

Teachers' Training Needs in Environmental Education: The Impact of a Contextual Training Action

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Abstract: The Environmental Education (EE) is seen as a means of shaping free and responsible citizens with knowledge, skills, values and behaviors that will enable them to cope with contemporary environmental problems (Vassala, 2005). Given that the teachers have the responsibility of educating the younger generation, the role of their education is crucial for equipping them with knowledge and skills that are appropriate for the EE. The purpose of this pilot empirical research is to record the teachers' experiences from training activities in the EE, the impact the experiences had on the teachers' self-perception of their abilities, and subsequently the exploration of their training needs in the EE. The investigation of the research questions was supported by the development of a quantitative research in a sample of 30 secondary school teachers in Chios that came from a target population of 143 people who implemented a questionnaire-based EE program. Their training needs mainly focus on issues related to pedagogical approaches, methodology, design and implementation of an EE program through mainly experiential actions. Also, the percentage that states that they want the mixed training model is notable, as well their preference in CCIs and Academic Institutions as training providers is clear.

Key words: environmental education, training

1. Introduction

1.1 Literature Review — Theoretical Reflection

The concept of Environmental Education (EE) was gradually developed and established as a global movement through a series of international conferences in the 1970s. The EE was not designed and enforced by government agencies responsible for education, but by the teachers' own initiatives. Those initiatives reinforced the notion that solving environmental problems is a matter that should occupy all the citizens and that education can be the key, by properly preparing all the citizens to take responsibilities and to contribute to solving problems, having naturally acquired the necessary skills for that (Papadimitriou, 1998).

In the course of the creation of the conceptual and theoretical framework of the EE, many different views have been expressed which is directly related to its dual existence, the environmental one and the educational existence (Kaztaridou, 2008). The wealth of these different views and ideas that are expressed in the EE reveals the freedom of thinking and expression and ensures its development (Flogaiti & Daskolia, 2005).

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On one hand, the establishment of the EE in Greece in 1992 introduced new educational directions such as interdisciplinarity and interdisciplinarity. On the other hand, it revealed the teaching practice's lack for modern pedagogical methods and strategies which highlighted the urgent need for teachers' education (Arvanta, 2006).

The recognition of the growing importance of environmental issues due to the industrial and technological revolution makes the citizens' education about the environment and sustainability necessary. That is an education in which the teacher as an educator is a key factor in the shaping, the promotion and the effectiveness of educational programs implemented in the EE. In fact, while the teacher has not been taught theory and practice issues in the EE during his/her basic studies, he/she needs a training framework through lifelong learning programs that are actively designed and formulated in a systematic approach to the environment (Antoniou, 2010; Anagnostakis & Nasaigas 2010).

The innovative and evolving nature of the EE requires that teacher training is a continuous process which aims at his competence, so that he successfully implements the EE programs (Michael, Papadimitriou, Athanasiadou & Angelidis, 2008). The evolution of the EE into education for Sustainable Development has come to confirm and reinforce the view that training is a necessary and continuous process (Dimopoulou & Babila, 2010).

The design of EE training activities should follow the principles of Adult Education, taking into account the place and the time as factors in differentiating the training needs, by creating new training frameworks. The training of teachers in knowledge about the environment, the ecology and the sustainable development, in the basic principles of the EE, in pedagogical approaches as well as in the design and implementation of EE programs needs to be designed and carried out in accordance with the critical examination of the trainees' perceptions. This process activates teachers and leads them to take action to improve the quality of the EE institution (Dimopoulou & Babila, 2010; Kaztaridou, 2007).

1.2 The Necessity of The Survey

The surveys that deal with the "Educational needs of teachers in environmental education (EE)" have been conducted in a context that has changed in recent years as a result of the socio-economic changes brought about by the political management of the economic crisis. It's a fact that significant changes have been made in the field of Education, such as the sub-financing and the administrative restructuring, which have led to the under-staffing of various structures. These changes also affected the teachers' education in general and particularly the education in the field of EE.

Due to the above events that took place in recent years and the changes they have made in the field of education, there is an emerging need for new empirical research on the training needs of teachers who develop EE programs in order to enrich the programs but primarily to update the existing findings.

The present research intends to complement the set of research already undertaken, as it offers the opportunity to study the training experiences as well as the needs not only of the EE, but also of the teachers who offer their services in school units in the islands of border Greece, where there are greater difficulties in the implementation of education programs, in teachers' movement and in finding trainers.

1.3 The Dimension Studied

The present study refers to the evaluation of the experiences from EE training programs, the evaluation of the impact of these programs on teachers' self-perception of their competence and the training needs of the Chios Secondary Education teachers who implement or have implemented at least one program in the EE during the period 2008–2014. The research population consisted of junior high school, senior high school and vocational high school

teachers in the geographical area of responsibility of the Secondary Education Directorate of Chios Prefecture, namely Chios, Oenousses and Psara.

1.4 The Purpose of The Research

The purpose of this research was to record the experiences, from educational activities in the EE of the teachers of the Secondary Education Department of Chios who implement EE programs. Specifically, the research focused on the teachers' perceptions of their training needs in the field of action and whether the findings matched or differentiated with previous relative research. In terms of training needs, these were determined on the basis of whether teachers' self-concept of competence and capacity is achieved, as well as to what extent they feel able to respond effectively to the planning and the coordination of actions and programs.

1.5 Functional Definitions

By self-concept of competence and capacity we mean whether they feel adequately trained and able to meet the needs of implementing EE programs.

By effective response to the role of the tutor-coordinator we mean the ability to implement the program and to exercise the role of the tutor-facilitator that achieves students' self-efficacy and creative involvement.

1.6 The Research Questions

In this context, the research questions were formulated as follows:

1a. How teachers' experiences of attending training programs in the EE are recorded.

1b. How do teachers evaluate these programs. How are the current training needs of teachers who prepare EE programs recorded as to:

2a. The training's content of knowledge, pedagogical approaches, action strategies, methods and techniques.

2b. The place and time of the training, as well as the duration and the promoter for its implementation.

2c. The context and form of the training, as well as the methodological practices used in it. How is teacher education related:

3a. To their self-concept of competence and capacity to carry out EE programs.

3b. To their effective response to the role of the Coordinator-Tutor they have in the implementation of EE programs.

2. Method of Data Collection and Analysis

2.1 Method

A quantitative research was carried out with the main aim of capturing experiences of training activities in the EE, namely the impact of these training activities on teachers' self-perception regarding their ability to manage and coordinate EE programs. Subsequently, there was an investigation of the training needs in the EE that the secondary education teachers who implemented or implement programs in the field of specific action had. The quantitative research was found to be appropriate for the purpose of the present research with the specific research questions (Cohen, & Manion, 1997), as it enabled the analysis of the phenomenon into individual "measurable" characteristics by distancing the researcher, which contributed to enhancing its reliability (Robson, 2010).

2.2 The Stages of The Research Process

In the effort to find the sample, a written request was submitted to the School Activities Office of the Chios

Secondary Education Directorate that oversees innovative action programs including the environmental education program. Our goal was to obtain a copy of the document with the teachers who at least once implemented or implement EE programs from the school year 2008–2009 and up to the current school year 2013–2014, as well as the school unit in which the program was taking place.

A written request was then made to the Chios Secondary Education Directorate, which informed us about the school units where these teachers currently serve and granted us access to the units in order to visit the teachers and to distribute the questionnaire. The meeting with the research subjects took place at their place of work, beyond their teaching hours, or beyond their working hours and of course, on the basis of each research subject's desire, where they were informed about the purpose of the research. This briefing emphasized the guarantee of their anonymity and provided detailed instructions, explanations and clarifications about the on-site completion of the questionnaire in order to ensure the credibility of the process.

2.3 The Sample

The target population of the study was the Chios Secondary Education Department's teachers who at least once implemented or implement EE programs from the school year 2008–2009 to the school year 2013–2014. Based on the data we received from the School Activities Office, the number of teachers who had deposited an EE program submission form during the aforementioned period is 143. From this target population, the sample for this study was selected by probability sampling, so that the sample becomes representative of the population and therefore generalizations of the research findings can be safely made. The size of our sample was selected using systematic sampling, probability sampling, based on the relative list we received from the School Activities Office. Specifically, each 5th person was selected from this list until the desired sample size was achieved. Thus, the sample of the research consisted of 30 teachers with different specialties who served in junior high schools, senior high schools and vocational high schools. The sample was consistent with the purpose and the questions of the present research, since 80% of the subjects had previous training experience in the EE.

2.4 The Data Collection Tool

A questionnaire with closed-ended questions and questions with preselected possible answers was used as a data collection tool in the context of quantitative research. Although closed-ended questions do not allow participants to freely express themselves, they do take advantage of the time needed to complete and codify them. Multiple choice questions also provide the subject with suggestions that in the case of open-ended questions might not have been affected by the subject. Multiple choice questions offer to the subject more choices than closed-ended questions, thereby allowing for more complete answers, while at the same time the answers are easier to be classified than the answers of open-ended questions. The multiple choice questions combine the advantages of open and closed-type questions while at the same time they eliminate their disadvantages (Daoutopoulos, 1994).

While designing the questionnaire, the study questionnaire that was carried out by Euricon Ltd. on behalf of the Teacher Training Organization in the context of the action “Teacher’s training in environmental education” (November 2008) was taken into consideration. We used some data from Section A of this questionnaire in order to investigate the demographic characteristics of the sample, data from Section C that recorded experiences of prior training activities in the EE as well as the evaluation of these activities and data from Section E that investigated the needs and the preferences of the sample about the carrier, the duration, the time, the method of teaching as well as the training topics in the EE. The questionnaire was also enriched with information about the context, the form, the content and the implementation promoter from the questionnaire about the training needs of teachers on behalf

of the Pedagogical Institute in the context of the “Major Education” Program (June 2010).

The questionnaire was structured in 4 sections.

The first section (Section A) included ten (10) demographic questions. These questions sought to investigate the profile of teachers who developed at least one EE program at the Chios Secondary Education Division during the period 2008–2014 in terms of gender, age, marital status, studies, specialization, foreign language and new technologies skills, years of service in education and especially in the public education system.

The second section (Section B) included six (6) questions. The questions B1, B2, B3, B5, and B6 sought to investigate the research question 1a, and the question B4 intended to investigate the research question 1b.

The third section (Section C) consisted of seven (8) questions. Question C1 served as an introduction to the research question 2, question C3 approached the 2a. Questions C2, C5, C8 studied the question 2b and Questions C4, C6 and C7 studied the question 2c.

The fourth section (Section D) consisted of two (2) questions. The first one (D1) investigated the research question 3a and the second one (D2) investigated the question 3b.

The validity of the tool was reinforced by the fact that it was fulfilled by the person in charge of the school activities of the Secondary Education Department of Chios and two members of the working team from the Homeroupolis Center of Environmental Education in Chios without submitting any relevant comments.

2.5 Data Analysis Method

Appropriate software (SPSS 21.0) was used to statistically process the primary data. The data were coded and then were analyzed using statistical methods in order to answer the research questions and obtain reliable results.

3. Data Analysis — Presentation of Results

According to the recording and processing of the answers of the participants in the research, we obtained the following results:

Regarding the demographic data of the participants, it is recorded that the research sample consists of 56.7% of men and 43.3% of women. The age of the majority of participants ranged between 36–45 years at a rate of 33.3% and between 46–55 years at a rate of 36.7%. Furthermore, 75% of the participants are married and 46.7% have two children. In terms of academic studies, 90% of the teachers are university graduates, 30% have a postgraduate degree and only 3.3% of them have a doctorate and also only 3.3% have a second degree. As for the specialty of the research subjects, the largest percentage (26.7%) are science teachers. The participants know a foreign language at a Very Good or Excellent level at a rate of 66.7% and they are able to handle a computer at a Very Good or Excellent level at a rate of 73.4%. The half (50%) of the sample has worked for 11–20 years in education, 63.4% has 6–15 years of service in the Public School from which the largest percentage (46.7%) serves in General High School.

The recording of the experiences from the monitoring of training programs in the EE and the evaluation of them shows us that the majority (80%) have attended a training program in the Environmental Education. These programs were organized primarily by the Environmental Education Center (EEC) (91.7%) and secondarily by the University Foundation (50%) and the Environmental Education Office (33.3%) which has been lately integrated into the School Activities Office (Table 1).

Table 1 Promoter of the E.E. Training Program

Promoter of the training program	Percentage (%)
Environmental Education Center	91.7
Environmental Education Office	33.3
School counselor	8.3
Regional Training Center	12.5
University Foundation	50
Specialized person	12.5
Other promoter	8.3

The content of these programs was by 79.2% about environmental knowledge and knowledge about ecology and sustainable development, by 62.5% about the design and implementation of an E.E. program, by 54.2% about the basic principles of E.E. and by 50% about pedagogical approaches and methodology for implementing an E.E. program (Table 2).

Table 2 Content of the training program in the E.E.

Content of the training program	Percentage (%)
Knowledge about environment-ecology-sustainable development	79.2
Basic principles of E.E.	54.2
Pedagogical approached-Methodology for implementing an E.E. program	50
Design and implementation of an E.E. program	62.5

Regarding the duration and organizational structure of the training programs about Environmental Education, 79.2% have attended a seminar lasting less than 20 hours which is evaluated positively at a rate of 57.9%, 66.7% have attended workshops which are evaluated positively at a rate of 56.3%, 29.2% have attended conferences which are evaluated positively at a rate of 85.7% and 25% have attended a training seminar lasting 20–50 hours which was positively evaluated at 50%. Only 16.7% have attended a training seminar lasting more than 100 hours and 12.5% a training seminar lasting 50-100 hours. It is noteworthy that in the last two cases the positive evaluation amounts to 100% (Table 3).

Table 3 Duration & Organizational Structure of the Training Program in E.E.

Duration and Structure of the training program	Attendance percentage (%)	Positive evaluation percentage (%)
Training seminar of >100 hours	16.7	100
Training seminar of 50-100 hours	12.5	100
Training seminar of 20-50 hours	25	50
Training seminar of < 20 hours	79.2	57.9
Conference	29.2	85.7
Workshop	66.7	56.3

Regarding the form in which the training was conducted, 87.5% stated “in person”, 12.5% stated “remotely” and 16% stated “mixed”. Regarding the form of participation of the trainees and the time of realization, 62.5% stated that the presence was mandatory and the performance took place at a predetermined time.

The recording of training needs in the EE, in terms of content, context, form, place and time of implementation as well as its implementation promoter, highlights in the most characteristic way the necessity for the organization

of a continuous training on EE issues. Typically, 90% of the sample consider it necessary to have a continuous training in EE issues, with 86.7% wishing that it be carried out at regular time intervals.

Regarding the content that they want the training in EE to have, 30% of the sample in a grade of "Much" and 53.3% in a grade "Enough" prefer the knowledge about environment-ecology-sustainable development. 43.3% of the sample in grade of "Very" and 36.7% in grade of "Enough" indicates a preference for pedagogical approaches and the methodology of implementation of EE programs. The design and implementation of the EE program is chosen by them as a subject of education in the degree of "Very" by 40% of the participants and in the degree of "Enough" by 36.7%, while the basic principles of the EE are chosen in the degree of "Very" only by 3.3% (Table 4).

Table 4 Content of a Training Program in E.E.

Content of the training program	"Much" in percentage (%)	"Enough" in percentage (%)
Knowledge about environment-ecology-sustainable development	30	53.3
Basic principles of EE	13.3	30
Pedagogical approached-Methodology of implementation of EE programs	43.3	36.7
Design and implementation of an EE program	40	36.7

As for the form they want the training to be conducted, 53.3% choose to be trained in person, but it is noteworthy that 40% show a preference for the mixed form. As for the time of the training, only 23.3% wish to be predetermined, compared to 76.7% who wish flexibility. The sample has a similar behavior in the matter of the form that the training wants to have in terms of participation with 76.7% wishing to be optional and 23.3% wishing to be mandatory. 70% of the teachers consider experiential actions to be the most efficient form of training, while only 3.3% choose conferences or workshops.

Regarding the promoter of the training programs, the subjects of the research place in the first place with a percentage of 76.7% the Environmental Education Center, which is followed by the case of the University Foundation with a percentage of 50% and the Head of the EE with 30%. Notable is the small percentage of preference recorded by the Regional Training Center (13.3%), the School Counselor (3.3%) and the Specialized Private Promoter (0%) (Table 5).

Table 5 Suitable Promoter for the Implementation of a Training Program in E.E.

Promoter of the training program	Percentage (%)
The Environmental Education Center	76.7
The University	50
The Head for Environmental Education	30
Regional Training Center	13.3
School Counselor	12.5

Regarding the self-perception that the participants of the research have about the possession of the necessary supplies in order to implement an EE program, only 10% state that they feel complete, while 33.3% state that they have moderate occupation of the knowledge needed.

Regarding the self-perception of the subjects regarding the possession of skills related to:

- a) EE program design, 66.7% state "Enough" and "Very".
- b) implementing an EE program, 63.3% state "Enough" and "Very".

- c) the practical application of a variety of educational methods, 73.3% state “Enough” and “Very”.
- d) activating students in order to get involved in the program and commit to their goals, 63.3% state “Enough” and 13.3% state “Very”.

4. Conclusion

The record of teachers' experiences from training activities in the environmental education has shown that a significant proportion has attended a relevant training program in which the basic implementation promoter was the Center of Environmental Education and the University Foundation. This fact is due to the presence of the Homeroupolis Research Center in Chios and the Department of Environment of the University of the Aegean based in Mytilene. The content was mainly related to knowledge about the environment, the ecology and the sustainable development and secondarily to the pedagogical approaches, the methodology, the design and the implementation of an Environmental Education program. In addition, the majority of the sample has attended in person, short-term training seminars at a pre-determined time. These seminars were characterised by mandatory attendance.

The investigation of the teachers' training needs in the EE highlights the need for them to be trained through programs in which their design, methodology, form and content will be determined based on the preferences of the trainees themselves. Their training needs focus not only on the environmental knowledge about ecology and sustainable development, but also on issues related to pedagogical approaches, the methodology, the designing and the implementation of an EE program mainly through experiential actions. Although the majority wishes for in person training, particular mention must be made about the notable proportion that states that they want the mixed training model. There is a clear preference for the flexibility they want the training program to have in terms of both the implementation time and the participation. The teachers express great confidence in the Centers of Environmental Education and the Universities as promoters for their training due to the positive feedback they have gained from their previous experiences.

Although the EE can't change the education system, it can create cracks in it. Therefore, it must take the place it deserves within the curriculum of the secondary education schools.

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