

## YouTube: An educational tool in Environmental Education

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### Abstract

The applications of Information and Communication Technologies (ICT) and more specifically YouTube in Environmental Education (EE) may support teaching and enhance student learning. The aim of the present study is the presentation of a YouTube channel and its use as a form of contemporary education on Environmental issues. The goal was to educate those teachers in the designing and implementing of environmental actions. The distance educational program was implemented through a YouTube channel created for the needs of the study. Among others, an assessment of knowledge and abilities of the teachers was done on the designing and implementation of environmental actions as well as an assessment of the channel in YouTube. Acquiring of knowledge and the improvement of abilities of participants on the design and implementation of environmental projects and their positive attitude on the way the educational program was implemented, were among other important results of the present study.

**Keywords:** *distance education, Internet, YouTube, Environmental Education*

## 1. Introduction

The education of teachers is a very important element in their effort to acquire knowledge and incorporate them in the teaching plan (Calnin, 2006; Garet, et al., 2001). In bibliography, training of teachers is determined as the total of activities and processes aiming to the enrichment, improvement, upgrading and further development of academic, practical, professional and personal interests, abilities and knowledge of teachers during their term. It also aims at their information on the development of sciences and especially of education in order to achieve continuous upgrade of the quality of their work within school and their respond to new social and educational needs. (Papadakis, 2003; Tsigka & Nasenas, , 2006; Fragoulis & Anagnou, 2013).

The use of distance education and especially of education through the internet is huge. The possibilities that the internet offers in education are many. These possibilities should be used to the maximum in order to have positive results and the creation of a contemporary and fruitful educational system. The use of internet refers to innovation, new learning and teaching experiences. What is of interest is the understanding of the way through which the internet is used as a tool for teaching and learning and as a supportive mean for teaching practices. Distance education is under continuous development. It used the abilities of technology, promotes the educational process, it is faster and much more adapted in personalized student needs. Education through the internet is used everywhere. It combines text, sound, picture and video while at the same time it promotes the interaction between teachers and students (Batur, et al, 2011).

ICT allow the development of forms of educational material that facilitate learning in day to day teaching as well as the development of innovative institutions of contemporary school such is Environmental Education (Gavrilakis & Sofoulis, 2002; Daskolia, 2001). Environmental Education is considered as one of the most efficient means for the formation of environmentally responsible citizens with knowledge and abilities that will allow them to actively participate in society and contribute to the building of sustainability (Elliot, 1993; Fien, 1993; Flogaitis, 1998; Luke, 2001). For this reason Environmental Education has been included in educational systems in most countries. In Greece, Environmental Education is part of school syllabi in primary and secondary education and is implemented on a voluntary basis by teachers and students (Papadimitriou, 1998). The aim and goals of Environmental Education are determined according to the subject of study and are included within the frame of the general goals of Environmental Education as these were set at international conferences (Sauve, 1994; Unesco, 1978, 1980, 2002; Flogaiti, 1993).

The importance of training of teachers on Environmental Education has been recognized by the Manifesto of Tbilisi (UNESCO, 1978) and has been reconfirmed by the Conference of Rio (UNCED, 1992). Also, within the framework of Education Decade for Sustainable Development (2005-2014), the appropriate training of teachers has been suggested to become one of the action lines (UNESCO, 2005). Finally, in order to achieve a successful development of Environmental Education, research data prove that well trained teachers are in need (Gough, 1998) even from the time of their undergraduate studies (Heimlichetal., 2004) especially under the scope of sustainable development (Summersetal., 2005). The acquisition of scientific knowledge and appropriate methodological tools as well as the knowledge of the historical and philosophical frame of Environmental Education, are considered as necessary tools for any relevant educational programs (Atreyaetal., 1985). The above mentioned require a learning model that would promote a different type of knowledge and mainly the development of abilities to search and manage information, investigate and analyze issues on the encouragement of personal engagement and analyze initiatives by users (Exarchou & Ioannou, 2009).

In Greece most teachers that are involved with Environmental Education in all educational levels did not have the opportunity to get acquainted with the subject of Environmental Education during

the university studies (Fikaris, 1998). Since the beginning of the '90s, courses of Environmental Sciences and Environmental Education were included in all Departments of Education found in Greek Universities (Flogaiti, 1998) as well as in other “productive” departments of teachers in the higher level of education (Skordoulis & Sotirakou, 2005). According to a recent study in Greece it is noted that the number of teachers that have been trained on Environmental Education remains rather small and therefore the number of teachers participating in environmental programs is also low. The need for the training of teachers on issues of environmental education is also mentioned (Zigouri, 2008; Kimionis, 2007).

The inclusion of environmental programs in levels of education from the one hand and the limited training of teachers on Environmental Education on the other, have led to the conducting of the present study, the aim of which was to cover training needs for teachers through a distance training program for the acquisition of knowledge and abilities on the planning and implementing of environmental programs.

At the training program, 105 teachers participated. From them, 53 were teachers of Physical Education (25 male and 28 female), 16 were primary school teachers (4 males and 12 females) and 36 were teachers in secondary education (18 males and 18 females).

## **2. Methodology**

The long distance training program that was implemented was entitled “Pilot application of long distance training of teachers on the designing and implementation of environmental actions”, and was conducted by the Center of Environmental Education of Maronia in cooperation with the sub-domain of New Technologies of the Department of Physical Education and Sport Science of Democritus University of Thrace. The total duration of the program was eight (8) weeks and combined the study of the available teaching material with long distance contemporary learning activities.

Initially, a YouTube channel was created under the name Center of Environmental Education of Maronia. Then, all selected participants were asked through e-mail to create a Google account. There they received the web address of the YouTube channel. At the beginning of the training program participants were informed that the material for each week will be available in the form of a video on the YouTube channel every Monday morning.

Along with the material, the participants were also given the activities they should develop and post up to Sunday night at the Google Group of the Center of Environmental Education that was created for the needs of training.

The subject was selected due to its direct relevance to contemporary professional needs (development of school programs) and the interests of trainees, while it was developed within eight different themes. The formation of the context of distance training was designed with the participation of the responsible of the sub-domain of New Technologies of the Department of Physical Education and Sport Science of the Democritus University of Thrace, the responsible of the Center for Environmental Education of Maronia and the researcher. It regarded information on ICT and on issues of environmental education aiming to acquire and update knowledge on planning and implementing environmental actions. More specifically, participants were trained on technological tools through which training would take place. Following and within the frame of environmental education, they were trained on national environmental networks “The European mountain paths E6 and E4” and “Play as a mean for environmental awareness, sports and action”, as well as the program “Discover your country (natural, manmade and historical environment).” The context of each consisted of theory in the form of a video uploaded on the channel of the Center of Environmental Education of Maronia, which they had to study and activities relevant to the

teaching material, which they had to implement with their students at school. The activities were videotaped and uploaded on the Google group where the rest of participants could watch and comment on. At the weekly activities participants could also find all the comments made by them and the others.

Participants were informed that with the completion of training and if they were consistent with all activities they should sent on time at the end of each week, they would receive a certificate of attendance of the training program, certified by the official institutions, Center of Environmental Education of Maronia and the sub-domain of New Technologies of the Department of Physical Education and Sport Science of the Democritus University of Thrace.

### 3. Materials

For the needs of the research the following technological environments were used.

#### 3.1. YouTube Channel

The first technological environment used was a web educational channel in YouTube where teachers were interconnected as members using their own private passwords (Fig. 1). The channel is a possibility offered by Google to its subscribers who they can adjust and form their personal profile within YouTube (Chau, 2010). The data appearing in each user's channel are social relations (e.g. friends, comments), interests (e.g. other channels the user is subscribed to), data relevant to the context of the channel (e.g. date and number of videos uploaded) as well as a brief personal presentation of the user (Rotmanetal., 2009).

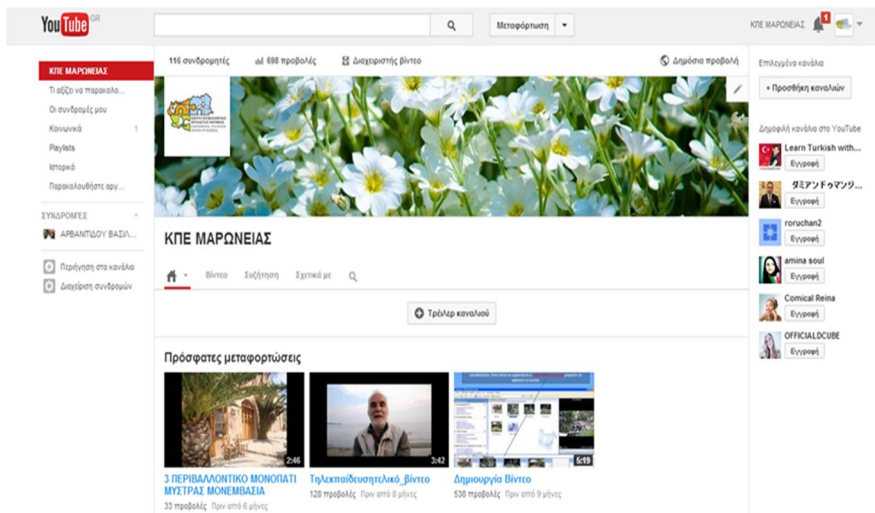


Fig. 1 YouTube channel

#### 3.2. Google Groups

The second technological environment used was Google Groups (Fig. 2). This is another possibility offered by Google to its subscribers. With the Google Groups, groups are created based on e-mail. Among others the members of Google Groups may:

- Participate in discussions on a specific subject.
- Read posts of the group through e-mail, or through chat or both
- Find individuals with similar interests or common origin.

Four categories were created in the specific Google Group:

1. Announcement: In this category participants could find all activities that should be implemented until the end of each week. Special posts and explanatory statements were also posted on this category. 2. Question: In this category participants could post any questions to trainers and/or other participants. 3. Reply: Replies on questions were posted in this category. 4. Discussion: In this category participants could start general discussions.

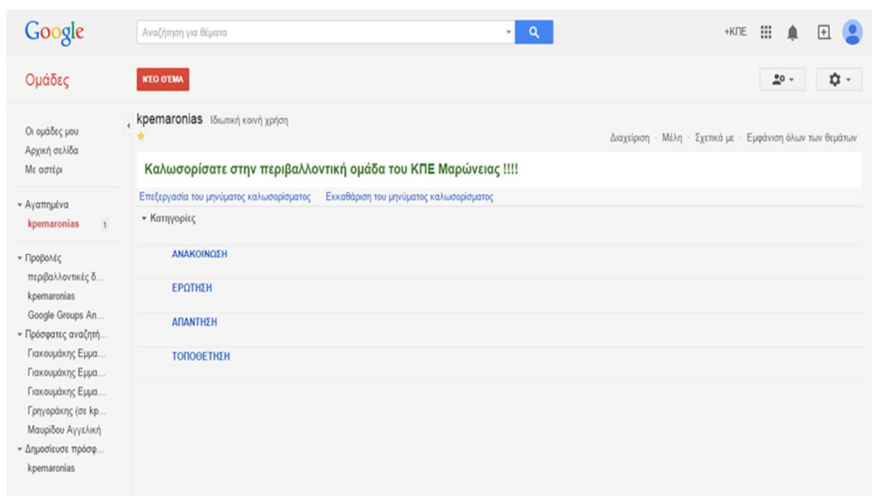


Fig. 2 Google Group

### 3.3 Google Drive

Finally, the third technological environment was used was the Google Drive (Fig. 3). Google Drive is a storage and synchronization of data service offered by Google, and was launched on April 24, 2012 allowing the use of cloud storage, sharing and collaborative editing by the user. Data that are publicly share in Google Drive may be researched through search engines. Google Drive is the “home” of Google Docs, an office suite with productivity apps that offers the collaborative editing of documents, excel sheets, presentations etc. With the use of this application, the questionnaires of the pilot study were created.

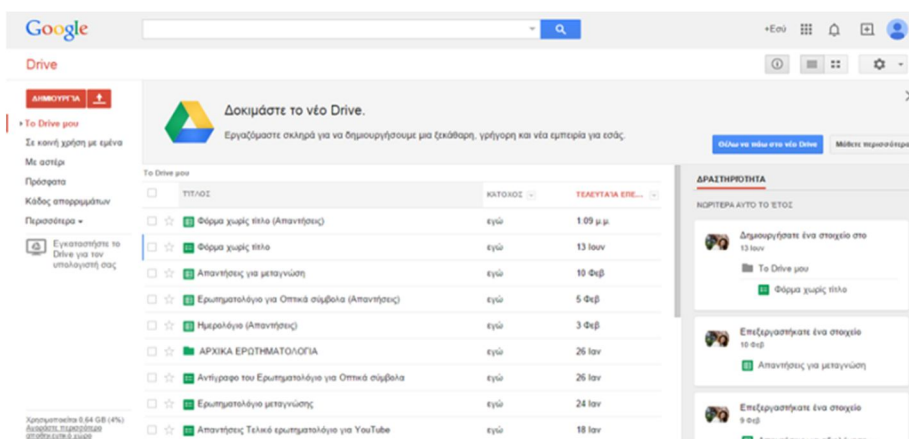


Fig. 3 Google Drive

## 4. Instruments

In order to reach results the following instruments were used:

i) Questionnaire on the investigation of needs/knowledge of teachers on Environmental Education. This is a questionnaire created by a team of researchers of the Organization for the Training of Teachers (2008) for the needs of a wider research of the Organization and was based on the review of relevant bibliography. The questionnaire had the form of Likert scale. The scale consisted of sentences reflecting various parts of the subject studied and participants were called upon to express the level of agreement or disagreement with each of the sentences. The choices that contained answers had a range of totally disagree to totally agree with three intermediate choices (disagree, so and so, agree). More specifically, the questionnaire consisted of three parts as follows:

1) The first part contained the demographics for participants. More specifically it included: sex, teaching experience, school unit they belong to, age, education and specialty.

2) The second part included 10 questions on proficiency of teachers on organization, implementation and assessment of a developmental education program.

3) The third part included 10 questions on the level of proficiency in the abilities of participants in organization, implementation and assessment of an environmental education program.

ii) Questionnaire for the assessment of the YouTube channel: For the assessment of the YouTube channel the questionnaire created by Petropoulou & Tsalgatidou, 2004 was used, which was also used on a similar training group. The questionnaire consisted of four parts where participants assessed: the technical environment and its use (6 questions), education material (5 questions), teaching methodology (7 questions) and the role of the trainer (4 questions). The questions were answered on a 5-level Likert scale (1=very much, 2=much, 3=enough, 4=little, 5=not at all).

#### 4.1. Research Questions

For the purposes of the present study three experimental groups were created: Group A consisted of Teachers of Physical Education (PE), Group B Teachers of primary education and Group C teachers of secondary education.

The questions examined in the specific study referred to whether or not knowledge and abilities of the participants were increased on the planning and implementing of environmental activities, after following the training program as well as what were their views on the technological instrument used for the implementation of the specific program.

### 5. Results

For the statistical analysis of the results the statistical package for social sciences (SPSS v. 20) was used. The processing of results was based on descriptive and inferential statistics. In descriptive statistics, statistical position measures (number, mean, maximum and minimum). In inferential statistics, the reliability coefficient Cronbach Alpha ( $\alpha$ ) was calculated as was done with the Two Way Anova for the control on the relationship between sex and the 3 groups. For each part of the questionnaires the Cronbach Alpha coefficient was separately calculated. A total indicator for each questionnaire could not be produced since in each part different structures/attributes were examined.

1. Questionnaire on the investigation on needs/ knowledge of teachers on Environmental Education.

The check of internal consistency of questions regarding knowledge of the planning and implementing environmental programs, Cronbach's Alpha was .979 in the first measurement. Statistically significant differences were found between sex,  $F_{(1, 97)} = 5.07, p = .027$ , and specialty  $F_{(2, 97)} = 9.19, p < .001$ . The review of means shows that males (*Average* = 3.12) presented higher scores in relation to females (*Average* = 3.23) (Fig. 4). Regarding specialty, analysis continued with post hoc comparisons on the Bonferroni criterion. Results showed that Physical Education Teachers (PE) (*Average* = 3.55) differ from secondary school teachers (*Average* = 2.68) ( $p < .001$ ).

	Males	Females	Total
Primary	2.56 (1.09)*	4.41 (3.30)*	3.03 (1.24)
Secondary	2.77 (0.62)	2.59 (0.91)	2.68 (0.77) ◇
PE	3.60 (0.88)	3.50 (1.24)	3.55 (1.06) ◇
Total	3.12 (0.96)*	3.23 (1.20)*	3.17 (1.07)

Fig.4. Knowledge on planning and implementing Environmental Programs (initial measurement)

Note: \* Statistically significant differences between sexes.

◇ Statistically significant differences between specialties

Internal consistency of questions on knowledge regarding planning and implementing, at the measurement after intervention was  $\alpha = .953$ . Statistically significant differences between sex and specialty that appeared during the first measurement seem to have been eliminated during the second measurement since they showed no difference at all (Fig. 5).

	Males	Females	Total
Primary	1.88 (0.65)	1.77 (0.21)	1.85 (0.55)
Secondary	1.65 (0.56)	1.74 (0.63)	1.69 (0.59)
PE	1.84 (0.55)	2.03 (0.66)	1.93 (0.60)
Total	1.78 (0.57)	1.89 (0.63)	1.83 (0.59)

Fig.5. Knowledge on planning and implementing of Environmental Programs (final measurement)

The comparison of the two sexes before (*Average* = 3.12) and after (*Average* = 1.78) intervention showed that males increased their perception regarding their knowledge ( $p < .001$ ). Similar difference was also found for females before (*Average* = 3.23) and after (*Average* = 1.88) ( $p < .001$ ). The same motif of differences appeared for each specialty since they all improved significantly their perception on their knowledge ( $p < .001$ ) (Physical Education Teachers before *Average* = 3.55, after *Average* = 1.93, Primary before *Average* = 3.03 after *Average* = 1.85 and Secondary before *Average* = 2.68, after *Average* = 1.69) (Fig. 4, 5).

The check for internal consistency of questions on the abilities for planning and implementing Environmental programs, the initial measure showed that Cronbach's Alpha coefficient was  $\alpha = .962$ . The check of results showed statistically significant differences appeared only for specialty,  $F_{(2, 97)} = 5.37$ ,  $p = .006$ . It is worth mentioning that marginally statistically significant differences appeared for sex  $F(1, 97) = 2.96$ ,  $p = .088$ . The analysis continued with post hoc comparisons with the Bonferroni criterion. Results revealed that Physical Education teachers (*Average* = 3.06) differ from Teachers in Secondary education (*Average* = 2.58) ( $p = .034$ ) (Fig. 6).

	Males	Females	Total
Primary	2.60 (0.96)	4.22 (0.22)	3.01 (1.10)
Secondary	2.72 (0.57)	2.44 (0.94)	2.58 (0.78)*
PE	3.19 (0.77)	2.92 (1.05)	3.06 (0.91)*
Total	2.92 (0.79)	2.85 (1.06)	2.89 (0.92)

Fig.6. Abilities on planning and implementing Environmental Programs (initial measurement)

Note: \*statistically significant differences between specialties

The internal consistency of questions on the abilities for planning and implementing Environmental Program following the intervention was  $\alpha = .950$

	Males	Females	Total
Primary	1.93 (0.69)	1.77 (0.26)	1.88 (0.58)
Secondary	1.71 (0.55)	1.74 (0.60)	1.72 (0.57)
PE	1.80 (0.56)	2,18 (0.77)	1.94 (0.68)
Total	1,79 (0.58)	1.93 (0.69)	1.85 (0.63)

Fig.7. Abilities on planning and implementing Environmental Programs (final measurement)

The analysis did not show significantly important differences between sex and specialty appeared, a fact showing that following the intervention, any differences that existed initially, disappeared (Fig. 7).

The comparison of the two sexes prior (*Average* = 2.92) and after (*Average* = 1.79) the intervention revealed that males increased their perception on their abilities ( $p < .001$ ). Similar difference was found in females prior (*Average* = 2.85) and after (*Average* = 1.93) ( $p < .001$ ). The same motif of differences appeared for each specialty since they significantly improved their perception on their abilities ( $p < .001$ ) (Teachers of Physical Education prior *Average* = 3.06, after *Average* = 1.94, Teachers of Primary Education before *Average* = 3.01 after *Average* = 1.88 and Teachers of Secondary Education before *Average* = 2.58, after *Average* = 1.72) (Fig. 6, 7).

## 2. Questionnaire for the assessment of the YouTube channel

	Males	Females	Total
Primary	1.77 (0.55)	1.75 (0.50)	1.76 (0.52)
Secondary	1.51 (0.46)	1.60 (0.59)	1.55 (0.53)
PE	1.57 (0.37)	1.45 (0.30)	1.51 (0.34)
Total	1.59 (0.44)	1.53 (0.45)	1.57 (0.45)

Fig.8. Assessment of the technological environment and uses of the system.

The internal consistency of the questions on technological environment and the uses of the system was  $\alpha = .759$ . There were no statistically significant differences in views on the technological environment and the uses of the system, between sex and specialty (Fig. 8). More specifically, the views of all participants were positive regarding the uses of the system and the technological environment since the system was easy to use and required no special equipment and therefore no problems appeared during the implementation of the program in relation to internet connection and their entrance in the channel. So their answers ranged from “not at all” to “a little”.

	Males	Females	Total
Primary	1.77 (0.61)	2.55 (0.85)	1.96 (0.73)*
Secondary	1.58 (0.56)	1.64 (0.38)	1.58 (0.55)
PE	1.52 (0.54)	1.64 (0.58)	1.57 (0.55)*
Total	1.59 (0.56)◇	1.72 (0.58)◇	1.65 (0.57)

Fig.9. Assessment of educational material.

Note: ◇Statistically significant differences between sexes.

\*Statistically significant differences between specialties.

The internal consistency of questions on the assessment of educational material was  $\alpha = .816$ . The examination of the means showed that males (*Average* = 1.59) scored higher in relation to



females (*Average* = 1.72). Results revealed that males had a more positive attitude towards the educational material used than females did. Statistically significant differences were found between the two sexes,  $F_{(1, 99)} = 5.97, p = .016$ , and specialty  $F_{(2, 99)} = 5.62, p = .005$ . Regarding specialty the analysis continued with post hoc comparisons by the Bonferroni criterion. Results showed that Teachers of Physical Education (*Average* = 1.57) ( $p = .047$ ) scored higher and therefore showed a more positive attitude than Teachers of primary school (*Average* = 1.96) (Fig. 9).

	Males	Females	Total
Primary	1.74 (0.51)	1.96 (0.53)	1.79 (0.51)
Secondary	1.69 (0.53)	1.56 (0.47)	1.62 (0.50)
PE	1.69 (0.53)	1.56 (0.47)	1.62 (0.50)
Total	1.72 (0.51)	1.74 (0.52)	1.73 (0.51)

Fig.10. Assessment of teaching methodology.

The internal consistency of questions on the assessment of teaching methodology was  $\alpha = .784$ . There were no statistically significant differences on the assessment of teaching methodology between sex and specialty. All participants presented a positive attitude towards the teaching methodology applied (Fig. 10).

	Males	Females	Total
Primary	1.85 (0.54)	1.67 (0.51)	1.81 (0.52)
Secondary	1.93 (0.52)	2.12 (0.45)	2.03 (0.49)
PE	1.94 (0.52)	2.15 (0.46)	2.04 (0.50)
Total	1.92 (0.52)	2.10 (0.47)	2.00 (0.50)

Fig.11. Assessment of the views on the role of teacher-trainer

The internal consistency of questions on the assessment of the role of teacher-trainer was  $\alpha = .759$ . It is concluded that there were no statistically significant differences between participants of the three groups on their views on the role of teacher-trainer as well as between males and females. Their views were positive (Fig.11).

## 6. Discussion

The object of the present study was the training on planning and implementing environmental programs. Results revealed that prior to training the perception of both males and females regarding their knowledge and abilities on planning and implementing environmental programs was low since their initial answers ranged from “so and so” to “totally disagree”. Similar are the results between the three groups with lower perception to appear in Teachers of Physical Education while Teachers in secondary education presented the highest level of perception. This could be explained by the fact that there are specialties within secondary education, such are physicists, chemistry teachers, biologists, etc., and who during their undergraduate studies received some basic knowledge on Environmental Education. This is not the case with Teachers in Primary Education and Teachers of Physical Education whom undergraduate studies included no environmental programs. It should be mentioned that efforts are done to bring changes by including the course of Environmental Education as an elective or main course. Findings of previous studies agree with the above noting that training needs of Greek teachers in secondary education who deal with Environmental Education could not be characterized as high, since the teachers themselves state that they have a sufficient level of knowledge on most of environmental issues (Daskolia, 2000). On the other hand, the majority of teachers in primary education do not have adequate knowledge on Environmental

Education neither they own the necessary knowledge and abilities to implement techniques of diffusion, selection and management of appropriate methodological tools, teaching practices and assessment techniques. In the same study it is noted that from the total of specialties dealing with environmental programs only a 4% is Teachers of Physical Education (Zygouri, 2008).

It is worth mentioning that after attending the long distance training program, not only differences between sexes and groups were eliminated, but also perception of participants regarding the knowledge and abilities on planning and implementing environmental programs were higher than before.

Regarding the tool used for training, i.e. the creation of a channel, participants found it rather interesting. Some of the participants had already a channel of their own without though being aware of all the possibilities the channel offers. This is enhanced by the findings of the study by Halvey and Keane (2007), who examined the use of YouTube tools that have been designed for the interaction among users and promote sharing of videos. The study proved that just a minority of users uses those tools. The users do not take advantage of the possibilities offered by this service, they don't invite friends, they don't comment and don't note posts.

Results also reveal that the majority of participants will use the channel and the possibilities it offers for both personal and professional purposes. This was because the channel was for participants a different place for work, cooperation, communication and interaction. Educational material and the way this was presented through the channel, made the attending of the program more attractive. Participants also noted their satisfaction on the method of the long distance training compared to traditional methods, since for them it is quite important to be trained without necessarily having to move. The lack of physical presence of the teacher did not seem to affect the attendance of the program. The feeling of isolation felt by participants during the program did not exist, confirming in this way the notes of other researchers (Emmanouilidou et.al.; Brower&Klay, 2000; Stodeletal., 2006).

YouTube marked the transition of the Internet from being static to become dynamic while it was enriched with a large number of videos with rich context. It is considered as the most appropriate learning platform since it allows trainees to watch videos with context relevant to their learning goals, make comments and assess their context (Chenetal., 2008; Duffy, 2008). YouTube has been used by various educational-learning environments (Garcia-Barriocanal, et. al., 2011; Milliken, et. al., 2008; Redecker, et. al., 2009). It is used for long distance learning courses for the achievement of better learning results (Burke & Snyder, 2008).

From all the above we can conclude that the adoption of such practices is useful and efficient and may be applied for the training of thousands of teachers on various educational subjects.

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