school itself individually.
The aim was to identify patterns through which Educational organisations, along with the society can cooperate, to develop 'sustainability-friendly' pupils. These pupils would be qualified with the knowledge, skills and values, which are necessary to deal with challenges concerning the environment and sustainable development. The pupils would also develop relevant attitudes and adopt actions of 'Environmentally Literate' civilians. These would be in the contest of a new

environmentally friendly behaviour, focusing on environment protection and life-quality improvement.

What makes the particular case study is interesting is the publication of the results of the application of 'sustainable school' in the local community of Rhodes. More specifically the dissemination of results will prove whether the sustainable school actually aims at the development of environmentally-wise responsible and literate civilians, through the establishment of interactive and open pedagogical approaches. The will be based on the development of cooperation networks:

At initial level with the local community

At a later stage with the wider community

Aiming to develop a new moral code that code will include personal action and cooperation at individual and group level, to improve life quality. That is through establishment and promotion of environmentally friendly actions and attitudes.

This way and having in mind the contest, the environmental needs and challenges of the local community, we tried to form and dynamic link, with the local community. This happened through adaptation of the Curriculum.

The importance of this "turn" of the educational organization, towards sustainability and the outcome of this action to the local Rhodian community, through experimental and hands-on educational interventions, is a challenge for everyone involved in topics around sustainable development.

The transition of an educational organization to a sustainable one is an innovation. Within the context of that innovation, a huge part of the curriculum had to be adapted. The syllabus of many units had to be linked to the particularities, challenges and traits of the local community. Of course the pupils experience and interests was taken into consideration as well. This lead to fruitful learning outcome, through to the activation of the intellectual capital of school.

To achieve our aims, we tried to adopt various actions of experimental active learning. These were:

1) Learner-oriented.
2) Group-oriented.
3) Cross –curricular, Integrative
4) Project,
5) Case study

This aimed to activate the whole mental, sentimental and inner world of the educator.

Διαμόρφωση σχολικής μονάδας σε αειφορική

Η προσπάθεια της σχολικής μονάδας για διαμόρφωση της σε αειφορική οργανώνεται με βάση τις δικές της ανάγκες, ιδιαιτερότητες και προβλήματα της κοινότητάς της , αλλά αξιοποιεί μία σειρά θεματικών πεδίων του Αναλυτικού Προγράμματος (Διαθεματικότητα) καθώς και νέους ρόλους για τη διεύθυνση: Μετάβαση από το μοντέλο του διευθυντή-διοικητικού-επόπτη, στο μοντέλο του ηγέτη-καθοδηγητική, οραματιστή, αφού καθοριστικό ρόλο για την επίτευξη της βιώσιμης ατζέντας του σχολείου έχει να επιτελέσει ο ρόλος της διεύθυνσης. Davies, B. & Davies, B. (2004), Ζαχαρίου, Α. (2005).

Γίνεται ετοιμασία σχετικής έκθεσης για την υπάρχουσα κατάσταση στο σχολείο καθώς και επιμόρφωση σε σχολική βάση και σχεδιασμός μακροχρόνιου πλάνου με σκοπούς και στόχους για κάθε ζήτημα (λειτουργία του σχολείου, Α.Π., εμπλοκή-συμμετοχή σχολείου κοινότητας)

Με καθολική συμμετοχή όλων των εκπαιδευτικών και όλων των μαθητών του προκειμένου να οργανώσουμε τη σχολική μας μονάδα σε αειφορική ακολουθήθηκε η παρακάτω διαδικασία:

- Συνεδρίαση συλλόγου διδασκόντων .
- Συνεδρίαση συλλόγου διδασκόντων, σχολικού συμβουλίου και εποπτικού συμβουλίου του Πανεπιστημίου Αιγαίου.
- Συνεδρίαση του συλλόγου διδασκόντων και μαθητικού συμβουλίου, όπως προέκυψαν κατά τις σχολικές εκλογές του Οκτωβρίου.

- Συνεδριάσεις μαθητών κατά τμήμα με τον υπεύθυνο εκπαιδευτικό.
- Συνεδρίαση εκπαιδευτικών , μαθητικών συμβουλίων, σχολικού συμβουλίου και εποπτικού συμβουλίου του Πανεπιστημίου Αιγαίου.
- Ανακοίνωση στην τοπική κοινωνία για την απόφαση του σχολείου να συμμετέχει στο Βραβείο Αειφόρου Σχολείου καθώς και του σχεδίου δράσης.

Κατανοείται από τους εκπαιδευτικούς και από όλους τους εμπλεκόμενους στη μαθησιακή διαδικασία η ενιαιότητα της μάθησης. Συνειδητοποιείται ότι η οικολογική γνώση δεν αρκεί για την αντιμετώπιση των περιβαλλοντικών προβλημάτων. Η διαμόρφωση περιβαλλοντικά υπεύθυνων πολιτών απαιτεί την ενσωμάτωση των κοινωνικών πτυχών της Π.Ε. οι οποίες μπορούν να συμβάλλουν στη διαμόρφωση περιβαλλοντικά υπεύθυνων πολιτών .

Σε ένα τέτοιο πλαίσιο εκείνο το οποίο κατανοείται είναι ότι η αναζήτηση εναλλακτικών λύσεων στα περιβαλλοντικά προβλήματα απαιτεί γνώση των πολιτικών, κοινωνικών, πολιτιστικών συνιστωσών του περιβάλλοντος.

Για να επιτύχουμε το στόχο μας προσπαθήσαμε να υιοθετήσουμε όσο το δυνατό εμείς και οι μαθητές μας κατάλληλες νοοτροπίες και συμπεριφορές , που αναγνωρίζουν την ανάγκη διατήρησης των κοινών αγαθών μέσα από ένα βιωματικό και συνεργατικό και μαθησιακό περιβάλλον. Επίσης περάσαμε σε δράσεις με απώτερο σκοπό την ορθή διαχείριση των τοπικών περιβαλλοντικών προβλημάτων στα πλαίσια της αειφορίας.

Ακολουθώντας αυτή τη συλλογιστική προχωρήσαμε από τη μεταβιβαστική μάθηση (Huckle & Sterling, 2001), στη μετασχηματιστική(Tilbury & Wortman, 2004)

Κινηθήκαμε σε ένα τέτοιο πλαίσιο έτσι ώστε η εκπαίδευση δεν προσανατολίστηκε να εμφυσήσει στους μαθητές προκαθορισμένες επιλογές, ούτε στηρίχθηκε σε ένα προαποφασισμένο πλαίσιο στόχων το οποίο θα πρέπει να επιτευχθεί από όλους. Βασιστήκαμε στην ανάπτυξη από τους μαθητές και γενικότερα όλους τους εμπλεκόμενους στη μαθησιακή διαδικασία στην έρευνα, στην κριτική ικανότητα, στην ερμηνεία ζητημάτων στην αναζήτηση λύσεων σε τοπικά ζητήματα και σε συγκεκριμένες καταστάσεις.

Επιλέξαμε, ως σημείο εισόδου στο διαγωνισμό «Ενέργεια - Νερό». Η ενασχόληση με το ζήτημα της ενέργειας και του νερού εκτός από επίκαιρη σε τοπικό, εθνικό αλλά και παγκόσμιο επίπεδο, μας έδωσε την ευκαιρία να προσαρμόσουμε μεγάλο μέρος του αναλυτικού μας προγράμματος σύμφωνα με τις ανάγκες της τοπικής κοινωνίας , έτσι ώστε οι μικροί μας μαθητές να είναι επί της ουσίας οι πρωταγωνιστές στην διαδικασίας της μάθησης και εμείς οι συνοδοιπόροι.

Η συμμετοχή του σχολείου μας στο διαγωνισμό «Αειφόρο σχολείο», ήταν καθολική. Δηλαδή συμμετείχαν όλοι οι εκπαιδευτικοί και όλοι μαθητές. Επίσης είχαμε ένα ποσοστό 60% των γονέων. Χωριστήκαμε σε ομάδες:
- 1.Οι Νερίτες Ιππότες
- 2. Οι Ρόδιοι ανακυκλωτικοί Ιππότες
- 3. Ενέργειας
- 4. Δημοσίων σχέσεων

Προσαρμόσαμε το αναλυτικό πρόγραμμα σύμφωνα με τις ανάγκες της σχολικής μονάδας και της τοπικής κοινωνίας. Δηλαδή δώσαμε τοπική διάσταση στα αντικείμενα που διαπραγματεύονται τα σχολικά εγχειρίδια με γνώμονα την αειφορία και τα ενδιαφέροντα των μαθητών μας.

Η παιδαγωγική αξία του εγχειρήματος απαιτούσε την εφαρμογή ποικιλίας μεθοδολογιών και τεχνικών ώστε οι εκπαιδευόμενοι:
- Να εκφραστούν
- Να αναλύσουν καταστάσεις
- Να αισθανθούν
- Να καταλήξουν σε αποφάσεις
- Μετά από κάθε απόφαση να καταλήγουν σε μία έκφραση Επομένως ο κάθε μαθητής μας μετατρέπεται:
  - Από παθητικό δέκτη γνώσεων σε δυναμικό αναζητητή της πληροφορίας και της γνώσης
  - Από τη μοναξιά της ατομικής προσπάθειας στη χαρά της ομαδικής συνεργασίας και δράσης
  - Από την παθητικότητα της ακρόασης στο δυναμισμό της κοινωνικής διερεύνησης και δράσης

■ Παράγει ένα συγκεκριμένο έργο, με την ομάδα του, το οποίο συνήθως αποτυπώνεται σε κάποιο τελικό χειροπιαστό προϊόν, όπως στη δική μας περίπτωση

Δώσαμε λοιπόν πολλές δυνατότητες για την ανάπτυξη ποικίλων ικανοτήτων, δεξιοτήτων όπως:

α. Την αναλυτική-συνθετική ικανότητα του μαθητή,

β. Την κριτική σκέψη και τη διερευνητική στάση απέναντι στη γνώση

γ. Την παρατηρητικότητα, τη δημιουργικότητα, τη συνεργασιμότητα, τη συλλογικότητα, την υπευθυνότητα, και δημιουργικότητα τη χαρά και ικανοποίηση για την παραγωγή υλικού και την παρουσίασή του,

δ. Τις δεξιότητες αυτόνομης μάθησης, αυτενέργειας, υπευθυνότητας και εκδήλωσης πρωτοβουλιών από τους μαθητές καθώς και επικοινωνίας που χρειάζεται ο μαθητής.

Αναλυτικά η πορεία που ακολουθήθηκε:

Βήμα 1 Επιλογή θέματος
Επιλέγουμε το θέμα του προγράμματός μας ανάλογα με:
■ Τα ενδιαφέροντα των μαθητών μας
■ Τα τοπικά προβλήματα
■ Τα προσφερόμενα μέσα στην περιοχή του σχολείου μας
■ Την επικαιρότητα
■ Το αναλυτικό πρόγραμμα.

Βήμα 2 Ανίχνευση της προϋπάρχουσας γνώσης
Πραγματοποιείται με συζήτηση ή συμπλήρωση ερωτηματολογίου. Τα στοιχεία που προκύπτουν :
■ Λαμβάνονται υπόψη στη δόμηση του προγράμματος.
■ Αναδεικνύουν εσφαλμένες αντιλήψεις, ιδέες και αναπαραστάσεις της πραγματικότητας, όπου χρειάζεται γίνεται η σχετική αναδόμησή τους.
■ Αναδεικνύουν σημεία στα οποία υπάρχουν αντικρουόμενες απόψεις, γύρω από τις οποίες μπορεί να οργανωθεί το πρόγραμμα.
■ Οργανώνεται η διεξαγωγή του προγράμματος με ποικιλία μέσων. Είναι αναγκαίο να αποκτήσουν εμπειρία για το πώς γίνονται:

Οι ατομικές ή ομαδικές έρευνες

Οι συλλογικές εργασίες προφορικές ή γραπτές

Η μελέτη στο πεδίο

Τα απλά πειράματα

Οι συναντήσεις με ειδικούς στην τάξη ή στο τόπο εργασίας τους

Η ανάλυση αξιών

Η χρήση και άλλων μέσων έκφρασης εκτός απ' το γραπτό και προφορικό λόγο

Η επαφή με κοινωνικούς φορείς

Η προσέγγιση απλών κατοίκων

Η αξιοποίηση της γνώσης και της εμπειρίας των ηλικιωμένων

Βήμα 3 Καθορισμός των στόχων του προγράμματος

Βήμα 4 Κατάτμηση του έργου σε μικρότερα τμήματα και οργάνωση των μαθητών σε ομάδες
Αφού αποφασίστηκε τι θα διερευνηθεί, τέθηκαν οι ερωτήσεις της έρευνας σχεδιάστηκαν οι δραστηριότητες, καταγράφηκαν οι πηγές πληροφόρησης, αποφασίστηκαν οι τρόποι διάχυσης των αποτελεσμάτων του project κ.ά.

Οι μαθητές ανέλαβαν ομαδικά ένα τμήμα του έργου γνωρίζοντας όλη την πορεία, τους στόχους και τις δραστηριότητες που θα κάνουν για να τους πετύχουν.

Βήμα 5 Εκτέλεση των δραστηριοτήτων

Βήμα 6 Σύνθεση των επιμέρους εργασιών
Στο στάδιο αυτό η κάθε ομάδα συγκεντρώνει και επεξεργάζεται όλες τις πληροφορίες της όπως:
■ Επεξεργάζεται τα ερωτηματολόγια ή τις συνεντεύξεις.
■ Οργανώνει κριτικά όλα τα στοιχεία που συγκεντρώθηκαν σε πίνακες, διαγράμματα, χάρτες κ.ά.
■ Συγγράφει τα τελικά κείμενα.
■ Διατυπώνει συμπεράσματα.
■ Καταγράφει τις προτάσεις.

■ Οργανώνει έκθεση του οπτικού υλικού.
■ Αποφασίζεται η εκδήλωση κάποιας δράσης.

Βήμα 7 Γνωστοποίηση του προγράμματος

Η γνωστοποίηση του προγράμματος έγινε:
■ Με ανακοινώσεις στους πίνακες ανακοινώσεων του σχολείου
■ Με οργάνωση εκθέσεων φωτογραφίας, ζωγραφικής, μακέτας, υλικού κ.ά.
■ Με εκδήλωση στο σχολείο και την τοπική κοινωνία η οποία θα περιλαμβάνει: Ανακοινώσεις των εργασιών, Θεατρικά, Δραματοποιήσεις, Παίξιμο ρόλων, Αφίσες, Φωτογραφίες, Μακέτες, Έκθεση ζωγραφικής, Έκθεση υλικού
■ Με μια τελική έκδοση του προγράμματος.
■ Δημιουργία ιστοσελίδας και BLOG-Περιβάλλοντος

Βήμα 8 Αξιολόγηση της πορείας και των αποτελεσμάτων

Κατανομή χρόνου

■ Αφού καταλήξαμε στα θέματα ενασχόλησης συγκροτήσαμε την παιδαγωγική ομάδα και παρουσιάσαμε σε , μαθητές και γονείς τις προτεινόμενες δραστηριότητες έτσι, ώστε να αποφασίσουμε από κοινού τις ενέργειες που πρέπει να πραγματοποιήσουμε, ποιοι και με ποιον τρόπο μπορούν να συνδράμουν στην ολοκλήρωση του προγράμματος μέσα στο Σεπτέμβρη.
■ Από το μήνα Οκτώβριο εισερχόμαστε στη δεύτερη φάση της περιγραφής και της οργάνωσης των δραστηριοτήτων με κριτήριο πόσο χρόνο απαιτούν.
■ Προγραμματίζουμε τις δράσεις εκτός σχολείου σε χρονικά διαστήματα που το επιτρέπουν οι καιρικές συνθήκες (φθινόπωρο – άνοιξη).
■ Προγραμματίζουμε ενημερώσεις από ειδικούς, επεξεργασία δεδομένων και ενδιάμεσες παρουσιάσεις σε κλειστό χώρο κατά την διάρκεια του χειμώνα.
■ Κατά το μήνα Μάρτιο ξεκινά η σύνθεση των δεδομένων που έχουν συλλεχθεί και η προετοιμασία των παρουσιάσεων των εργασιών.
■ Τον Απρίλη γίνονται οι τελικές συμπληρώσεις, απορρίπτεται ό,τι δεν λειτούργησε όσα δεν «περπάτησαν» με επιτυχία και γίνονται δοκιμαστικά των τελικών παρουσιάσεων.
■ Με την επιστροφή της ομάδας από τις πασχαλινές διακοπές παρουσιάζονται όσα ετοιμάστηκαν στο κοινό.
■ Επαλήθευση:
■ Η διαμορφωτική αξιολόγηση γίνεται:
■ Με τήρηση ημερολογίου,
■ Με συζητήσεις ανάμεσα στην ομάδα, τόσο την παιδαγωγική όσο και την μαθητική,
■ Με παρατήρηση της συμπεριφοράς των μαθητών, όπως πώς αντιδρούν σε συγκεκριμένα προβλήματα,
■ Με τη μελέτη των κειμένων, των εικαστικών δημιουργιών ή άλλων κατασκευών,
■ Με ερωτηματολόγια

Αναλυτικά σας παραθέτουμε …

Ενέργεια

1. Κριτήρια Επιλογή θέματος

Το θέμα της ενέργειας είναι πάντα επίκαιρο και ενδιαφέρον. Παρουσιάζει το πλεονέκτημα της διεπιστημονικής αντιμετώπισης και επομένως δίνει ευκαιρία για εμπλοκή σε αυτό πολλών παραγόντων, τόσο του σχολείου όσο και της τοπικής κοινωνίας. Το θέμα έχει τοπική, εθνική και παγκόσμια διάσταση. Προσφέρεται για συλλογή και ανταλλαγή πληροφοριών, επεξεργασία και εξαγωγή συμπερασμάτων.

2. Εκπαιδευτικοί στόχοι

Οι μαθητές/ριες

Να αναγνωρίζουν τις ενεργειακές πηγές

Να διαχωρίζουν τις ανανεώσιμες πηγές ενέργειας από τις συμβατικές

Να διαπιστώσουν ότι ο ήλιος είναι η πρωταρχική πηγή ενέργειας

Να αναγνωρίζουν τα πλεονεκτήματα και μειονεκτήματα των εναλλακτικών μορφών της ενέργειας

Να αναφέρουν γεωγραφικά διαμερίσματα της Ελλάδας όπου μπορεί να γίνει εκμετάλλευση εναλλακτικών μορφών ενέργειας

Να ευαισθητοποιηθούν στην κατανάλωση της ενέργειας

Να αποκτήσουν θετική στάση και συμπεριφορά στο πρόβλημα/ζήτημα της εξοικονόμησης της ενέργειας

Να υπολογίζουν την απώλεια της θερμικής ενέργειας στο σπίτι τους

Να καταγράφουν τους παράγοντες που επιδρούν στην απώλεια της θερμικής ενέργειας

Να υπολογίζουν την ηλεκτρική ενέργεια που καταναλώνουν στην καθημερινή τους ζωή

Να ευαισθητοποιηθούν στα ενεργειακά προβλήματα της τοπικής κοινωνίας

Να καταγράψουν τις αρνητικές επιπτώσεις της υπερκατανάλωσης της ενέργειας

Να συσχετίζουν λογοτεχνικά κείμενα με το ενεργειακό πρόβλημα/ζήτημα

Να καλλιεργήσουν πνεύμα συνεργασίας και υπευθυνότητας

Να ασκηθούν στη μεθοδολογία της έρευνας

Να αναπτύξουν στάσεις και δεξιότητες με αειφορικές διαστάσεις σε σχέση με τη διαχείριση της ενέργειας

Να καλλιέργησουν αξίες

Να συμμετέχουν στη λήψη αποφάσεων και στην ανάληψη δράσεων Να καλλιεργήσουν ήθος που θα αναγνωρίζει την ανάγκη διατήρησης των κοινών αγαθών.

3. Μέθοδοι υλοποίησης

Μαθητοκεντρική

Ομαδοκεντρική

Διαθεματική - Διεπιστημονική

4. Εκπαιδευτικές δραστηριότητες

Project –Μελέτη περίπτωσης

α. Αναγνώριση-εντοπισμός προβλήματος

Μελέτη της παρούσας κατάστασης -αναζήτηση κι εντοπισμός προβλήματος. Τα παιδιά μελετούν και καταγράφουν τις συσκευές που είναι αναμμένες στο σπίτι, τα φώτα και τις ώρες λειτουργίας τους, όπως επίσης και το ποσό που πληρώνουν στη ΔΕΗ. Καταμέτρηση συνολικών κιλοβατώρων στο   σχολείο   και   στα   σπίτια   των   παιδιών   -).

β. Αίτια προβλήματος

Μελέτη για τη σπατάλη ηλεκτρικού ρεύματος στο σχολείο και στο σπίτι. Χαρτογράφηση σχολικού κτηρίου, σχεδιασμός των σημείων. Εντοπίζεται η πιο πολλή σπατάλη ενέργεια. παρουσίαση αποτελεσμάτων με γραφική παράσταση.

γ. Συνέπειες στο περιβάλλον (συλλογή πληροφοριών, οργάνωση, επεξεργασία και ανάλυση)

δ. Εναλλακτικές λύσεις - αξιολόγησή τους

Αφού έγινε η μελέτη και επεξεργάστηκαν οι πληροφορίες, προτάθηκαν λύσεις εξοικονόμησης, τις οποίες εφάρμοσαν και θα αξιολόγησαν. Καταμέτρηση ξανά για 2 διμηνίες. Εισηγήσεις εξοικονόμησης όσο το δυνατό περισσότερης ενέργειας, συνεπώς και χρημάτων που μπορούν να αξιοποιηθούν για άλλο σκοπό.

ε. Μελέτη πηγών ενέργειας και μορφών ενέργειας

στ. Επίσκεψη στο πεδίο και πραγματοποίηση περιβαλλοντικών παιχνιδιών

5. Δράσεις – παρεμβάσεις

Δημοσίευση στην ιστοσελίδα του Σχολείου μας των καλύτερων ζωγραφιών, εργασιών και ποιημάτων των μαθητών μας.

Δημοσίευση του οικολογικού κώδικα, φωτογραφιών από τις οικολογικές μας δραστηριότητες και των συμβουλών για τα μέτρα εξοικονόμησης της ενέργειας.

Επίβλεψη στα διαλείμματα από υπεύθυνους μαθητές με ειδική σήμανση εξοικονόμησης ενέργειας σβήσιμο των φώτων και των ηλεκτρικών συσκευών.

Δημιουργία σχολικού διαγωνισμού ποιήματος ή τραγουδιού με θέμα την ενέργεια.

Καταγραφή αμαξιών και επιβατών κατά την άφιξη και αποχώρηση των μαθητών

Περιβαλλοντικά παιχνίδια.

Υπαίθριες δραστηριότητες.

Συνάντηση και ενημέρωση των γονέων για τους στόχους του προγράμματος και εισηγήσεις για περιβαλλοντική συμπεριφορά στο σπίτι

Συνάντηση με το δήμαρχο της Ρόδου ,έκθεση της υφιστάμενης κατάστασης και προτεινόμενων λύσεων.

Νερό

1. Κριτήρια Επιλογή θέματος

Το θέμα του νερού είναι επίκαιρο. Παρουσιάζει το πλεονέκτημα της διεπιστημονικής αντιμετώπισης και επομένως δίνει ευκαιρία για εμπλοκή σε αυτό πολλών παραγόντων, τόσο του σχολείου όσο και της τοπικής κοινωνίας. Το θέμα έχει τοπική, εθνική και παγκόσμια διάσταση. Προσφέρεται για συλλογή και ανταλλαγή πληροφοριών, επεξεργασία και εξαγωγή συμπερασμάτων.

2. Εκπαιδευτικοί στόχοι

Η ενημέρωση και ευαισθητοποίηση των παιδιών και κατ' επέκταση της τοπικής κοινωνίας για τις αξίες, τα αποθέματα του νερού.

Η ενεργός συμμετοχή των παιδιών, μέσα από προσιτές και εύκολες περιβαλλοντικές δραστηριότητες, που μπορούν να πραγματοποιηθούν μέσα και γύρω από το σχολείο τους

Η δημιουργία κινήτρων, μέσων και μηχανισμών για τη σταδιακή βελτίωση του τοπικού περιβάλλοντος, με τη συνδρομή και συμμετοχή της Τοπικής Αυτοδιοίκησης, των φορέων της περιοχής, αλλά και της εθελοντικής εργασίας όλων γενικότερα

Η αλλαγή των παραδοσιακών στάσεων και αντιλήψεων στον ευρύτερο κοινωνικό ιστό, ως προς το περιβάλλον, την προστασία, την ανάδειξη και τη βιώσιμη ανάπτυξη.

Η ανάπτυξη στάσεων και αξιών για την ορθολογική χρήση του νερού.

3. Μέθοδοι υλοποίησης

Μαθητοκεντρική

Ομαδοκεντρική

Διαθεματική – Διεπιστημονική

Εκπαιδευτικές δραστηριότητες

Project

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β. Αίτια προβλήματος

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Δημοσίευση στην ιστοσελίδα του Σχολείου μας των καλύτερων, εργασιών και ποιημάτων των μαθητών μας.

Δημοσίευση του οικολογικού κώδικα, φωτογραφιών από τις οικολογικές μας δραστηριότητες και των συμβουλών για τα μέτρα εξοικονόμησης του νερού.

Επίβλεψη στα διαλείμματα από υπεύθυνους μαθητές με ειδική

σήμανση εξοικονόμησης νερού κλείσιμο των βρυσών.

Δημιουργία εξοικονόμησης του νερού στις τουαλέτες με την τοποθέτηση μπουκαλιών στα καζανάκια.

Δημιουργία σχολικού διαγωνισμού ποιήματος ή τραγουδιού με θέμα το νερό και δημοσίευσης του στον τύπο.

Δημιουργία παραμυθιού ή κόμικ με θέμα την εξοικονόμηση νερού.

Ανάρτηση κανόνων ορθής χρήσης του νερού.

Περιβαλλοντικά παιχνίδια.

Υπαίθριες δραστηριότητες.

Συνάντηση και ενημέρωση των γονέων για τους στόχους του προγράμματος και εισηγήσεις για περιβαλλοντική συμπεριφορά στο σπίτι

Συνάντηση με το δήμαρχο της Ρόδου ,έκθεση της υφιστάμενης κατάστασης και προτεινόμενων λύσεων.

Αποτελέσματα:

Έχοντας στο μυαλό μας πως...

Τα σχολεία πρέπει να διδάξουν τα παιδιά μας από το παράδειγμα καθώς επίσης και από την οδηγία. DfES 5 Yr Strategy, 2004 και έχοντας ως **γνώμονα πως η δράση στοχεύει στην επίλυση του προβλήματος εργαστήκαμε και πετύχαμε**

Ανακύκλωση

- Περιορισμός της χρήσης φυλλαδίων και των συσκευασιών μιας χρήσης.
- Δημιουργία έκθεσης με θέμα «τα χρήσιμα άχρηστα».
- Οργάνωση παζάρ με ανταλλαγή παιχνιδιών και βιβλίων.
- Ομιλίες από εκπροσώπους της ΑΦΗΣ, με θέμα την «Ανακύκλωση των μπαταριών ».
- Δημιουργία βιολογικών σαπουνιών.

Νερό

- Δημιουργία σχολικού διαγωνισμού ποιήματος ή τραγουδιού με θέμα το νερό.
- Δημιουργία παραμυθιού
- Μείωση κατανάλωσης νερού στις σχολικές τουαλέτες με την τοποθέτηση αυτοσχέδιων μπουκαλιών.
- Επίβλεψη στα διαλείμματα από υπεύθυνους μαθητές με ειδική σήμανση εξοικονόμησης νερού (έλεγχος βρυσών και τουαλετών).
- Περιβαλλοντικά παιχνίδια.
- Υπαίθριες δραστηριότητες.

όπως , προκύπτει από τα παραπάνω οι μικροί μας μαθητές, ως υπεύθυνοι περιβαλλοντικά πολίτες πέρασαν σε μία σειρά δραστηριοτήτων και δράσεων με απώτερο σκοπό την ορθή διαχείριση των τοπικών περιβαλλοντικών προβλημάτων στα πλαίσια της αειφορίας δημιουργώντας ένα αξιόλογο εκπαιδευτικό υλικό. Συγκεκριμένα:

- Εκπαιδευτικό Υλικό-POWER POINT
- Ταινία: Ένας Πλανήτης Μια Ευκαιρία
- Περιοδικό: Τρισδιάστατο
- SCRATCH-Τα Ζώα της Ρόδου προς εξαφάνιση
- Ένθετο Αειφορίας-Οδηγός Καλής Χρήσης
- VIDEO : Η Χημεία της Τέχνης, Μια διαθεματική προσέγγιση της χημείας
- Επιδαπέδιο περιβαλλοντικό παιχνίδι -«Ανανεώσιμες Πηγές Ενέργειας»
- Βιβλία: Παραμύθια (ποσότητα=8τεύχη)
- Συλλογικά έργα_Παραγωγή Παραμυθιών, αποτέλεσμα ευαισθητοποίησης των μαθητών με θέμα τα ζώα προς εξαφάνιση
- Υλικό Ιστοσελίδας και BLOG-Περιβάλλοντος
- www.2opeiramatiko-rodou.eu
- www.natura.2opeiramatiko-rodou.eu
- Παράδειγμα τοπικού εντύπου, τοπικών αρχών, εθνικού συλλόγου εκπαιδευτικών κλπ.
- Δημοσιεύσεις σε Τοπικό Τύπο Δράσεων
- Συμμετοχή σε Πανελλήνιους Διαγωνισμούς: Πρωτοπόροι Δάσκαλοι
- Ανάρτηση ανάλογης θεματικής στα Αριστεία 2012
- Συμμετοχή σε τοπικούς διαγωνισμούς π.χ. «ανταποδοτική ανακύκλωση
- Περιβαλλοντικά άρθρα στο σχολικό περιοδικό που διανέμονται και στην τοπική κοινωνία
- Οδηγίες-ένθετο για το κοινό
- Δράσεις με περιβαλλοντικό εκθεσιακό προφίλ σε δημόσιο χώρο: Από το παιδί για το Παιδί!!!
- Ανακοινώσεις μετά από δράσεις στην Ιστοσελίδα του σχολείου
- Δημιουργία αποκλειστικά Περιβαλλοντικού –BLOG

- Αφίσες-Πινακίδες
- δηλώσεις με πρόσκληση τοπικών φορέων όλων των επιπέδων, σε εκδηλώσεις: Χριστούγεννα-Γιορτή Βιβλίου-Γιορτή μητέρας με Bazaar: με έργα από άχρηστα υλικά, χειροτεχνίες μαθητών του σχολείου, συμμετοχή στην Παγκόσμια Ημέρα Περιβάλλοντος και στη γιορτή λήξης, καθώς επίσης
- ΗΜΕΡΙΔΑ «μαθητικών εισηγήσεων» με θέμα το Περιβάλλον
- Τρισδιάστατη απόδοση του πραγματικού κόσμου σε μικρογραφία με αειφορική προοπτική…- έκθεση σε ευρύ κοινό
- Δεντροφύτευση
- Υιοθεσία αρτάνες του Δήμου Ρόδο, ενταγμένη στο Πρόγραμμα: «Αγκάλιασε ένα Πάρκο»
- Συμμετοχή στο Πρόγραμμα: Πρασινίζοντας τις αυλές των Σχολείων-Γραφείο Εθελοντών Δήμου Ρόδου
- Συμμετοχή στο Πρόγραμμα: Δημιουργικές Συζητήσεις- Γραφείο Εθελοντών Δήμου Ρόδου

Συμπεράσματα

Με καθολική συμμετοχή όλων των εκπαιδευτικών και όλων των μαθητών του σχολείου μας μέσω ποικίλων δράσεων επιτύχαμε σε μεγάλο βαθμό τη μείωση της κατανάλωσης ενέργειας, νερού, χαρτιού, το άνοιγμα του σχολείου στην κοινωνία, την ανάπτυξη στάσεων και συμπεριφορών από όλα τα μέλη της σχολικής κοινότητας που συνάδουν με τις αρχές της αειφορίας.

Οι μικροί μας μαθητές, ως υπεύθυνοι περιβαλλοντικά πολίτες πέρασαν σε μία σειρά τηριοτήτων και δράσεων με απώτερο σκοπό την ορθή διαχείριση των τοπικών περιβαλλοντικών προβλημάτων στα πλαίσια της αειφορίας. Έτσι δημιούργησαν ένα αξιόλογο εκπαιδευτικό υλικό με θεματολογία από τα περιβαλλοντικά ζητήματα της Ρόδου. Υιοθέτησαν περιοχές εντός και εκτός πόλεως Ρόδου και δεντροφύτευσαν, Δημιούργησαν ιστοσελίδα και BLOG περιβάλλοντος έχοντας την ευκαιρία να δημοσιεύουν τις δράσεις – παρεμβάσεις τους σε θέματα που προβληματίζουν την τοπική κοινωνία εκθέτοντας την υφιστάμενη κατάσταση και προτείνοντας λύσεις

Όσον αφορά τη συμβολή του εγχειρήματος στη λειτουργία της σχολικής μονάδας, στα πλαίσια της συμμετοχής του σχολείου μας στον Πανελλήνιο Διαγωνισμό Αειφόρο Σχολείο επιχειρήσαμε να εντάξουμε στο πρόγραμμα μας έν μέρη την Αξιολόγηση του Εκπαιδευτικού Έργου της σχολικής μονάδας, έτσι ώστε να χαρτογραφήσουμε –αποτυπώσουμε το πραγματικό άνοιγμα του σχολείου στην τοπική κοινωνία της Ρόδου στα πλαίσια της εκπαίδευσης για την αειφορία. Τα μεθοδολογικά εργαλεία που χρησιμοποιήσαμε για τη συστηματική καταγραφή των διαφόρων πληροφοριών που συνδέονται με την ανάπτυξη/εφαρμογή της ΑΕΕ στο σχολείο ήταν :

1. Το ημερολόγιο, το οποίο αποτελεί ένα σημαντικό μεθοδολογικό εργαλείο για τη συστηματική καταγραφή των διαφόρων πληροφοριών, που συνδέονται με την ανάπτυξη/εφαρμογή της ΑΕΕ στο σχολείο στα πλαίσια της αειφορίας.

2. Ενδεικτικά Παραδείγματα Σχεδίων Συνέντευξης και Παρατήρησης για την ποιοτική αποτίμηση περιοχών του εκπαιδευτικού έργου και την προετοιμασία σχεδίων δράσης για τη βελτίωση της ποιότητας του εκπαιδευτικού έργου στα σχολεία εναρμονισμένο με την εκπαίδευση για την αειφορία.

Α. Σχέδιο Συνέντευξης με γονείς μαθητών/τριών

Θεματικό πεδίο: Συνεργασία/Επικοινωνία

Θεματικό πεδίο : Σχολική ζωή / Κλίμα και σχέσεις στο σχολείο

Θεματικό πεδίο: Φυσικό Περιβάλλον του σχολείου / Ασφάλεια των μαθητών στο σχολείο

3. Μετρήσιμους δείκτες, σύμφωνα με τη συμμετοχή μας στον Πανελλήνιο Διαγωνισμό Αειφόρο Σχολείο

o Παιδαγωγικοί δείκτες (Αναλυτικό Πρόγραμμα - Μεθοδολογίες)

o Κοινωνικοί και οργανωτικοί δείκτες (Διοίκηση, μαθητικές κοινότητες, γονείς)

o Περιβαλλοντικοί δείκτες

Εν κατακλείδι πιστεύουμε πως συμβάλαμε, αφενός στην επίτευξη σημαντικών στόχων για τη δημιουργία ενεργών πολιτών και αφετέρου στην ανάπτυξη δεξιοτήτων και στάσεων σε μαθητές και εκπαιδευτικούς για τη χρήση στρατηγικών για τη διερεύνηση πηγών και δεδομένων και για την αποσαφήνιση αξιών και την εξεύρεση πιθανών λύσεων καθώς και στην καλλιέργεια αισθήματος προσωπικής ευθύνης και δέσμευσης απέναντι στα τοπικά ζητήματα.

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Μελέτη Περίπτωσης (Case Study): Η Συμμετοχή του 2ου ΕΠΑΛ Ηρακλείου στον Πρώτο Διαγωνισμό «Βραβείο Αειφόρου Σχολείου»

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Περίληψη

Αυτή η περιπτωσιολογική μελέτη έγινε για να εξετάσουμε την επίδραση που είχε στην σχολική κοινότητα του 2[ου] ΕΠΑΛ Ηρακλείου, η συμμετοχή των καθηγητών και μαθητών στο διαγωνισμό.
Το «Αειφόρο Σχολείο» είναι ένα εφικτό όραμα, μια εφικτή ουτοπία. Η βασική ιδέα του «Αειφόρου Σχολείου» είναι η ενσωμάτωση της ιδέας και των αξιών της αειφορίας σε κάθε πλευρά της ζωής του, δηλαδή στη διοίκηση, στη μαθησιακή διαδικασία, στη διαχείριση των κτηρίων, στις μετακινήσεις από και προς το σχολείο, στις σχέσεις του σχολείου με τη σχολική και την ευρύτερη τοπική κοινότητα. Μπορούμε να κατατάξουμε τα χαρακτηριστικά του αειφόρου σχολείου σε τρεις γενικές κατηγορίες ή σε τρία επίπεδα οργάνωσης: Το παιδαγωγικό, το κοινωνικό και οργανωτικό και το περιβαλλοντικό (http://www.aeiforosxoleio.gr/index.php)
Το «Αειφόρο Σχολείο» είναι κάτι νέο για τα Ελληνικά δεδομένα. Το «Βραβείο Αειφόρου Σχολείου» είναι επίσης ένα καινοτόμο έργο, ένα βραβείο που έχει σκοπό να ενεργοποιήσει όλη την εκπαιδευτική κοινότητα προς την αειφόρο ανάπτυξη.
Η συνεργασία μαθητών, καθηγητών, γονέων, και τοπικής κοινωνίας είναι ένας από τους βασικούς άξονες που θα οδηγήσουν προς την αειφορία. Είναι μια συνεργασία που θα πρέπει να εστιάζει σε ένα κοινό όραμα, δηλαδή, στη βελτίωση του εκπαιδευτικού αποτελέσματος με τελικούς αποδέκτες τους μαθητές, τους αυριανούς πολίτες, την κοινωνία ολόκληρη.
Η ενημέρωση και η ενθάρρυνση για την συμμετοχή του σχολείου μας στον διαγωνισμό «Βραβείο Αειφόρου Σχολείου», έγινε από την υπεύθυνη του Γραφείου Περιβαλλοντικής Εκπαίδευσης Δευτεροβάθμιας Εκπαίδευσης Νομού Ηρακλείου, κ. Μαρία Σφακιανάκη, η οποία υπήρξε πολύτιμη συνεργάτης μας.
Κατά την διάρκεια της σχολικής χρονιάς του διαγωνισμού έγιναν παράλληλες δράσεις σε όλα τα επίπεδα, ενταγμένες σε προγράμματα σχολικών δραστηριοτήτων, αλλά και εκτός προγραμμάτων, μέσα και έξω από το σχολείο.
Πραγματοποιήθηκαν προγράμματα Περιβαλλοντικής Εκπαίδευσης, Αγωγής Υγείας, Σταδιοδρομίας – Επιχειρηματικότητας και Πολιτιστικών θεμάτων. Υπήρξε συνεργασία σχολείου με την τοπική κοινωνία και με τους γονείς των μαθητών. Ακολουθεί παρουσίαση τω δράσεων και παράθεση των αποτελεσμάτων που εξήχθησαν.

Abstract

This case study has been conducted in order to examine the effect of the participation of students and teachers in the Sustainable School Award competition on the school community.
The Sustainable School is an attainable vision, an attainable utopia. The basic idea behind the Sustainable School is the incorporation of the idea and the values of sustainability in every aspect of its life, that is, in administration, the learning process, the management of school buildings, the commute from and to school, the relationship between the school and general local community. We can categorize the characteristics of the Sustainable School into three general categories or levels of organization: Pedagogical, Social and organizational, Environmental (http://www.aeiforosxoleio.gr/index.php)

The Sustainable School is something new to the Greek reality. The Sustainable School Award is also an innovation, an award which aims at activating the whole educational community towards sustainable development.

The cooperation among students, teachers, parents and the local community is one of the keys towards sustainability. It is a cooperation which should focus on a common vision, i.e. the improvement of the educational outcome, with final recipients the students, tomorrow's citizens, and the whole society.

The source of information and encouragement for our school's participation was the Director of the Office of Environmental Education of Heraklio, Ms Sfakianaki Maria, who was an invaluable partner.

During the competition, there were parallel actions at all levels, integrated into school activities projects, as well as outside them, in and out of our school.

Environmental Education, Health Education, Career and Entrepreneurship and Cultural projects were carried out. There was cooperation with the parents of our students and the local community. Next, we are going to present our actions and cite the results which were derived.

Εισαγωγή

Στην εποχή μας τα περιβαλλοντικά προβλήματα που αντιμετωπίζει ο σύγχρονος άνθρωπος, ως αποτέλεσμα του «ιδιαίτερου» τρόπου με τον οποίο διαχειρίζεται το φυσικό περιβάλλον, οδηγούν τελικά στην ανάγκη αναθεώρησης της σχέσης του με αυτό. Σήμερα, άλλωστε, πολλοί είναι εκείνοι που υιοθετούν την άποψη ότι είναι απαραίτητο το χτίσιμο μια νέας κοσμοαντίληψης για το περιβάλλον, ότι απαιτείται, με άλλα λόγια, αφενός μεν σε βάθος γνώση γι' αυτό, αφετέρου δε αλλαγή των περιβαλλοντικών στάσεων καθώς και προβολή και καλλιέργεια των περιβαλλοντικών αξιών (Χαλεπλής, 2008).

Η Οικονομική Επιτροπή του Οργανισμού Ηνωμένων Εθνών για την Ευρώπη (UNECE), στη συνάντηση των Υπουργών Περιβάλλοντος και Παιδείας που πραγματοποιήθηκε στην πόλη Βίλνιους της Λιθουανίας στις 17-18 Μαρτίου 2005, υιοθέτησε το κείμενο «*Στρατηγική της UNECE για την Εκπαίδευση για την Αειφόρο Ανάπτυξη*» (CEP/AC.13/2005/3/Rev.1, 23 Μαρτίου 2005, Agenda σημεία 5 και 6). Η Στρατηγική αποσκοπεί στην αλλαγή της νοοτροπίας των ανθρώπων παρέχοντάς τους τη δυνατότητα να δημιουργήσουν έναν κόσμο περισσότερο ασφαλή, πιο υγιή και με περισσότερη ευημερία, άρα και να συμβάλλει στη βελτίωση της ποιότητας της ζωής (Κατσακιώρη κ.ά., 2008).

Το όραμα που υιοθετήθηκε είναι: Αλληλεγγύη, ισότητα, αμοιβαίος σεβασμός μεταξύ των λαών, των χωρών και των γενεών, είναι οι κοινές αξίες που χαρακτηρίζουν την αειφόρο ανάπτυξη, στην οποία συμπεριλαμβάνονται η οικονομική ευρωστία, η δικαιοσύνη, η κοινωνική συνοχή, η προστασία του περιβάλλοντος και η αειφορική διαχείριση των φυσικών πόρων, έτσι ώστε να ανταποκρίνονται στις ανάγκες των σημερινών γενεών χωρίς να υποθηκεύουν την δυνατότητα των μελλοντικών γενεών να ικανοποιήσουν τις δικές τους ανάγκες (Παγκόσμια Επιτροπή για το Περιβάλλον και την Ανάπτυξη,1987).

Η εκπαίδευση δεν αποτελεί μόνο ανθρώπινο δικαίωμα, αλλά είναι εξίσου απαραίτητη προϋπόθεση για την αειφόρο ανάπτυξη, καθώς επίσης και σημαντικό εργαλείο για καλή διακυβέρνηση, για τη λήψη αποφάσεων «*μετά λόγου γνώσεως*» και για την προώθηση της δημοκρατίας. (Διακήρυξη για την Εκπαίδευση για την Βιώσιμη Ανάπτυξη, Πέμπτη Υπουργική Διάσκεψη «Ένα περιβάλλον για την Ευρώπη», Κίεβο, 2003).

Η Εκπαίδευση για την Αειφόρο Ανάπτυξη (ΕΑΑ) αναπτύσσει και ενισχύει την ικανότητα την ατόμων, των ομάδων, των κοινωνιών, των οργανισμών και των χωρών να διαμορφώνουν απόψεις και επιλογές προς την κατεύθυνση της αειφόρου ανάπτυξης (UNECE, 2005, Agenda σημεία 5 και 6). Παράλληλα, θεωρείται διάδοχος της ΠΕ και δεν μπορεί να στηρίζεται σε μεμονωμένους ενθουσιώδεις εκπαιδευτικούς με περιστασιακό χαρακτήρα όπως γίνονταν και γίνεται μέχρι και σήμερα, αλλά θα πρέπει να αποτελέσει μέρος της καθημερινής εκπαίδευσης όλων των μαθητών και να διαχέεται σε όλη δομή και λειτουργία του σχολείου. Έτσι, θεωρήθηκε ως πιο πρόσφορη πρακτική για την προώθηση της αειφορίας η υιοθέτηση της προσέγγισης που εμπλέκει το όλο

σχολείο 'the whole school approach', που θα έχει διαρκή χαρακτήρα και θα γίνει μόνιμη πολιτική του σχολείου (Gough, 2005).

Πρόκειται για μια ολιστική προσέγγιση που διαπερνά την όλη δομή και λειτουργία του σχολείου και προϋποθέτει μια σχολική κουλτούρα και ένα σχολικό κλίμα που προσδιορίζει ένα πλαίσιο λειτουργίας του σχολείου με χαρακτηριστικά όπως:

- Επικοινωνία και συνεργασία μεταξύ όλων των παραγόντων του σχολείου, των μαθητών, εκπαιδευτικών και γονέων.
- Διδακτικές μέθοδοι που εμπεριέχουν την ενεργό συμμετοχή των μαθητών.
- Παρεμβάσεις από τους εκπαιδευτικούς στο αναλυτικό πρόγραμμα του σχολείου οι οποίες σχεδιάζονται μέσα από συνεργασίες μεταξύ τους και όχι μόνο.
- Ερευνητικό πνεύμα από όλους τους συμμετέχοντες.
- Οργάνωση και λειτουργία κοινοτήτων μάθησης με στόχο τη διαμόρφωση και υλοποίηση των δράσεων αλλά ταυτόχρονα και την επαγγελματική ανάπτυξη των εκπαιδευτικών.
- Η διεύθυνση του σχολείου να διακρίνεται από ευρύνοια, διάθεση και ικανότητες να υποστηρίξει τις απαιτούμενες καινοτομικές δράσεις..
- Ύπαρξη κατάλληλων υποδομών και την απαιτούμενη οικονομική ενίσχυση που εξασφαλίζουν στο σχολείο συνθήκες που υποστηρίζουν την υλοποίηση των όποιων δράσεων αποφασιστούν (Παπαδημητρίου, 2010).

Η διαμόρφωση ενός σχολείου ανοιχτού στην κοινωνία και τα προβλήματα της, συνεπάγεται την δημιουργία μιας κατάλληλης σχέσης που θα μπορούν οι εκπαιδευτικοί και οι μαθητές να συνεργάζονται εύκολα με τους τοπικούς φορείς. Απαιτείται όμως η αλλαγή των καταναλωτικών προτύπων μέσα από την συνειδητοποίηση των προβλημάτων, τη συνεργασία, τον τοπικό διάλογο, τις συμπράξεις και τον ολοκληρωμένο σχεδιασμό (Αποστολάκης & Σφακιανάκη, 2006).

Το όραμα της Βιώσιμης ανάπτυξης είναι μια τοπική κοινωνία με ενεργούς πολίτες που παίρνουν πρωτοβουλίες και δρουν ατομικά και συλλογικά και αυτό συνδυάζεται με ένα σχολείο σύγχρονο, επικοινωνιακό, εξωστρεφές και ασφαλές που καλύπτει στόχους γνωστικούς, συναισθηματικούς και ψυχοκινητικούς (Μεσσάρης, 2005).

Αειφόρο σχολείο είναι αυτό που ετοιμάζει τους νέους για ένα αειφορικό τρόπο ζωής (από τις κατασκευές μέχρι τις καθημερινές πρακτικές) και τους οδηγεί σε μια δέσμευση να νοιάζονται, να φροντίζουν: για την υγεία και ευημερία των ίδιων, για τους άλλους (ανεξάρτητα από τις διαφορές κουλτούρας, απόστασης και γενεάς), για το τοπικό και παγκόσμιο περιβάλλον. Προκειμένου λοιπόν τα σχολεία να ενδυναμώσουν τους μαθητές έτσι ώστε να είναι ικανοί να υλοποιήσουν ένα αειφόρο μέλλον, θα πρέπει να τους εξοπλίσουν με γνώσεις, δεξιότητες και αξίες ώστε να γίνουν αυτόνομοι πολίτες ικανοί να διαμορφώσουν τα δικά τους συμπεράσματα σχετικά με τις μορφές τεχνολογίας (εργαλεία και ιδέες) και κοινωνικής οργάνωσης (κυβέρνησης, δημοκρατίας και ιδιότητας του πολίτη), οι οποίες θα αποδώσουν καλύτερα την αειφορία όπως οι ίδιοι οι πολίτες την ορίζουν (Huckle, 2010).

Μέθοδος

Το 2ο Επαγγελματικό Λύκειο βρίσκεται στην νότια πλευρά του Ηρακλείου σε αστική περιοχή, καλύπτει 2050 τ.μ. (Ισόγειο και Α΄ όροφος) και βρίσκεται μέσα σε οικόπεδο έκτασης 3.600 τ.μ. Οι εγκαταστάσεις του σχολείου είναι σχετικά νέες, γιατί εγκαινιάστηκε το 2005.Το σχολικό έτος 2010-11 το μαθητικό δυναμικό ήταν 340 μαθητές και υπηρετούσαν σε αυτό 60 εκπαιδευτικοί διαφόρων ειδικοτήτων.

Τα τελευταία χρόνια, έχει εκδηλωθεί έντονο ενδιαφέρον απ' όλα τα μέλη της σχολικής κοινότητας του 2ου ΕΠΑΛ για καινοτομίες. Η τιμητική διάκριση στο διαγωνισμό Αειφόρου Σχολείου δεν ήταν αυτοσκοπός, αλλά ένα κίνητρο για περισσότερη δράση και βελτίωση της οικολογικής - περιβαλλοντικής συνείδησης των μαθητών. Η διεκδίκηση του βραβείου Αειφόρου Σχολείου ήταν μια πρόκληση για συμμετοχή σε περισσότερες δράσεις, εμπλουτισμό σε γνώσεις αλλά και ευαισθητοποίηση των νέων μαθητών ώστε να ενστερνιστούν στάσεις, αξίες και συμπεριφορές που να είναι αποδεκτές από το σύνολο της εκπαιδευτικής κοινότητας.

Ειδικότερα, ο σκοπός της συμμετοχής του σχολείου στον πρώτο διαγωνισμό Αειφόρου Σχολείου του έτους 2010-2011 ήταν η ευαισθητοποίηση των μαθητών σε θέματα προστασίας του περιβάλλοντος, εθελοντισμού, κοινωνικού αποκλεισμού, ισότητας, διαφορετικότητας, πολιτισμού και τέχνης, σωματικής και ψυχικής υγείας. Στόχος των δράσεων ήταν να αναπτύξουν οι μαθητές τα ταλέντα και τις ικανότητές τους, την κριτική σκέψη, την ομαδικότητα, τη συνεργασία, την ηγετική τους ικανότητα αλλά και την αποδοχή και την άσκηση κριτικής. Παράλληλα θα δινόταν η δυνατότητα στους μαθητές να μελετήσουν και να γνωρίσουν τα ανθρώπινα δικαιώματα, τα δικαιώματα του παιδιού, αλλά και στη δύσκολη περίοδο της εφηβείας, να διδαχτούν βιωματικά τον αυτοσεβασμό και την δύναμη της ανθρώπινης αξίας. Στους επιμέρους στόχους των δράσεων οι μαθητές θα μπορούσαν να ενημερωθούν για τα αγωνίσματα των Παγκόσμιων Αγώνων Special Olympics.

Το «Αειφόρο Σχολείο» είναι νέο για τα ελληνικά δεδομένα και το βραβείο Αειφόρου Σχολείου είναι ένα καινοτόμο έργο, που έχει σκοπό να ενεργοποιήσει όλη την εκπαιδευτική κοινότητα για την Εκπαίδευση στην Αειφόρο Ανάπτυξη. Η συνεργασία μαθητών, εκπαιδευτικών, γονέων και τοπικής κοινωνίας είναι ένας από τους βασικούς άξονες που θα οδηγήσουν προς την αειφορία και εστιάζει σε ένα κοινό όραμα: τη βελτίωση του εκπαιδευτικού συστήματος με τελικούς αποδέκτες τους μαθητές και επομένως την κοινωνία ολόκληρη. Βάσει αυτού του δεδομένου, βασική επιδίωξη του σχολείου μας ήταν να αναπτυχθούν συνεργασίες με την τοπική κοινωνία, τους κρατικούς φορείς, το σύλλογο γονέων και κηδεμόνων αλλά και να ενδυναμωθεί η συνεργασία των εκπαιδευτικών του σχολείου, ώστε να δημιουργηθεί θετικό κλίμα σε όλη την σχολική κοινότητα.

Τέλος, βασικός μας στόχος ήταν η εξοικονόμηση ενέργειας, η αξιοποίηση των φυσικών πόρων, η ανακύκλωση, η επαναχρησιμοποίηση υλικών, αφού είναι βασικές διαδικασίες που πρέπει να γνωρίζουν και να τηρούν όλοι οι μαθητές και φυσικά οι μελλοντικοί υπεύθυνοι ενεργοί πολίτες αυτού του τόπου.

Υλοποίηση δράσεων στα πλαίσια του βραβείου του Αειφόρου Σχολείου:

Α. Δράσεις εντός σχολείου

Για το Περιβάλλον

- Αναζήτηση πληροφοριών για την ανακύκλωση υλικών, με στόχο να μάθουν οι μαθητές τα υλικά που είναι ανακυκλώσιμα και να γνωρίσουν τους τρόπους ανακύκλωσης.
- Συλλογή χαρτιού και τοποθέτησή του στους κάδους ανακύκλωσης του δήμου.
- Παρασκευή παραδοσιακού σαπουνιού με χρησιμοποιημένο λάδι, κατασκευή ετικέτας και συσκευασίας σαπουνιού.
- Διαμόρφωση της αυλής του σχολείου από την ομάδα εξωτερικών παρεμβάσεων, καθαρισμός του κήπου από τα ξερά χόρτα και φύτεμα λουλουδιών και δέντρων. Τα ξερά χόρτα τοποθετήθηκαν στον οργανικό αποικοδομητή για να γίνουν λίπασμα.
- Μια αχρησιμοποίητη δεξαμενή που υπήρχε, διαμορφώθηκε για να γίνεται η συλλογή του βρόχινου νερού και με άντληση, το πότισμα των λουλουδιών τους καλοκαιρινούς μήνες.
- Από την ομάδα εσωτερικών παρεμβάσεων έγινε καθαριότητα και διαμόρφωση των αιθουσών και των διαδρόμων του σχολείου. Πραγματοποιήθηκε αισθητική παρέμβαση στις αίθουσες διδασκαλίας.
- Από την ομάδα ηλεκτρονικής διαχείρισης πραγματοποιήθηκε συλλογή πληροφοριών, επεξεργασίας και δημιουργίας κοινωνικής δικτύωσης. Έργο της ομάδας ήταν να προβάλλει την ομαδική εργασία των μαθητών, τις δράσεις των ομάδων και τη μεταξύ τους επικοινωνία.
- Οργάνωση ημερίδας παρουσίασης Προγραμμάτων Περιβαλλοντικής Εκπαίδευσης απ' όλα τα σχολεία του νομού, σε συνεργασία με το γραφείο Περιβαλλοντικής Εκπαίδευσης και το Κέντρο Περιβαλλοντικής Εκπαίδευσης Ρούβα. Η ημερίδα πραγματοποιήθηκε στην αίθουσα πολλαπλών χρήσεων του σχολείου και είχε στόχο το άνοιγμα του σχολείου προς την κοινωνία.

Για την υγεία και τα ανθρώπινα δικαιώματα

- Συλλογή πληροφοριών και ενημέρωση για την διανοητική αναπηρία και για τους Παγκόσμιους Αγώνες Special Olympics.

- Προβολή video για τα άτομα με διανοητική αναπηρία και προβολή της ταινίας «ντοκιμαντέρ και αναπηρία». Ακολούθησε συζήτηση και οι μαθητές/τριες κατέθεσαν τις απόψεις τους και περιέγραψαν τα συναισθήματα που ένιωσαν.
- Προβολή της ταινίας του Taare Zameen Par «Κάθε παιδί είναι διαφορετικό», στην αίθουσα πολλαπλών χρήσεων, σε όλους τους μαθητές του σχολείου.
- Σχεδιασμός ειδικής μπλούζας της εθελοντικής ομάδας, για τη συμμετοχή στις δράσεις που οργάνωσε ο Δήμος Ηρακλείου για τους αθλητές των Παγκόσμιων Αγώνων Special Olympics.
- Οργάνωση εθελοντικής αιμοδοσίας από καθηγητές και μαθητές του τομέας Υγείας και Πρόνοιας του σχολείου μας, σε συνεργασία με το Βενιζέλειο Νοσοκομείο Ηρακλείου.
- Οργάνωση ομιλίας συζήτησης με γνωστό γυναικολόγο γιατρό, στο χώρο του σχολείου για την ενημέρωση των μαθητριών σε θέματα καρκίνου του μαστού.
- Οργάνωση ομιλίας συζήτησης με γυναίκα που είχε προσβληθεί από τον καρκίνο του μαστού στο παρελθόν και τώρα έχει θεραπευτεί.
- Για τον Πολιτισμό και την Επιχειρηματικότητα
- Δημιουργία κινηματογραφικής λέσχης και προβολή ταινιών στην αίθουσα πολλαπλών χρήσεων του σχολείου, κάθε 2η Παρασκευή του μήνα.
- Έκδοση ηλεκτρονικής εφημερίδας.
- Πραγματοποίηση συναντήσεων με ανθρώπους των γραμμάτων και των τεχνών.
- Συμμετοχή στην εικονική έκθεση εικαστικών μαθητικών έργων που πραγματοποιήθηκε στα πλαίσια του 2ου Πανελλήνιου συμποσίου της Πανελλήνιας Ένωσης Εκπαιδευτικών Πολιτιστικών Θεμάτων (ΠΕΕΠΟΘΕ).
- Οργάνωση ομιλίας συζήτηση με εργαζομένους, για την αγορά εργασίας της πόλης του Ηρακλείου.

Β. Δράσεις εκτός σχολείου

Η σχολική κοινότητα συμμετείχε εκτός των χώρων του σχολείου σε δράσεις:

- Συλλογή υλικού για ανακύκλωση από το χώρο του σχολείου και συμμετοχή στην ανακύκλωση ηλεκτρικών συσκευών που οργάνωσε ο ραδιοσταθμός ΣΚΑΙ στην πόλη μας.
- Το σχολείο συμμετείχε σε πολιτιστικές και αθλητικές εκδηλώσεις με την επωνυμία «Τυλίσσια» που οργάνωσε ο Δήμος Μαλεβιζίου, όπως και σε περιβαλλοντικά, αθλητικά και πολιτιστικά δρώμενα του δήμου. Οι μαθητές συνεργάστηκαν με μαθητές δημοτικού σχολείου.
- Συνάντηση με τον κ. Μόσχο, συνήγορο του παιδιού μαζί με μια ομάδα μαθητών του 2ου Γυμνασίου Ηρακλείου. Στην συζήτηση που ακολούθησε οι μαθητές/τριες χωρίς δισταγμό εξέφρασαν τις απορίες τους και ενημερώθηκαν για τα δικαιώματα του παιδιού.
- Θεατρική παράσταση «Το ασχημόπαπο» σε διασκευή των μαθητών. Κατασκευή κουστουμιών και σκηνικών από τους ίδιους τους μαθητές.
- Δημιουργία εθελοντικής ομάδας και συμμετοχή στο πρόγραμμα «Πόλις Αμφιτρύων» που οργάνωσε ο Δήμος Ηρακλείου. Το πρόγραμμα « Πόλις Αμφιτρύων» ή ‘‘Host Town’’ που πραγματοποιήθηκε από τις 20 έως τις 24 Ιουνίου 2011, ήταν αναπόσπαστο μέρος των Παγκοσμίων Αγώνων Special Olympics ΑΘΗΝΑ 2011
- Συμμετοχή σε δενδροφύτευση στο δάσος της Κέρης που οργάνωσε ο ραδιοσταθμός ΣΚΑΙ
- Συμμετοχή καθηγητών στον καθαρισμό της παραλίας του Λίντο, που οργάνωσε ο ραδιοσταθμός ΣΚΑΙ
- Παρακολούθηση της θεατρικής παράστασης «Ζορμπά μάθε με να χορεύω» σε σκηνοθεσία του Μάνου Μανιά στην αίθουσα τέχνης ΚΡΗΤΕΛΕΙΟ της Θεατρικής Σκηνής Ηρακλείου.
- Συμμετοχή στην υποδοχή της φλόγας της ελπίδας των Παγκόσμιων Αγώνων Special Olympics, στις προπονήσεις των αθλητών και στην τελετή υποδοχής των αθλητών των Special Olympics στο Παγκρήτιο Στάδιο Ηρακλείου.

- Συμμετοχή στην ανταλλαγή αναμνηστικών δώρων με τους αθλητές των Παγκόσμιων Αγώνων Special Olympics σε εκδήλωση που οργάνωσε ο δήμος Ηρακλείου .
- Συμμετοχή στις καλλιτεχνικές και πολιτιστικές εκδηλώσεις του Δήμου Ηρακλείου
- Συμμετοχή σε ενημέρωση από το Εθνικό Κέντρο Επαγγελματικού Προσανατολισμού (ΕΚΕΠ) στην Πλατεία Ελευθερίας.
- Συμμετοχή στο Φεστιβάλ Γερμανόφωνου κινηματογράφου.

Γ. Εκπαιδευτικές επισκέψεις

- Εκπαιδευτικές επισκέψεις πραγματοποιήθηκαν κατά τη διάρκεια των δράσεων του σχολείου:
- Στο Κέντρο Περιβαλλοντικής Εκπαίδευσης Ιεράπετρας και συμμετοχή στο πρόγραμμα « Ήλιε το φώς σου δώσε μας, κι' αέρα την πνοή σου, νερό, δροσιά και δύναμη, και Γη τη Θαλπωρή σου».
- Στο Κέντρο Περιβαλλοντικής Εκπαίδευσης Ρούβα και συμμετοχή στο πρόγραμμα «"Άξιον εστί…του νερού η αόρατη αορτή που πάλλει…" : Οι Νερόμυλοι της Γέργερης».
- Στο Επαγγελματικό Λύκειο Ειδικής Αγωγής με συμμετοχή σε εργαστηριακές ασκήσεις των μαθητών.

Δ. Συμμετοχή σε διαγωνισμό

Συμμετοχή ομάδας μαθητών στον μονοήμερο διαγωνισμός που πραγματοποιήθηκε από το Σωματείο Επιχειρηματικότητας Νέων European Creativty & Innovation Challenge –leonardo da vinci στην Αθήνα. Ομάδα μαθητών στην οποία συμμετείχε μαθήτρια του σχολείου, κατέλαβε την 3η πανελλήνια θέση στο διαγωνισμό καινοτομίας και επιχειρηματικότητας.

Ε. Δράσεις προβολής και διάχυσης αποτελεσμάτων

- Συμμετοχή σε ενημερωτική εκπομπή του τοπικού τηλεοπτικού σταθμού TV Creta, με θέμα τη συμμετοχή μας στις δράσεις του Δήμου , « Πόλις Αμφιτρύων» και τον εθελοντισμό.
- Συνέντευξη στον τοπικό τηλεοπτικό σταθμό TV Creta, για την συμμετοχή του σχολείου μας και τη βράβευση μαθήτριας στον διαγωνισμό επιχειρηματικότητας του Σωματείου Επιχειρηματικότητας Νέων European Creativty & Innovation Challenge –leonardo da vinci.
- Συνέντευξη στον τοπικό τηλεοπτικός σταθμός TV Creta, για τον παραδοσιακό τρόπο παρασκευής σαπουνιού από την περιβαλλοντική ομάδα του σχολείου μας.

ΣΤ. Συνεργασίες με φορείς

Για την υλοποίηση των δράσεων πραγματοποιήθηκαν συνεργασίες με:

- Το σύλλογο γονέων και κηδεμόνων του σχολείου
- Το Γραφείο Περιβαλλοντικής Εκπαίδευσης και μετά (το 2ο χρόνο) με το γραφείο Σχολικών Δραστηριοτήτων Δευτεροβάθμιας Εκπαίδευσης Ηρακλείου
  - Τα Κέντρα Περιβαλλοντικής Εκπαίδευσης Ιεράπετρας και Ρούβα
  - Το Επαγγελματικό Λύκειο Ειδικής Αγωγής
  - Το 2ο Γυμνάσιο Ηρακλείου
  - Το Γυμνάσιο Αλικαρνασσού
  - Την Πανελλήνια Ένωση Εκπαιδευτικών για την Περιβαλλοντική Εκπαίδευση, Παράρτημα Κρήτης (Π.Ε.ΕΚ.Π.Ε)
  - Την Πανελλήνια Ένωσης Εκπαιδευτικών Πολιτιστικών Θεμάτων
  - Το Εθνικό Κέντρο Επαγγελματικού Προσανατολισμού
  - Το Συνήγορο του Παιδιού
  - Το Βενιζέλειο Νοσοκομείο Ηρακλείου
  - Τον Δήμο Ηρακλείου
  - Τον Δήμο Μαλεβιζίου
  - Το Σωματείο Επιχειρηματικότητας Νέων European Creativty & Innovation Challenge
  - Την Πανελλήνια Ομοσπονδία Συλλόγων Γονέων Παιδιών με Δυσλεξία και Μαθησιακές Δυσκολίες
  - Τη Θεατρική Σκηνή Ηρακλείου
  - Τον τηλεοπτικός σταθμός TV Greta

- Τον ραδιοσταθμό ΣΚΑΪ
- Επαγγελματίες και ιδιώτες της πόλης του Ηρακλείου

Αποτελέσματα και συζήτηση

Με τις δράσεις που πραγματοποίησαν οι μαθητές, ανέπτυξαν το πνεύμα της συνεργασίας και της ομαδικότητας. Αυτό που αξίζει να σημειωθεί είναι η αυτενέργεια των μαθητών/τριών και η ανάληψη πρωτοβουλιών σε κάθε δράση της συμμετοχής του σχολείου στο βραβείο Αειφόρου Σχολείου. Έμαθαν να σέβονται και να αγαπάνε το χώρο του σχολείου και γενικά τον περιβάλλοντα χώρο τους. Άλλαξαν τρόπους συμπεριφοράς προς το περιβάλλον και υιοθέτησαν νέες στάσεις, συμπεριφορές και αξίες. Έμαθαν πώς να ανακυκλώνουν και να επαναχρησιμοποιούν τα υλικά, αλλά και πώς να εξοικονομούν ενέργεια. Με βιωματικό τρόπο έμαθαν να φτιάχνουν λίπασμα στον οργανικό αποικοδομητή.

Οι μαθητές είχαν μια μοναδική εμπειρία να βιώσουν τον εθελοντισμό και την διαφορετικότητα, μέσα και από την συμμετοχή τους σαν εθελοντική ομάδα στους Παγκόσμιους Αγώνες Special Olympics. Γνώρισαν τα αθλήματα των Αγώνων και εμπλούτισαν τις γνώσεις τους για τους Παγκόσμιους Αγώνες. Βίωσαν την διαφορετικότητα, κατά την συνεργασία που είχαν με τους μαθητές/τριες του ΕΠΑΛ Ειδικής Αγωγής, γιατί όπως είπαν και οι ίδιοι, εκείνες τις ώρες ένιωθαν οι ίδιοι να είναι διαφορετικοί. Είναι χαρακτηριστικό αυτό που δήλωσαν οι μαθητές και οι μαθήτριες , κατά την αξιολόγηση: «Η ανθρώπινη αξία είναι πάνω από την δυσαρέσκεια, το μίσος, την ζήλεια και έργο όλων πρέπει να είναι η ένωση των ανθρώπων. Έργο μας επίσης πρέπει να είναι η πίστη, η ελπίδα, η φιλανθρωπία που ορίζονται από την αγάπη. Μια αγάπη ανιδιοτελή χωρίς προσμονή ανταλλάγματος. Εθελοντική προσφορά. Μόνο έτσι ο κόσμος μας θα γίνει πιο ανθρώπινος και ο άνθρωπος πιο κόσμιος» Η προβολή ταινιών για την διαφορετικότητα, προκάλεσε συγκίνηση και αλληλοσυγκρουόμενα συναισθήματα στους μαθητές.

Η συμμετοχή των μαθητών στην δημιουργία της εθελοντικής ομάδας για την συμμετοχή στις δράσεις του δήμου, ήταν μια πλούσια σε συναισθήματα εμπειρία. Προσέγγισαν από κοντά την ιδέα του εθελοντισμού, τον θρίαμβο της θέλησης και την δύναμη της προσπάθειας, που είναι οι βασικές αρχές των Αγώνων.

Κατά την συνεργασία με το Επαγγελματικό Λύκειο Ειδικής Αγωγής, οι μαθητές των δύο σχολείων συνεργάστηκαν και επικοινώνησαν άμεσα. Αυτό που αξίζει να σημειωθεί, είναι το σχόλιο μιας μαθήτριας ότι: «πριν μάθει για την διανοητική αναπηρία και πριν γνωρίσει παιδιά με αυτή την ιδιαιτερότητα, ένιωθε έναν φόβο γι' αυτούς τους ανθρώπους, (φόβο για το άγνωστο) ενώ τώρα τους καταλαβαίνει και τους σέβεται». Οι μαθητές επίσης συνεργάστηκαν με τοπικούς φορείς και έμαθαν να παρουσιάζουν το έργο τους, με αποτέλεσμα την ευαισθητοποίηση και την ενθάρρυνση της τοπικής κοινωνίας για συμμετοχή όλων. Τα σχόλια των γονέων επίσης ήταν θετικά όσον αφορά την συμμετοχή των παιδιών τους στις δράσεις του σχολείου και για την ευκαιρία που είχαν να μάθουν για την προστασία του περιβάλλοντος, τον εθελοντισμό, την παράδοση, την ισότητα, την επιχειρηματικότητα, την καινοτομία, την ανταγωνιστικότητα, την αειφόρο ανάπτυξη.

Για την διερεύνηση των αποτελεσμάτων της συμμετοχής του σχολείου στο «διαγωνισμό Αειφόρου Σχολείου» πραγματοποιήθηκε έρευνα με ερωτηματολόγια σε μαθητές και εκπαιδευτικούς. Για την αντικειμενικότητα των αποτελεσμάτων, τα ερωτηματολόγια διανεμήθηκαν σε 100 μαθητές/τριες της Α΄ τάξης και 100 μαθητές/τριες της Β΄ τάξης. Οι μαθητές της Α΄ τάξης φοιτούν για πρώτη χρονιά στο σχολείο μας και το σχολείο συμμετέχει για δεύτερη φορά στο διαγωνισμό. Οι μαθητές/τριες της Β΄ τάξης είναι για δεύτερη χρονιά στο σχολείο και το σχολείο συμμετέχει στο διαγωνισμό και τις δύο χρονιές του διαγωνισμού. (2010-2011και 2011-2012). Συμμετείχαν 98 αγόρια και 102 κορίτσια και 50 εκπαιδευτικοί του σχολείου. Οι απαντήσεις που δόθηκαν σχετικά με την περιβαλλοντική συμπεριφορά από τους μαθητές και τους εκπαιδευτικούς φαίνονται στον πίνακα 1:

	ΜΑΘΗΤΕΣ	ΚΑΘΗΓΗΤΕΣ
Ανακυκλώνετε χαρτί;	60% ΝΑΙ	98% ΝΑΙ
Ανακυκλώνετε μπαταρίες;	44% ΝΑΙ	96% ΝΑΙ
Συμβάλλετε στην μείωση κατανάλωσης νερού;	67% ΝΑΙ	96% ΝΑΙ
Συμβάλλετε στην μείωση κατανάλωσης ηλεκτρικού;	71% ΝΑΙ	100% ΝΑΙ
Χρησιμοποιείτε Μ.Μ.Μ, ποδήλατο, περπάτημα;	60% ΝΑΙ	72% ΝΑΙ

Πίνακας 1: Ερωτήσεις για την περιβαλλοντική συμπεριφορά σε εκπαιδευτικούς και μαθητές

Πιστεύεις ότι ωφελήθηκες από την συμμετοχή σου σε σχολικά προγράμματα;	64% ΝΑΙ
Από τη συμμετοχή σου σε προγράμματα ωφελήθηκες σε επίπεδο επικοινωνίας με τους συμμαθητές σους;	57% ΝΑΙ
Από τη συμμετοχή σου σε προγράμματα ωφελήθηκες σε επίπεδο επικοινωνίας με τους καθηγητές σου και την τοπική κοινωνία;	52% ΝΑΙ
Από τη συμμετοχή σου σε προγράμματα απέκτησες γνώσεις;	50% ΝΑΙ
Από τη συμμετοχή σου σε προγράμματα καλλιέργησες δεξιότητες συνεργασίας και ομαδικότητας ;	50% ΝΑΙ
Η συμμετοχή σου σε δράσεις του σχολείου, ενίσχυσε τις σχέσεις σου με τους συμμαθητές σου;	61% ΝΑΙ
Η συμμετοχή του σχολείου στο διαγωνισμό Αειφόρου Σχολείου, αφύπνισε την περιβαλλοντική σου συνείδηση;	61% ΝΑΙ
Αν σου δοθεί η ευκαιρία θα συμμετείχες ξανά σε πρόγραμμα του σχολείου;	71% ΝΑΙ
Αν σου δοθεί η ευκαιρία θα συμμετάσχεις σε εθελοντικές ομάδες σαν ενεργός πολίτης;	84% ΝΑΙ
Η συμμετοχή σου σε εκπαιδευτικές επισκέψεις και σε δράσεις του σχολείου, ενίσχυσε θετικά τις σχέσεις σου με το οικογενειακό περιβάλλον σε θέματα εμπιστοσύνης και υπευθυνότητας;	67% ΝΑΙ

Πίνακας 2: Ερωτήσεις μόνο προς τους μαθητές.

Πιστεύετε ότι ωφελήθηκαν οι μαθητές από την συμμετοχή τους σε προγράμματα σχολικών δραστηριοτήτων;	98% ΝΑΙ
Η συμμετοχή των μαθητών σε σχολικά προγράμματα, πιστεύετε ότι ωφέλησε το επίπεδο επικοινωνίας με τους συμμαθητές τους;	100% ΝΑΙ
Η συμμετοχή των μαθητών σε σχολικά προγράμματα πιστεύετε ότι ωφέλησε την επικοινωνία με τους καθηγητές και την τοπική κοινωνία;	98% ΝΑΙ
Με τη συμμετοχή των μαθητών σε δράσεις του σχολείου, πιστεύετε ότι ενισχύθηκε η προσωπικότητα και η αυτενέργεια των μαθητών;	100% ΝΑΙ
Η συμμετοχή του σχολείου στο βραβείο Αειφόρου Σχολείου, πιστεύετε ότι αφύπνισε την περιβαλλοντική συνείδηση των μαθητών;	100% ΝΑΙ
Η συμμετοχή των μαθητών σε εκπαιδευτικές επισκέψεις και δράσεις του σχολείου, πιστεύετε ότι ενίσχυσε θετικά τις σχέσεις τους με το οικογενειακό περιβάλλον σε θέματα εμπιστοσύνης και υπευθυνότητας;	98% ΝΑΙ
Πιστεύετε ότι η συμμετοχή του σχολείου στο βραβείο Αειφόρου Σχολείου, βελτίωσε τη συνεργασία των καθηγητών και την ανάπτυξη της διαθεματικότητας;	86% ΝΑΙ
Στο μάθημά σας ενσωματώσατε θέματα σχετικά με την αειφορία π.χ. εθελοντισμού, περιβαλλοντικά, ανθρωπίνων δικαιωμάτων, ισότητας, δικαιοσύνης, αγωγής υγείας, γνωριμία με άλλους πολιτισμούς, οικονομικής ανάπτυξης, πολιτιστικής κληρονομιάς;	84% ΝΑΙ
Θεωρείτε ότι η συμμετοχή των μαθητών σε σχολικές δραστηριότητες μειώνει την παραβατικότητα;	98% ΝΑΙ
Θεωρείτε ότι η συμμετοχή των μαθητών σε σχολικές δραστηριότητες συμβάλει θετικά στη μείωση της μαθητικής διαρροής;	98% ΝΑΙ

Πίνακας 3: Ερωτήσεις μόνο προς τους εκπαιδευτικούς.

Στον πίνακα 2 φαίνεται η θετική στάση που ανάπτυξαν οι μαθητές προς το σχολείο και η ενίσχυση των σχέσεων όλων των μελών της σχολικής κοινότητας.
Από τη συμμετοχή του σχολείου στο διαγωνισμό Αειφόρου Σχολείου, εκτός των παραπάνω, το σχολείο κέρδισε και την δεύτερη Πανελλήνια θέση στην κατηγορία Γυμνάσια Λύκεια.

Συμπεράσματα – Προτάσεις

Οι δράσεις που πραγματοποιήθηκαν κατά την διάρκεια συμμετοχής του σχολείου στον διαγωνισμό για το βραβείο Αειφόρου Σχολείου, υλοποιήθηκαν στα πλαίσια των βασικών αρχών των Προγραμμάτων των Σχολικών Δραστηριοτήτων. Η ενεργός συμμετοχή και η συνεργασία

μαθητών, καθηγητών, γονέων διαμόρφωσε θετικό κλίμα, προς όφελος όλων των εμπλεκομένων και ιδιαίτερα των μαθητών. Με τη συμμετοχική διαδικασία, βελτιώθηκαν οι σχέσεις των μελών της εκπαιδευτικής κοινότητας και αναπτύχθηκε η σχέση εμπιστοσύνης. Βελτιώθηκε η συνεργασία μεταξύ των καθηγητών και ενισχύθηκε η διαθεματικότητα στα σχολικά μαθήματα. Ταυτόχρονα οι μαθητές διερεύνησαν τα γνωστικά αντικείμενα των μαθημάτων, πέραν του αναλυτικού προγράμματος.

Συμπερασματικά διαπιστώθηκε η ευαισθητοποίηση της σχολικής κοινότητας και η αρχή της τροποποίησης της συμπεριφοράς τους στα θέματα που επεξεργάστηκαν. Έτσι μειώθηκαν τα απορρίμματα, εξοικονομήθηκε νερό και ενέργεια και γενικά μειώθηκε το οικολογικό αποτύπωμα του σχολείου. Στη σχολική αυλή διαμορφώθηκε χώρος πρασίνου με πολλές λειτουργικές και αισθητικές παρεμβάσεις και πραγματοποιήθηκε διαμόρφωση όλων των χώρων του σχολείου. Αναπτύχθηκε το ενδιαφέρον των μαθητών για τα ανθρώπινα δικαιώματα, την διαφορετικότητα, την ισότητα, την καταπάτηση των ανθρωπίνων δικαιωμάτων και την φτώχεια τόσο σε τοπικό επίπεδο όσο και σε παγκόσμιο.

Ενισχύθηκε η προσωπικότητα και η αυτενέργεια των μαθητών, με αποτέλεσμα την μείωση της παραβατικότητας. Οι μαθητές έμαθαν να αγωνίζονται και να διεκδικούν μέσα από την γνώση, ανέπτυξαν την ικανότητα ηγεσίας και το πνεύμα ανταγωνιστικότητας. Απέκτησαν δεξιότητες επικοινωνίας και προβολής του έργου τους. Έμαθαν να αναζητούν, να αξιολογούν και να ταξινομούν την πληροφορία. Η θετική στάση που ανέπτυξαν οι μαθητές προς το σχολείο, λειτούργησε ενισχυτικά, έτσι, ώστε να συμβάλει στην εκμηδένιση της μαθητικής διαρροής. Ανέπτυξαν πνεύμα αλληλεγγύης και εθελοντισμού και ομαδικότητας με διάθεση να σέβονται και να αποδέχονται το διαφορετικό.

Χρειάζεται ακόμη πολλά να γίνουν για τη δημιουργία του «πραγματικού» Αειφόρου Σχολείου. Ένα Αειφόρο Σχολείο θα πρέπει να είναι σε θέση να παράγει την ενέργεια που χρειάζεται για τις λειτουργικές του ανάγκες. Με παρέμβαση της Τοπικής αυτοδιοίκησης, με νομοθετική ρύθμιση και κρατική χρηματοδότηση, μπορούν να τοποθετηθούν φωτοβολταϊκά συστήματα στα σχολεία ως καλή πρακτική για τους μαθητές. Επίσης διαπιστώνεται ότι πρέπει να υπάρχει περισσότερη ενημέρωση-πληροφόρηση για το βραβείο και ενθάρρυνση για τη συμμετοχή των σχολείων. Χρειάζεται να συνεχιστεί και να ενισχυθεί ο θεσμός του βραβείου «Αειφόρου Σχολείου» για την αύξηση των αριθμό των σχολείων. Για το σκοπό αυτό θα ήταν σκόπιμο η δημιουργία Δικτύου Αειφόρων Σχολείων σε Περιφερειακό αλλά και σε πανελλήνιο επίπεδο για την καλή διάδοση και διάχυση των σχετικών θεμάτων. Τελικά η σχολική κοινότητα διαφαίνεται μέσω του βραβείου Αειφόρου Σχολείου, να επιθυμεί να συμμετάσχει στην διαδικασία της Εκπαίδευσης για την Αειφόρο Ανάπτυξη (ΕΑΕ), έτσι ώστε να συντελέσει στην βελτίωση του εκπαιδευτικού μας συστήματος και της ποιότητας ζωής.

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Πρόγραμμα για το Αειφόρο Σχολείο 1ο ΕΠΑΛ Λάρισας

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Περίληψη

Κατά τη διάρκεια του σχολικού έτους 2011 – 2012 υλοποιήθηκε το Πρόγραμμα «Αειφόρο Σχολείο», από τους μαθητές της Β΄ τάξης Λυκείου του Τομέα Γεωπονίας, Τροφίμων και Περιβάλλοντος, του 1^{ου} ΕΠΑ.Λ Λάρισας. Το πρόγραμμα εντάχθηκε στο πανελλήνιο σχολικό πρόγραμμα της Ελληνικής Εταιρείας Περιβάλλοντος για την Αειφόρο Ανάπτυξη. Παράλληλα με το πρόγραμμα δόθηκε η δυνατότητα συμμετοχής των σχολείων στον 2^{ο} Πανελλήνιο διαγωνισμό της εταιρείας.

Το Πρόγραμμα εκπονήθηκε με την ομαδοκεντρική μέθοδο, από 8 μαθητές με μία συντονίστρια εκπαιδευτικό και με τη στήριξη του διευθυντή και των ευαισθητοποιημένων εκπαιδευτικών του σχολείου.

Οι άξονες δράσης ήταν:

- Παρακολούθηση και καταγραφή στοιχείων από τους μετρητές της ύδρευσης, του ηλεκτρικού ρεύματος και του φυσικού αερίου του σχολικού συγκροτήματος.
- Συγκέντρωση και καταγραφή των ποσοτήτων των ανακυκλώσιμων υλικών.
- Ενημέρωση όλων των μαθητών του σχολείου, με έμφαση στην Ανακύκλωση υλικών στο χώρο του σχολείου και παράλληλη ευαισθητοποίηση στην εξοικονόμηση των παραπάνω μορφών ενέργειας και φυσικών πόρων.

Τα βασικά συμπεράσματα που προέκυψαν με την ολοκλήρωση του προγράμματος είναι τα εξής :

- Χρειάζεται περισσότερη ενημέρωση και ευαισθητοποίηση μαθητών και εκπαιδευτικών, αν είναι δυνατόν, όλων των σχολικών μονάδων που συστεγάζονται στο συγκρότημα σε θέματα αειφόρου ανάπτυξης.
- Παράλληλα με την Ανακύκλωση υλικών πρέπει να ενταθεί και η περιφρούρηση της άσκοπης κατανάλωσης ενέργειας και πόρων από τους ίδιους τους μαθητές και τους εκπαιδευτικούς στο βαθμό που εξαρτάται από αυτούς.
- Η συνέχιση της παρακολούθησης και καταγραφής των στοιχείων των μετρητών κατανάλωσης ενέργειας και φυσικών πόρων κρίνεται σκόπιμη για τα επόμενα χρόνια, για την ασφαλέστερη εξαγωγή συμπερασμάτων και περαιτέρω σχεδιασμό των δράσεων στο συγκεκριμένο σχολικό συγκρότημα.

Abstract

During school year 2011-2012, a program titled "Sustainable School" was implemented by students of 1st Technical Vocational School of Larissa (department of Agriculture, Food and Environment). The above program was included in the National Curriculum of the Greek Society of Environment for Sustainable Development. Furthermore through the program the school participated in the 2nd Pan-Hellenic Contest of the Society.

The program was developed using the group centred method consisted of eight students and one coordinator teacher, as well as with the support of the Principal of the school and other sensitized teachers.

The axes of the program were:

- Monitoring and recording data of water - meters machines, electricity – meters and gas – meters of the school complex.
- Collection and recording of the quantities of recyclable material.

- Updating the knowledge of the students emphasizing on "recycling material in school" and raising awareness to save the above forms of energy and natural resources.

The main conclusions reached by completion of the program were the following:

- ➢ More awareness and sensitization in Sustainable Development is needed for both students and teachers all schools of the complex.
- ➢ At the same time, the unnecessary consumption of energy and resources must be guarded to the extent that depends on them. Also the recycling of materials must be intensified.
- ➢ The continuation of monitoring and recording data of consumption of energy and natural resources is necessary for the coming years for the safer conclusion extracts and further planning of actions in the school complex.

Εισαγωγή

Στις αρχές της φετινής σχολικής χρονιάς ενημερωθήκαμε μέσω της ηλεκτρονικής αλληλογραφίας του σχολείου μας, για μια δραστηριότητα της Ελληνικής Περιβαλλοντικής Εταιρίας και για τον πανελλήνιο σχολικό διαγωνισμό που αφορούσε την Αειφορία στο χώρο των σχολείων.

Η ανακοίνωση αυτή, μαζί με την ευαισθησία μου για θέματα που αφορούν στο Περιβάλλον, μου προκάλεσε ενδιαφέρον. Έθεσα το θέμα στους μαθητές μου της Β΄ τάξης του Τομέα Γεωπονίας του 1ου ΕΠΑ.Λ που υπηρετώ οι οποίοι έδειξαν επίσης ενδιαφέρον να εμπλακούν στη δράση αν και στην αρχή εστίασαν περισσότερο στη λέξη «Βραβείο». Αμέσως εξέφρασαν την επιθυμία να λάβουν μέρος στο Πρόγραμμα και κατά συνέπεια στο Διαγωνισμό για να διεκδικήσουν το «Βραβείο Αειφόρου Σχολείου». Μετά από συζήτηση μαζί τους κατάφερα να τους πείσω ότι αυτό που θα βάλουμε ως στόχο θα είναι να ολοκληρώσουμε το Πρόγραμμα αποκομίζοντας όλα τα οφέλη από αυτό χωρίς να υπολογίζουμε στο «Βραβείο». Πράγματι αμέσως συνειδητοποίησαν τη σημασία της ίδιας της δράσης και στη συνέχεια και ως το τέλος της προσπάθειάς μας δεν αναφέρθηκαν ξανά στο «Βραβείο». Νομίζω ότι τελικά κατάφερα να αποσυνδέσω το βραβείο από τον σκοπό και τους στόχους του προγράμματος και οι μαθητές μου να εργαστούν για τα ποικίλα οφέλη που θα προέκυπταν από αυτή την δραστηριοποίηση.

Σημαντικό στην ανάληψη αυτής της δράσης ήταν ότι οι μαθητές μου, του Τομέα Γεωπονίας, Τροφίμων και Περιβάλλοντος είναι εξοικειωμένοι με τις έννοιες «αειφορία», «ανακύκλωση», «διαχείριση ενέργειας» κλπ εφόσον και στο αναλυτικό πρόγραμμα διδάσκονται μαθήματα με τέτοια θεματολογία. Εκτός αυτού, στην αρχή του προγράμματος, αφιέρωσα δύο συναντήσεις μαζί τους για να τους εξηγήσω τη φιλοσοφία της Αειφόρου ανάπτυξης γενικότερα.

Αναφορικά με την υλοποίηση, αυτό που βοήθησε πολύ στην ενεργό και αποτελεσματική εκπόνηση του προγράμματος «Αειφόρο Σχολείο» ήταν το γεγονός ότι η ομάδα δράσης είχε πολύ καλή επικοινωνία και δέσιμο. Υπηρετώ πολλά χρόνια στην εκπαίδευση και είναι από τις λίγες φορές που συναντώ μια τάξη – μικρή μεν – αλλά με υπέροχο πνεύμα συνεργασίας το οποίο διευρύνθηκε με τη στήριξη και άλλων μελών του σχολείου μας. Ενημέρωσα σχετικά τον διευθυντή μου κ. Μπουρουτζήκα Ιωάννη ο οποίος ήταν πολύ θετικός σε αυτή την πρωτοβουλία μας. Με διαβεβαίωσε ότι θα βοηθούσε σε κάθε περίπτωση και με κάθε τρόπο. Επίσης την προσπάθειά μας στήριξε και ο συνάδελφος κ. Ζαφειρίου Βασίλης, μηχανολόγος στην ειδικότητα και ερασιτέχνης φωτογράφος. Ο κ. Ζαφειρίου «κάλυψε» φωτογραφικά όλες τις φάσεις του Προγράμματός μας, με ευαισθησία και πολύ προθυμία γι' αυτό το σκοπό.

Μεθοδολογία

Στην αρχή σχεδιάσαμε το πλάνο δράσης εγώ και οι μαθητές της ομάδας μου οι οποίοι για πρώτη φορά ενεπλάκησαν σε μια τέτοια προσπάθεια παρόλο που το σχολείο μας ενδείκνυται για τέτοιου είδους δραστηριότητες. Συγκεκριμένα, το 1ο ΕΠΑΛ ανήκει σε ένα μεγάλο σχολικό συγκρότημα που αποτελείται από επτά σχολεία και η συνολική του έκταση είναι 27.000 m^2 (κτίριο και αυλή)!!

Αναφορικά με την Ανακύκλωση προχωρήσαμε στις εξής ενέργειες. Με αίτησή μας ζητήσαμε από την αρμόδια υπηρεσία του Δήμου της πόλης μας να μας παραχωρήσει έναν τουλάχιστον μεγάλο τροχήλατο κάδο με σκοπό να τον εγκαταστήσουμε σε κεντρικό σημείο, στο εσωτερικό του σχολείου για να είναι προσβάσιμος στους μαθητές. Το σχολικό συγκρότημα διαθέτει ήδη δυο μεγάλους μπλε κάδους ανακύκλωσης οι οποίοι όμως βρίσκονται έξω από το σχολείο σε σημεία που και διάθεση να έχει κανείς να ανακυκλώσει μια συσκευασία είναι πολύ δύσκολο να κάνει μια πολύ μεγάλη διαδρομή για να βρεθεί στα σημεία που βρίσκονται. Μαζί με τον κάδο αυτό στην αίτησή μας ζητήσαμε και ένα κάδο για ανακύκλωση μικρών ηλεκτρικών συσκευών (παλιά κινητά, μετασχηματιστές, μικρές οικιακές συσκευές κλπ). Ακόμα ζητήσαμε και ειδικούς κάδους με τις ανάλογες ενδείξεις, από σκληρό χαρτόνι για την ανακύκλωση καμένων λαμπτήρων (κοινών και φωτός ημέρας). Για τα τελειωμένα toner χρησιμοποιήσαμε ένα κοινό κουτί από χαρτόνι όπου τους συγκεντρώνουμε και τους πηγαίνουμε σ' ένα κατάστημα της πόλης που αναλαμβάνει την αναγόμωση ή την ανακύκλωσή τους. Στο σχολείο μας υπάρχουν και λειτουργούν τέσσερις εκτυπωτές που χρησιμοποιούν toner.Πράγματι τα αιτήματά μας εισακούστηκαν και με την πολύτιμη βοήθεια του υπεύθυνου του Τμήματος Καθαριότητας-Ανακύκλωσης του Δήμου Λαρισαίων, κ. Καραγιάννη όλοι αυτοί οι κάδοι ήρθαν στο σχολείο μας και τοποθετήθηκαν σε λειτουργικές θέσεις.

Σημαντική ήταν στη συνέχεια η αλλαγή των συνηθειών των μαθητών ώστε να αξιοποιηθεί η προσπάθεια μας. Όλοι οι μαθητές του σχολείου ενημερώθηκαν για τις θέσεις και το σκοπό των κάδων που τοποθετήθηκαν στους χώρους του σχολείου, από το δ/ντή κατά την ώρα της προσευχής. Η υπενθύμιση γινόταν τακτικά αλλά ο τρόπος αυτός δεν ήταν αποτελεσματικός. Πολύ συχνά βρίσκαμε κοινά σκουπίδια μέσα στους κάδους ανακύκλωσης συσκευασιών και χαρτιού.

Μετά από συνεννόηση με το δ/ντή οργανώσαμε ένα πρόγραμμα ενημέρωσης όλων των μαθητών του σχολείου μου, ανά τμήμα και για μια διδακτική ώρα το καθένα. Στόχος μας ήταν να επικοινωνήσουμε τα μηνύματα του Αειφόρου Σχολείου και να κάνουμε συμμέτοχους όσο περισσότερους μαθητές γίνεται στο σκοπό αυτό αφού η επιτυχία τέτοιων Προγραμμάτων προϋποθέτει την ευαισθητοποίηση και την ενεργό συμμετοχή όλων. Επίσης πληροφορήσαμε όλους τους μαθητές και εκπαιδευτικούς, για τα σημεία που βρίσκονται οι κάδοι Ανακύκλωσης και ποια υλικά μπορούν να ανακυκλωθούν σ' αυτούς, εξηγώντας τους βασικούς κανόνες της σωστής Ανακύκλωσης.

Προκειμένου να γίνει πιο ολοκληρωμένη παρέμβαση, διαπραγματευτήκαμε και το θέμα της κατανάλωσης ενέργειας και φυσικών πόρων στο χώρο του σχολείου. Προβληματιστήκαμε και προτείναμε τελικά τον τρόπο με τον οποίο μπορούμε να μειώσουμε τη σπατάλη, κλείνοντας τους διακόπτες του ρεύματος, προσέχοντας την σπατάλη φυσικού αερίου και νερού και γενικότερα την άσκοπη κατανάλωση ενέργειας και φυσικών πόρων μιλώντας παράλληλα για τις επιπτώσεις όλων αυτών. Με το δεδομένο ότι σε πολλές περιπτώσεις ο έλεγχος της σπατάλης ενέργειας στο χώρο του σχολείου, δεν μπορεί να γίνεται από τους μαθητές π.χ κατανάλωση φυσικού αερίου, η ενημέρωση των μαθητών έχει προεκτάσεις γιατί αυτό θα μπορούσε να γίνει από αυτούς στο σπίτι τους τώρα ή και στο μέλλον.

Έγιναν συνολικά 10 ωριαίες ενημερώσεις, όσα είναι και τα τμήματα του σχολείου.

Οι παραπάνω παρεμβάσεις είχαν πολύ θετικά αποτελέσματα. Το διαπιστώσαμε από τον όγκο των ανακυκλώσιμων υλικών που αυξήθηκε σημαντικά αλλά και από το γεγονός ότι δεν βρίσκαμε τόσο συχνά σκουπίδια στους κάδους ανακύκλωσης. Επίσης όλοι λειτούργησαν περισσότερο συνειδητά σε θέματα κατανάλωσης ηλεκτρικού ρεύματος, νερού και φυσικού αερίου.

Την ενημέρωση επιχειρήσαμε να «κοινωνήσουμε» και στα άλλα σχολεία που στεγάζονται στο ίδιο κτίριο με το δικό μας, για καλλίτερα αποτελέσματα της προσπάθειάς μας. Η αλήθεια είναι πως αντιμετωπίστηκε θετικά από κάποιους εκπαιδευτικούς η ιδέα αυτή, αλλά έμεινε μόνο εκεί.

Σε ότι αφορά το Πρόγραμμα, ο τρόπος με τον οποίο υλοποιήθηκε το «Αειφόρο Σχολείο» στηρίχθηκε στην ομαδική συνεργασία των συμμετεχόντων μαθητών. Η βασική ομάδα χωρίστηκε σε επιμέρους υποομάδες των 2-3 ατόμων Γράφαμε στο απουσιολόγιο την ομάδα υπηρεσίας και έτσι συμμετείχαν διαδοχικά όλοι. Για να τηρηθούν οι κανόνες υγιεινής οι μαθητές που κάθε φορά διαχειρίζονταν το περιεχόμενο των κάδων φορούσαν απαραιτήτως πλαστικά γάντια μιας χρήσης. Μια φορά την εβδομάδα, η υποομάδα που είχε την ευθύνη της συγκέντρωσης των ανακυκλώσιμων υλικών από τους επιμέρους κάδους, τα μετέφερε στον μεγάλο μπλε κάδο του

Δήμου, αφού προηγουμένως τα ζύγιζε με τη βοήθεια μιας ζυγαριάς μπάνιου και κατέγραφε το βάρος τους. Οι κάδοι ανακύκλωσης χαρτιού χρειάστηκε πολλές φορές να τους αδειάζουμε και δεύτερη φορά μέσα στη βδομάδα. Κατά διαστήματα γίνονταν «εξορμήσεις» απ' όλη την ομάδα, με πλαστικά γάντια και μαύρες σακούλες, στην αυλή κυρίως αλλά και στο εσωτερικό του κτιρίου για τη συλλογή ανακυκλώσιμων υλικών. Τα ειδικά απορριμματοφόρα της Ανακύκλωσης του Δήμου κάνουν αποκομιδή του περιεχομένου των Μπλε κάδων, δυο φορές την εβδομάδα .

Σχετικά με την ενέργεια και τους φυσικούς πόρους, για την παρακολούθηση και καταγραφή των ενδείξεων του νερού, του ηλεκτρικού ρεύματος και του φυσικού αερίου κάναμε τα παρακάτω:

Αρχίσαμε πρώτα εντοπίζοντας που βρίσκονται στον ευρύτερο χώρο του σχολείου, τα ρολόγια - μετρητές των διαφόρων μορφών ενέργειας και του νερού. Σε αυτή τη φάση ζητήσαμε τη βοήθειά του φύλακα του σχολικού συγκροτήματος κ. Καφάση καθώς γνωρίζει όλα τα «κατατόπια» του κτιρίου και τα περισσότερα σημεία που μας ενδιέφεραν. Ο μετρητής του νερού ήταν τελικά εύκολα προσβάσιμος, αν εξαιρέσει κανείς το γεγονός ότι κάθε φορά που οι μαθητές έπαιρναν την μέτρηση έπρεπε να σηκώνουν ένα βαρύ μεταλλικό καπάκι και να πηδάνε μέσα σε ένα σκάμμα ενός μέτρου περίπου, όπου και βρίσκεται ο εν λόγω μετρητής.

Όταν ψάξαμε να βρούμε τον μετρητή της παροχής ηλεκτρικής ενέργειας, κοινώς το ρολόι της ΔΕΗ, τα πράγματα δυσκόλεψαν. Το σχολικό συγκρότημα χρησιμοποιεί βιομηχανικό ρεύμα πολύ υψηλής τάσης. Αυτό το ρεύμα οδηγείται στο υπόγειο του συγκροτήματος και εκεί με μετασχηματιστές μοιράζεται σε 18 ρολόγια-μετρητές που δίνουν ηλεκτρική ενέργεια σε όλο το συγκρότημα. Υπάρχει λοιπόν ένας κεντρικός μετρητής στερεωμένος σε μια κολώνα της ΔΕΗ έξω από το κτίριο του συγκροτήματος. Ο μετρητής όμως αυτός είναι κλειδωμένος με λουκέτο. Σε μια τηλεφωνική επικοινωνία που είχαμε με τον αρμόδιο υπάλληλο της ΔΕΗ πληροφορηθήκαμε ότι δεν επιτρέπονταν σε μας να έχουμε το κλειδί και να ξεκλειδώνουμε για να κάνουμε τις μετρήσεις που μας ενδιέφεραν. Αυτό θα μπορούσαμε να το κάνουμε μόνον από τους λογαριασμούς που έρχονταν στο σχολείο, ταχυδρομικά. Αυτό και κάναμε. Δηλαδή φωτοτυπούσαμε τον λογαριασμό της ΔΕΗ, όταν έφθανε στο σχολείο και καταγράφαμε τις μετρήσεις στο πλάνο μας.

Η καταγραφή των ενδείξεων από το ρολόι της ύδρευσης καθώς και από τους λογαριασμούς (ΔΕΗ, Φυσικού Αερίου) γινόταν τις ημερομηνίες που υποδείκνυε μια ειδική φόρμα που μας είχε σταλεί από την Ελληνική Περιβαλλοντική Εταιρία μαζί με τις οδηγίες για τις μετρήσεις (Πίνακας 1).

Τις τελευταίες μετρήσεις τις πήραμε το μήνα Μάιο και πριν τη λήξη του σχολικού έτους.

ΠΙΝΑΚΑΣ ΜΕΤΡΗΣΕΩΝ ΓΙΑ ΤΟ ΣΧΟΛΙΚΟ ΕΤΟΣ 2011- 2012												
Όνομα σχολείου: 1ο ΕΠΑ.Λ ΛΑΡΙΣΑΣ												
Ονοματεπώνυμο υπευθύνου: ΑΘΑΝΑΣΙΑΔΟΥ ΔΕΣΠΟΙΝΑ												
ΗΛΕΚΤΡΙΚΗ ΕΝΕΡΓΕΙΑ												
Ημερομηνίες λήψης μετρήσεων	από 1/11/11 έως 1/12/11		από 1/12/11 έως 1/01/12		από 1/01/12 έως 1/02/12		από 1/02/12 έως 1/03/12		από 1/03/12 έως 1/04/12		από 1/04/12 έως 1/05/12	τελική ένδειξη
	989	1006		1020		1035		1050		1063		1070
Διαφορά	17		14		15		15		13		7 ΣΥΝΟΛΟ	81
											81Χ1200=	**97.200kw/h**
ΥΔΡΕΥΣΗ												
Ημερομηνίες λήψης μετρήσεων	25/11/11	09/12/11	23/12/11	09/01/12	23/01/12	06/02/12	20/02/12	05/03/12	19/03/12	02/04/12	23/04/12 07/05/12	τελική ένδειξη
Νερό	15469	15522	15577	15637	15703	15761	15842	15884	15980	16078	16205 16263	
Διαφορά		53	55	60	66	58	79	42	96	98	127 58	**792 m³**
ΘΕΡΜΑΝΣΗ												
Ημερομηνίες λήψης μετρήσεων		από 1/11/11 έως 30/11/11		από 1/12/11 έως 30/12/12		από 31/12/12 έως 31/01/12		από 1/02/12 έως 29/02/12		από 1/03/12 έως 29/03/12		τελική ένδειξη
Φυσικό Αέριο	760.292	771.936		784.725		801.704		823.117		833.609		
Διαφορά		12.808,4		14.067,9		18.676,9		23.554,3		11.541,2		**80648,7m3**
ΑΝΑΚΥΚΛΩΣΗ												
Ημερομηνίες λήψης μετρήσεων	25/11/11	09/12/11	23/12/11	09/01/12	23/01/12	06/02/12	20/02/12	05/03/12	19/03/12	02/04/12	23/04/12 07/05/12	τελική ένδειξη
Ανακυκλώσιμα	50	52	55	60	68	73	82	110	103	115	93 105	**966 kg**

Πίνακας 1

626

Οι δράσεις μας όμως δεν περιορίστηκαν εδώ. Στις αρχές του Νοεμβρίου 2011 κατόπιν συνεννόησης με τον δ/ντή του σχολείου κ. Μπουρουτζήκα συντάξαμε και καταθέσαμε στην υπηρεσία Πρασίνου του Δήμου Λαρισαίων, ένα έγγραφο με αίτημα την αναμόρφωση της αυλής του σχολείου ζητώντας τη βοήθεια της. Η υπηρεσία Πρασίνου ανταποκρίθηκε και μετά από λίγες μέρες επισκέφθηκε το σχολείο μας ένα κλιμάκιο αποτελούμενο από το δ/ντή της υπηρεσίας Πρασίνου του Δήμου Λαρισαίων, κ. Παπαδόπουλο, την προϊσταμένη του τμήματος Μελετών της υπηρεσίας, κ. Μπεργιάννη και τον γεωτεχνικό κ. Χριστοδούλου.

Μετά από την επιτόπια εξέταση του χώρου, συμφωνήθηκε η επόμενη δράση (φύτευση δενδροστοιχιών) να γίνει μετά από την ολοκλήρωση εργασιών που θα επιτρέψουν τις δεντροφυτεύεις. Εδώ συναντήσαμε δυσκολίες οικονομικής φύσης. Έπρεπε να βρεθούν κονδύλια για να αφαιρεθούν κομμάτια από την ασφαλτοστρωμένη αυλή του σχολικού συγκροτήματος που θα επέτρεπαν τη δεντροφύτευση.

Για την ολοκλήρωση της δράσης, εκτός από τα παραπάνω, αποφασίσαμε την εγκατάσταση φωτοβολταϊκών. Δυστυχώς η ιδέα και οι ενέργειες που κάναμε για την εγκατάσταση φωτοβολταϊκών πάνελς και την ένταξη στο πρόγραμμα «πράσινη στέγη» στις ταράτσες του συγκροτήματος, που η έκτασή τους είναι πολύ μεγάλη αλλά και οι προϋποθέσεις για τη συλλογή ηλιακής ενέργειας ιδανική, βρήκε αναπάντεχο εμπόδιο το γεγονός ότι το συγκρότημα δεν διαθέτει πολεοδομική άδεια !!

Αποτελέσματα – Διαπιστώσεις - Συμπεράσματα

Οι μετρήσεις που καταγράφηκαν αφορούν όλο το σχολικό συγκρότημα και όχι μόνο το δικό μας σχολείο. Βρήκαμε λοιπόν το συνολικό αριθμό μαθητών που φοιτούν στα συστεγαζόμενα σχολεία και το συνολικό αριθμό των εκπαιδευτικών που υπηρετούν σ' αυτά.
Ο συνολικός αριθμός μαθητών είναι 825 και των εκπαιδευτικών είναι 209. Σύνολο 1034.
Τα αποτελέσματα που βγάλαμε έχουν ως εξής:
   1. Από την 1/11/2011 μέχρι και την 1/05/2012, δηλαδή λίγες μέρες πριν την επίσημη λήξη του σχολικού έτους η κατανάλωση ηλεκτρικού ρεύματος στο σχολικό συγκρότημα ήταν 97.200 kw/h
   ► Άρα η κατανάλωση ηλεκτρικής ενέργειας ανά μαθητή και εκπαιδευτικό είναι: 94 kw/h
2. Η συνολική ποσότητα νερού που καταναλώθηκε κατά το διάστημα από 25/11/2011 έως και 7/05/2012 που πήραμε την τελευταία μέτρηση ήταν 792 m^3
   ► Άρα η κατανάλωση νερού ανά μαθητή και εκπαιδευτικό είναι: 0,76 m3
*** Η χρήση μεγάλης ποσότητας νερού στα εργαστήρια γενικότερα και ιδιαίτερα στο θερμοκήπιο που λειτουργεί στο πλαίσιο των εργαστηρίων του Τομέα Γεωπονίας, επιβαρύνει τη συνολική κατανάλωση νερού του σχολικού συγκροτήματος.
3. Η συνολική ποσότητα Φυσικού Αερίου που καταναλώθηκε για τη θέρμανση του κτιρίου από 1/11/2011 έως 29/03/2012 ήταν 80646,7 m^3
   ► Άρα η κατανάλωση Φυσικού Αερίου ανά μαθητή και εκπαιδευτικό είναι 77,9 m3
*** Η θέρμανση λειτουργεί στο σχολικό συγκρότημα από τις 7:30 το πρωί έως τις 9:30 το βράδυ, διότι εκτός της πρωινής βάρδιας, λειτουργούν ένα απογευματινό και ένα βραδινό σχολείο.
4. Τέλος τα ανακυκλώσιμα υλικά (χαρτί και συσκευασίες) ήταν 966 kg.
   ► Άρα τα ανακυκλώσιμα που αναλογούν ανά μαθητή και εκπαιδευτικό είναι: 0,93 kg
*** Στις ποσότητες ανακυκλώσιμων δεν έχουν υπολογιστεί οι ποσότητες που συχνά συλλέγαμε στις εξορμήσεις καθαριότητας της ομάδας.

Οι διαπιστώσεις που κάναμε εν συντομία είναι ότι:
   ☐   Χρειάζεται περισσότερη ενημέρωση και ευαισθητοποίηση των μαθητών, αν είναι δυνατόν όλων των σχολικών μονάδων που συστεγάζονται στο συγκρότημα.
   ☐   Αν και το Πρόγραμμά μας ήταν η αφορμή να εκδηλώσουν την ευαισθητοποίηση τους αρκετοί εκπαιδευτικοί, χρειάζεται να αναλάβουν πιο ενεργά δράση περισσότεροι.
   ☐   Πρέπει να ενταθεί η περιφρούρηση της άσκοπης κατανάλωσης ενέργειας κάθε μορφής από τους ίδιους τους μαθητές και τους καθηγητές.

☐ Η συνέχιση της παρακολούθησης και καταγραφής των στοιχείων των μετρητών κατανάλωσης ενέργειας και φυσικών πόρων κρίνεται σκόπιμη για τα επόμενα χρόνια, για την ασφαλέστερη εξαγωγή συμπερασμάτων και περαιτέρω σχεδιασμό των δράσεων στο συγκεκριμένο σχολικό συγκρότημα.

Οι αλλαγές που πραγματοποιήθηκαν κατά τη διάρκεια της υλοποίησης του Προγράμματος είναι:

► Οι μαθητές δούλεψαν σε ομάδες με άριστη συνεργασία. Με την ολοκλήρωση της εργασίας δόθηκε η δυνατότητα για ατομική και ομαδική ενδυνάμωση, ανάπτυξη δεξιοτήτων και αισθήματος πληρότητας με την επίτευξη των στόχων.

► Η ομάδα των μαθητών μου που εργάστηκαν για την υλοποίησή του Προγράμματος «Αειφόρο Σχολείο» με ενθάρρυνση αλλά και ανατροφοδότηση, ξεπέρασαν τους δισταγμούς τους και συμμετείχαν χωρίς να δίνουν σημασία στα ειρωνικά σχόλια των συμμαθητών τους.

► Όλο και περισσότερα παιδιά και συνάδελφοι, σέβονταν την προσπάθειά μας και έπαιρναν ενεργά μέρος στην Ανακύκλωση υλικών τηρώντας τους κανόνες της.

► Προτείναμε τη μείωση των λαμπτήρων ημέρας σε σημεία π.χ διαδρόμους και αίθουσες που ο αριθμός τους κρίθηκε υπερβολικός, αφαιρώντας ορισμένους απ' αυτούς.

► Η ανακύκλωση μικρών συσκευών και καμένων λαμπτήρων είχε μικρή συμμετοχή και αυτή περισσότερο από τους καθηγητές του σχολείο και λιγότερο από τους μαθητές. Το μεγαλύτερο ποσοστό των μαθητών μας μετακινούνται με αστικά λεωφορεία, έτσι προκύπτει η δυσκολία μεταφοράς των ανακυκλώσιμων μικρών ηλεκτρικών συσκευών από τα παιδιά

► Η παρέμβαση για τη μείωση της σπατάλης ορισμένων μορφών ενέργειας ή πόρων στο χώρο του σχολείου, εκ μέρους των μαθητών και των εκπαιδευτικών είναι μικρή π.χ φυσικό αέριο. Η ευαισθητοποίησή τους όμως μπορεί να φέρει αποτελέσματα στη μείωση της σπατάλης στα σπίτια τους.

Προτάσεις

Προτείνουμε τις παρακάτω ενέργειες- δράσεις για την επόμενη σχολική χρονιά, έχοντας ήδη χρήσιμες εμπειρίες από τις δυσκολίες και τα προβλήματα που αντιμετωπίσαμε στην υλοποίηση του Προγράμματος:

► Κυρίαρχος στόχος είναι η ανάπτυξη αισθήματος κοινωνικής ευθύνης. Να αλλάξει η νοοτροπία: « Τι με νοιάζει, εγώ το πληρώνω; Γιατί να κάνω οικονομία». Η κρίση αφορά και την οικονομία ενέργειας στα δημόσια κτίρια όπως είναι τα σχολικά κτίρια.

► Είναι πολύ σημαντικό να οργανώσουμε συντονισμένη ενημέρωση για τους μαθητές και τους καθηγητές των άλλων σχολικών μονάδων που συστεγάζονται στο σχολικό συγκρότημα.

► Θα βοηθούσε σημαντικά στη μείωση της άσκοπης κατανάλωσης ηλεκτρικής ενέργειας, να κολλήσουμε ένα σύντομο μήνυμα υπενθύμισης π.χ «Σβήστε τα φώτα όταν δεν τα χρειάζεστε» κοντά στους διακόπτες φωτισμού των αιθουσών και των γραφείων.

► Η διοργάνωση μιας εκδήλωσης στην οποία θα ανακοινώσουμε τα αποτελέσματα και τα συμπεράσματα της δράσης μας σε όλους τους μαθητές του σχολείου μας. Αυτό θα είχε σαν αποτέλεσμα την ανατροφοδότηση των μαθητών που εργάστηκαν για το Πρόγραμμα αλλά και την παρακίνηση νέων εθελοντών.

► Με τη λογική ότι στο χώρο ενός σχολείου παράγονται ελάχιστες ποσότητες σκουπιδιών που δεν ανακυκλώνονται θα πρέπει να εστιάσουμε στη συνεργασία της ομάδας μας με τις καθαρίστριες που εργάζονται στο σχολικό συγκρότημα. Με αυτό τον τρόπο θα αυξήσουμε τις ποσότητες ανακυκλώσιμων υλικών και θα μειώσουμε τα κοινά σκουπίδια.

► Να μπορέσουμε να εξασφαλίσουμε το ποσό που χρειάζεται για τις εργασίες αφαίρεσης τμημάτων της ασφάλτου στην αυλή του σχολείου, για να μπορέσουμε στη συνέχεια να «πρασινίσουμε» την ομολογουμένως τεράστια, ασφαλτοστρωμένη αυλή του σχολείου μας.

► Να επαναθέσουμε την πρότασή μας για εγκατάσταση φωτοβολταϊκών πάνελς και την ένταξη μας στο νέο πρόγραμμα του Δήμου Λαρισαίων «πράσινη στέγη». Θα προσπαθήσουμε να ξεπεραστούν προβλήματα γραφειοκρατίας που αποτέλεσαν σε πρώτη φάση εμπόδιο για την πραγματοποίησή του.

Ευχαριστίες

Εγώ και η ομάδα μου ευχαριστούμε θερμά τον δ/ντή του σχολείου μας κ. Μπουρουτζήκα Ιωάννη για την υποστήριξή του, τον συνάδελφο κ. Ζαφειρίου Βασίλειο για την πολύτιμη βοήθειά του, καθώς και όλους όσους συνέβαλλαν στην υλοποίηση του Προγράμματος «Αειφόρο Σχολείο».
Θέλουμε ακόμα να ευχαριστήσουμε τον υπεύθυνο του Τμήματος Καθαριότητας-Ανακύκλωσης του Δήμου Λαρισαίων κ. Καραγιάννη Βασίλειο για την πολύτιμη στήριξη της προσπάθειάς μας κάθε φορά που απευθυνθήκαμε σε αυτόν.