

“Water Energy, Watermills, Lakes”: The Environmental Program of E.E.C. Kissavos-Elassona

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Abstract: The paper presents an educational program of the Environmental Education Center (E.E.C.) of Kissavos-Elassona about water energy, watermills and lake ecosystems in Greece. It also analyzes the stages of the program and the worksheets that students complete in the field study and then investigates the course of the program in depth of the decade that is being implemented (2009–2019). The project method was used for the design and implementation of the program, along with several pedagogical teaching methodologies and modern technical infrastructure. The objective of this work is the study and analysis of the overall structure of this educational program of the E.E.C., along with its contribution in the aid of knowledge of students and teachers with regard to ecological and environmental issues. The educational effort, in the long run, aims to form personalities of citizens who are active, responsible and sensitive to issues of pre-industrial heritage.

Key words: environmental education, environmental education center, watermill, experiential learning, ecosystem

1. Introduction

For the design of this program, the Pedagogical Team (PT) of the Environmental Education Center (E.E.C.) Kissavos-Elassona took into account the strong interest expressed by several schools and teachers for programs related to water energy, water mills and lakes. In this work we will analyze the stages of the program and the worksheets that students complete in the field study and we will investigate the course of the program in depth of the decade that is being implemented (2009–2019) at E.E.C. with schools from Thessaly (one day program).

The recognition and understanding of the traditional forms of utilization of water energy, as well as those concerning lake ecosystems, is the goal of the program “*Water Energy, Watermills, Lakes*”. This daily program of Environmental Education (EE) uses as a field of work and observation the village of Kefalovryso (translated as “village full of water fountains”) of the Municipality of Elassona. The program is implemented with the work of the students in the areas of E.E.C., as well as in the field with a tour and acquaintance with the lake and the watermills and fulling mills of the village. In addition to the more specific topics, students study general topics about water, as well as research in an experiential way of specific issues for its uses and become aware of the natural environment and its proper management.

2. Teaching Methodology — Material and Technical Infrastructure

The project method was used for the design and implementation of the program, which is a very good tool for the required flexible experiential learning process. This method is considered as a comprehensive methodological approach that contributes to both interdisciplinary and interdisciplinary approach to a topic (Voudrislis & Avgerinou, 2004). The following pedagogical teaching methodologies were also used: a) experiential teaching, b) exploratory learning, c) interdisciplinary and interdisciplinary approach and d) field research and study.

The material and technical infrastructure used is: a) the video projector of E.E.C, b) an educational presentation of MS POWERPOINT with content related to the topics of the program, c) the computers of E.E.C, d) the Internet to search for information related to the program, e) the worksheets in printed form for use in the field (note: in this first decade the worksheets were in printed form, the service tablets of E.E.C. with the integrated worksheets would be given for use from Spring 2020 — that never happened though, due to the COVID 19 pandemic).

Environmental school groups that participated and time of implementation. The program is addressed to environmental groups of students of both Primary and Secondary Education. Table 1 presents the participation of students and teachers in the educational program for the school years 2009–2019. The implementation of the environmental program “Water Energy, Watermills, Lakes” took place in 112 school units and 483 teachers.

Table 1 From Left to Right: The School Year, The Programs Implemented Per Year, the Students and the Teachers Who Attended Them

	KPE KISSAVOU ELASSONAS	ΠΡΟΓΡΑΜΜΑ ΥΔΑΤΙΝΗΣ ΕΝΕΡΓΕΙΑΣ	
School Year	School Units	Students	ΕΚΠΑΙΔΕΥΤΙΚΟΙ
2009–2010	20	710	71
2010–2011	16	556	48
2011–2012	11	366	32
2012–2013	15	623	53
2013–2014	4	167	15
2014–2015	10	324	138
2015–2016	5	206	38
2016–2017	9	240	21
2017–2018	18	636	54
2018–2019	4	214	13
Total	112	4042	483

This daily program of Environmental Education uses as a field of work and observation the settlement of Kefalovryso of the Municipality of Ellassona. It is implemented with the work of the students in the premises of E.E.C., as well as in the field. In addition to the more specific topics (such as popular beliefs, customs, local history, etc., concerning the lake and hydro-powered structures like the watermills and the fulling mills), students study general topics about water and research in an experiential way specific topics for its uses, ways and its management structures, and are aware of the natural environment and its proper management.

The objectives of the program are to understand the relationship between man-made and natural environment, to realize the timeless relationship of man with water, the contact with buildings belonging to the cultural heritage,

the recording of these buildings at the local level per school unit, to become known the functions of watermills to meet the needs of sustainability and to acquire knowledge about lakes and their ecosystems in an experiential way (Nikolaou, 2014).

The educational effort is sure that in the long run it will form personalities of citizens who are active, responsible and sensitive to issues of pre-industrial heritage. In addition, the connection of the past with the present and the future, through the exploration of forms of energy of the past, will enhance the understanding of the need to adopt modern renewable and sustainable forms of energy (Stylianou, 2014).

3. Program Structure

The environmental program is one-day, lasting 7 teaching hours, and is structured in four main parts:

A) Sending supporting material to the school environmental groups selected to participate in the program: The relevant supporting material is sent to the teachers who coordinate the group. This gives teachers the opportunity to prepare their teams for the visit to the E.E.C., as well as to prepare their final work and presentation. This material consists mainly of presentations, documents and articles on relevant websites or magazines related to a) water energy, b) hydro-powered structures, such as the watermill and the fulling mill and c) lake ecosystems.

B) Presentation and consolidation of the cognitive part: On the scheduled day the meeting of the environmental team with the Pedagogical Team of the center in the building located in the center of the city of Ellassona, in the Cultural Center, where the headquarters of E.E.C. The familiarization of the students and the pedagogical team is done with some acquaintance games. Then the presentation of the cognitive part follows, made by a member of the Pedagogical Team. The presentation is made in MS PowerPoint with interactive projection with the use of the video projector and the active participation of the students. The introductory part of the presentation includes the following sections: a) the timeless importance of water for humans b) the water cycle in nature, c) water scarcity — desertification — suggestions for proper water management d) water energy and its forms, e) water mills and fulling mills (Grassos, 2009), f) water as a renewable energy source today and g) lakes and their ecosystems.

For the consolidation of the cognitive part, the students are divided into groups and are invited to take part in a series of activities (always with the guidance of the members of the PT of the Center). The students are invited to work in groups on the E.E.C. computers, in order to search the Internet through search engines and to work on a worksheet that is given to them electronically. They should look on the Internet for ways in which people exploit water energy (e.g., renewable energy sources - RES) on websites (such as the Greek *Wikipedia* or the *PhotoTree*). Finally, to look for ways to save water at home (e.g., on the website of the *Mediterranean SOS Network*). So, after the students process the data they will find and record their findings — conclusions, they are asked to collaborate and present them to the class using the video projectors.

C) In the third stage of the program, the work in the field (“*field trip*”), the students and the teachers, go to the village Kefalovryso of Ellassona, where the homonymous lake is located, which they visit first, in order to understand where the water comes from, which they then use through water canals (“*water flumes*”) the water mills and the fulling mills, as well as to observe closely the aquatic ecosystem of the lake. Students in groups, thus learning to work in groups and collaboratively, use the printed worksheets provided by the E.E.C. and must complete (in the future the worksheets will be inside the service tablets, thus utilizing new technologies and at the same time saving paper).

Next is the move a little further down the village, where the fulling mills and watermills are located (the latter are no longer operating). There, the completion of the worksheet continues, in the part now that concerns the fulling mills, which the students usually see in operation.

D) Evaluation: As in any environmental program, program evaluation is very important, as it is a key source of feedback. The P.T. of the Center reshapes the program according to the results of the evaluation. This takes place after the end of the actions, in the area of the village square, with a specially designed evaluation sheet.

4. Conclusions

The teaching of the program “*Water Energy, Watermills, Lakes*” has so far (2009–2019) been applied in 112 school units, 4,042 students and 483 primary and secondary school teachers. At the end of the educational process, many students clarify basic principles of water energy and its applications (watermills, etc.), and also learn in an experiential way about their lakes and ecosystems. As for the goals of the program, the evaluation of the worksheets shows that the goals that were initially set are achieved.

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