EVALUATION OF SUSTAINABLE DEVELOPMENT PROGRAMMES BY SECONDARY SCHOOL TEACHERS

DOI: 10.26341/issn.2241-4010-2025-10a-8-K02190

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Abstract
The scientific community has been drawing the attention over the last decades about the necessity of introducing Environmental Education (E.E.) and Education for Sustainable Development (EfS) in secondary schools in Greece. It is therefore considered necessary to train teachers throughout the Greek territory on environmental and sustainable development issues. It is about time to take immediate action as a country and give our young people, as teachers and educators, the guarantees of how they can live sustainably. Climate change and ecological crisis are apparent and it seems we no longer have time for theories; but, this is the time for all teachers to be trained in sustainable development and environmental education. During the study and writing of the literature review, a large learning knowledge gap was observed by the teachers themselves on topics related to EfS/EE. There are many times that the phenomenon of assigning courses to teachers who are not related to the subject of Environmental Education and Education for Sustainable Development has been observed. The latter, however, is due to insufficient teaching staff trained in environmental issues.

However, we take a note at this point, as was also evident from the first thirty questionnaires given as a pilot survey in this case study, that many teachers are already starting to be trained in environmental education and sustainable development issues. This article aims to share with its readers the inventory of the attitudes, knowledge and behaviors of secondary school teachers in relation to environmental issues. We conclude that the present research aims to "close" gaps that have been noticed in the evaluation of environmental programs in secondary education. This article, which is part of the PhD thesis, presents the first 270/500 results of the research samples. The statistical program spss was used for the analysis of the latter. The results of the survey showed that teachers have a good relationship with issues related to environmental protection and coping with the environment and the zeal they show in learning about environmental education and sustainable development. In conclusion, it is observed that the respondents' years of teaching service played an important role in terms of the inductive analysis of the survey results. In conclusion, EfS/EE can offer many benefits in the field of EfS/EE.

Keywords: *Environmental education, Sustainable development, Primary research, Secondary education, SPSS.*

Introduction

The environment is a continuous, open and dynamic system, which is constantly changing (Dimitropoulos, 2005). Nowadays, more than ever, issues related to its quality and protection

are of great importance. The term environment is used to highlight the natural place where the human species grows and reproduces and the functions that take place in it. (Flogaiti, 1998). According to the U.N.E.S.C.O.: "The environment is a complex set of physical, biological, social, cultural and political conditions that surround a human being or an organism and determine the form and nature of its survival".

Environmental Education, refers to the local education that students receive in the society in which they live and develop. All environmental programs that are created have as their main focus the protection and preservation of the environment (Trikalitis, 2005). Their ultimate goal is to pass on the subject matter to future generations and to activate students' motivation to become active, well informed citizens. The teacher is called upon to instill in pupils the spirit of environmental awareness from pre-school education. He or she has the opportunity to study extensively the elements of Environmental Education in order to be fully qualified.

The dual dimension of environmental education is what distinguishes it from other, general forms of education (Papadimitriou, 1998). The usefulness of EE as a subject for all citizens of our country is in fact what underlines the need for its inclusion in the already existing curricula of formal education. The way and methods in which many teachers frame it varies from place to place. Art, culture and the values embraced by each teacher, starting from kindergarten to university, play an equally important role (Soos & Kovancs, 2008). To motivate students to become familiar with experiential experiences, to get in touch with Ecological and Environmental Science, to create active citizens, to transmit the values of life, such as that nature is a gift and that we must pass it on to future generations, just as it has been given to us by our Creator.

Many times, we use the term 'Environmental Education' without knowing its deeper and conceptual meaning. Historically, the World Conservation Union, (I.U.C.N., 1970) defined P.E. as follows: "Environmental Education is the process of identifying values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelationship of man, culture and the biophysical environment.

It requires practical involvement in decision-making and the development of a code of conduct on issues relating to the quality of the environment." (I.U.C.N.,1970). One definition of EE is that of the U.N.E.S.C.O., as formulated at the Tbilisi Conference in 1977: "Environmental education promotes the development of a clear understanding of and interest in economic, social, political and ecological interdependence in urban and rural areas. It contributes to the creation of new patterns of behavior of individuals, groups and societies towards the environment" (U.N.E.S.C.O., 1977).

Hungerford, Peyton & Wilke, as environmental researchers, defined PE as: "the process of helping citizens to become knowledgeable about the environment, and above all to become able and determined to be willing to work individually and collectively to achieve and maintain a dynamic balance between quality of life and the environment" (Wilke et al, In the 21st century, the concept of Environmental Education is now beginning to be aligned with that of Education for Sustainable Development, co-signed in the U.N.E.S.C.O. International Declaration on Environment and Development, held in Rio, Brazil in 1992 (Kalaitzidis & Ouzounis, 1999).

Environmental Education and Communication

Environmental Communication is a new broader term than Environmental Education. Harrison in 1993 defines P.E.C. as "an open, two-way exchange of information between groups of the population interested in a particular environmental issue". Fichter and Loew in

1997 propose a similar definition, as follows: "E.I.P. is the transmission and exchange of information related to the environment. It therefore represents a mutual learning process'.

A third definition characterizes E.I.P. as the strategically planned use of the communication process and products of the mass media (media) to effectively support policy making, citizen participation and the implementation of environmental sustainability-oriented programs (O.E.C.D., 1995). The definitions mentioned above share common features, but there are important differences. The first two emphasize the imperative of the two-way dimension of E.I.P., i.e. the interaction between the parties involved in communication, although this is not always possible on a practical level (Zingales, 2000).These definitions also give a holistic perspective to ECCE, unlike the latter, in which ECCE is limited to a specific and organized process with the ultimate goal of sustainability and the mobilization of students at all levels of schooling to become actively involved in the problems of the environment.

Environmental Education is considered the most effective method of dealing with the ecological crisis, as it forms citizens with a universal perception and attitude towards the environment (Flogoiti, 1998). However, having first been taught, trained and sensitized to the subject of environmental education and education for sustainable development (Athanasakis & Koussouris, 1987), teachers themselves are called upon to understand, cultivate and utilize the necessary skills of Environmental Communication in order to serve it.

Methodology

The tool used to conduct this research was the questionnaire. The questionnaire consisted of three sections. The first part asked for the demographic data of the respondents such as: age, gender, marital status, studies and educational level and the related. The second part consisted of open and closed questions about their knowledge of E.E./ EfS, how many programs they have implemented in their school if they have been prepared and how much success they had. The third part of the questionnaire investigated the knowledge, attitudes and behaviors of teachers and how much they believe that environmental education and education for sustainable development affects the wider awareness of students. The research started in 2023 and ended in 2025.

The questionnaires were distributed to secondary school teachers throughout the country. Before starting the main survey, a pilot survey took part in our country to the teachers of secondary institutions without filter selection such as rural, semi-rural and urban. The purpose was to clarify possible points of ambiguity or ignorance or misunderstanding in the questionnaire so that we can be sure of the correctness and confidence index of the questionnaire. The results of the pilot study showed that there was no need for any correction of the questionnaire. In our research we collected 270 questionnaires. The total number of samples we have is 270 secondary school teachers from various faculties from all over Greece. This is something we desire as we are interested in an interdisciplinary and multidisciplinary subject. For the needs of the present work, research was conducted regarding teachers from secondary education level. The aim was to write the behavior, postures and knowledge about environmental education, communication and awareness. The questionnaire included multiple-choice questions and was anonymous and answered by 270 teachers. The survey was conducted in December 2023- December 2025.

Survey Results

According to the demographic results, 31,8% of the respondents were men and 68,2% were women. In terms of age, 15.5% were 22-30 years old, 22,1% were 31-40 years old, 31,5% were 41-50 years old, > 51 years old were 28,8 %.

In the question about the marital status of the respondents we had the following results: 55% were married with children, 33,4% were single and 11,6% were married without children. To the question of the employment status of the respondents, they answered: 63,6% that they were permanent, 27% substitutes and only 9,4% were hourly workers.

On the question of previous employment, we would have the following statistical answers on statistical evidence: 0 - 5 years 36.1%, 6 -12 years , 15.2%, followed by 13 -25 years with a percentage of 33.3% then 26 -35 with a percentage of 12.1% and finally with over 36 years of seniority only 3.3%.

In the question of respondents' education, we had the following results: 45.87% had an undergraduate degree, 62,7% had a master's degree, 9.4% had a doctorate, 5,2% had a master's degree on E.E./ EfS, 1.5% were PhDs on E.E./ EfS, 7,9% had a Special Education diploma, 15,8% humanities & Social Sciences, 11.5% Natural Sciences, only 0,3% were post doctorates or something like that.

We asked respondents to list the first five words that come to mind when they hear the term Environmental Issues. This question was quite interesting as we got many answers but quite the same as they already knew the serious and basic environmental problems and they listed the following for us: Environmental Pollution, Environmental Contamination, Acid Rain, Ozone Layer Depletion, Climate Change, Renewable Energy Sources, Extinction of Biodiversity, extinction, desertification, energy crisis, unequal distribution of natural resources, globalization, Greenhouse Effect, etc. We asked them to list the first five words that came to their mind when they hear the term E.E./EfS and if this question was of any interest to them. We collected the following responses: Environmental Communication, Environmental Behavior, Awareness, School, Field Actions, Utilization of Natural Resources, Sustainable Development Goals, Climate, Change, Economy etc.

Next, the respondents had to answer the question whether the subject they teach at school is related to E.E./ EfS: 59.6% have nothing to do with the subject and 40.4% combine the concept of E.E./ EfS with their course.

To the question ¨Have you attended seminars or training programs regarding E.E./ EfS they answered accordingly: 40.3% that they had not attended while there was an impressive percentage of 59.7% who had attended a program or seminar.

The questionnaire continues at this point with the second part consisting of questions using the Linkert scale. Respondents were asked to indicate the degree of agreement or disagreement with a series of statements and situations. Following are, both the proposals and the percentagewise answers of the respondents.

E.E./ EfS contribute to improving the quality of life: 2% answered that they strongly disagree, 5% that they disagree, 5% that neither disagree nor agree, 10% agree and a 80% strongly agree.

Next state, E.E./ EfS is a key pillar of sustainable development. 3% answered that they strongly disagree, 2% that they disagree, 15% that neither disagree nor agree, 30% agree and a 50% strongly agree.

The next situation followed on whether E.E./ EfS should be gradually integrated into all subjects of school programs in both primary and secondary education: 2% answered that they strongly disagree, 8% that they disagree, 6 % that neither disagree nor agree, 54% agree and a 30% completely agree. Then, E.E./ EfS is a separate compulsory subject in Grade A and Grade B education. 3% answered that they strongly disagree, 12% that they disagree, 20% that they neither disagree nor agree, 25% agree and a 40% strongly agree.

Does E.E./ EfS contribute to the creation of environmentally conscious citizens? 3% answered that they strongly disagree, 3% that they disagree, 20% that neither disagree nor agree, 30% agree and a 44% strongly agree. The penultimate situation where they had to answer whether they agreed or disagreed was the following: E.E./ EfS at school improves

students' lives as adults. 2% answered that they strongly disagree, 4% that they disagree, 6% that neither disagree nor agree, 30% agree and a 58% strongly agree. Finally, E.E./ EfS increases environmental knowledge and contributes to the collection of attitudes, knowledge and behaviors regarding environmental protection: 0.5% answered that they strongly disagree, 2.5% that they disagree, 15% that neither disagree nor agree, 32% agree and 50% strongly agree.

One more question which found it important to ask respondents was: how many E.E./ EfS programs they have participated in. The answers we received because it was a question where the respondent could write they wrote to us a minimum of 0, that they have not yet participated, and this is reasonable because they may have just started their educational career up to 30 which seems to be an experienced staff.

In the next question we posed propositions of situations and collected the respondents' degree of disagreement and agreement. As in the first question for example which read: The evaluation process of E.E./ EfS programs is an important stage of implementation of EfS programs.: 3% answered that strongly disagree, 2% disagree, 15% neither disagree nor agree, 50% agree and a 30% strongly agree.

The Planning of an E.E./ EfS program should also include the final evaluation of the achievement of the objectives: 2% answered that they completely disagree, 4% that they disagree, 14% that they neither disagree nor agree, 50% agree and a 30% strongly agree.

The evaluation of an E.E./ EfS program aims exclusively at improving learning outcomes: 8% answered that they strongly disagree, 25% that they disagree, 27% that neither disagree nor agree, 10% agree and 30% strongly agree.

In the next question Can teachers create reliable evaluation tools for E.E./ EfS programs: 4% answered that they strongly disagree, 20% that they disagree, 16% that they neither disagree nor agree, 20% agree and 40% strongly agree. Next state: Environmental Education seminars improve environmental knowledge: 1% responded that they strongly disagree, 3% that they disagree, 11% that neither disagree nor agree, 40% agree and a 45% strongly agree. E.E./ EfS 1% answered that they strongly disagree, 5% that they disagree, 24% that neither disagree nor agree, 40% agree and a 30% strongly agree.

The evaluation of an E.E. EfS program includes the achievement of the cognitive/learning/psychomotor as well as emotional goals of the program: 2% answered that they completely disagree, 6% that they disagree, 22% that neither disagree nor agree, 30% agree and a 40% completely agree.

Finally, the respondents were asked to answer the last sub-question of this question as to whether you believe that the evaluation process of an E.E./ EfS program aims exclusively at forming a cooperative spirit: 5% answered that they strongly disagree, 25 % disagree, 25% neither disagree nor agree, 27% agree and 18% strongly agree. As for the question of whether you think it is difficult to build reliable evaluation tools for E.E./ EfS programs by teachers: 5% answered that they strongly disagree, 15% that they disagree, 40% that they neither disagree neither agree, 25% agree and a 15% strongly agree.

The visits to Environmental Education Center with a percentage of 90% positive, 9% negative and only 1% did not know can they be considered a necessary element of an independent program of environmental education and sustainable development? Actions on global days with a positive percentage of 80% negative 18% and neutral 2% is or should it be part of an independent program of environmental education and sustainable development? The workshops of environmental thematic units with a positive percentage of 92% negative 6% and neutral 2% as they probably do not know is or should be part of an independent program of environmental education and sustainable development?

And the last sentence they were asked to mark whether they agreed or not, was whether an environmental education and sustainable development program needs to be

equal to one school year in length to be a feature of a stand-alone program? They answered 80% yes, 10% no and a 10% don't know.

In the last question of the questionnaire, the respondents had to answer an open-ended question on how many and titled environmental education and sustainable development programs they have noted as a school. We were registered by the following programs: Life in Water, Life on Land, I Care for the Environment, Less Inequalities, Sustainable Waste Management, Sustainable School, Sustainable Utilization of ICT Tools, Environment and Communication, School Garden, Solar Radiation, Human rights.

Conclusions

This study attempted to analyze the environmental knowledge, attitudes and behavior of secondary school teachers. Factors affecting environmental knowledge, attitudes and behavior were also identified. Furthermore, the importance that teachers give to Environmental Education (E.E.) in their lessons was analyzed. This research involved the use of both quantitative and qualitative modes of inquiry. Two hundred seventy questionnaire respondents took part in the research. Statistical and thematic analysis of the data obtained from the questionnaires was carried out respectively. Triangulation of data was also done. The analysis revealed that secondary school teachers have an overall good level of environmental knowledge, although lacking some details and they do have an overall positive attitude and behavior towards the environment.

A significant relationship between the environmental attitudes and behavior as well as the environmental knowledge and behavior was identified. The implementation of E.E. by secondary school teachers was characterized by a strong influence of the curriculum. In addition, they also incorporate E.E. through pro-environmental behavior, particularly concerning waste issues. The main restrictions that limit secondary school teachers from including E.E. are time constraints and the negative feedback they receive. With regards to the grounding offered to teachers related to E.E., secondary school teachers described the teacher training courses as being more theoretical rather than focusing on practical applications. In light of these findings, this research puts forward suggestions for a better structure of teacher training courses.

This study aims at investigating secondary school students' knowledge of and attitudes towards environment on different variables. The study was conducted with 300 secondary school teachers through the descriptive survey model. 'Environmental Knowledge Test' and 'Environmental Attitude Scale' were used to collect data for the study. The results showed that secondary school teachers' knowledge of and attitudes towards environment did not differ on gender. Finally, some suggestions based on results were included in the study. It is also interesting that all the teachers who completed this questionnaire, whether their background was related to the subject or not, wanted to include and combine the subject of E.E./ EfS in their course. The contribution of education to the promotion of the principles of education for sustainability has been of major concern in the international bibliography resulting to form an area of special scientific interest that focuses both on initial education and on the continuing professional development of teachers in the subjects of E.E./ EfS.

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