

## Environmental Education in the Greek Schools

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**Introduction.** An increasing public awareness towards environmental issues is observed in our days. The formation of informal 'pressure' groups, of official formal organizations, governmental and non-governmental and the responses of individuals to environmental problems is enough evidence. Their effectiveness, however, towards the amelioration or, at least, the non-deterioration of the environment is questionable. In many cases, they fail to grab the attention of the citizens. In other cases they push towards the wrong direction due to ignorance or insufficient data or just out of selfish motives. By now, community or member state legislation already regulates issues related to the environment. People, however, are, in general, unaware of it. Also, important basic knowledge and a friendly to the environment appropriate social behaviour is mostly absent. It seems that a consistent action to disseminate information on environmental issues is necessary. Environmental education towards the provision of factual knowledge and the development of environmentally friendly behaviours is one of the means to achieve this dissemination. Also, environmental education, if taught properly, may be proven as an excellent means towards the development of critical thinking and of Social skills.

In this work, a review of the organization and operation of environmental education within the Greek schools is presented followed by some thoughts on the contents it should have and the teaching approach to be used<sup>1</sup>.

**1.-Formal environmental education in Greek schools.** Environmental issues are dispersed in the outline of almost all the subjects taught into schools. The objectives of the different courses in the schools of primary and secondary education include a specific mention on environmental education<sup>2</sup>. It has been found<sup>3</sup> that this environmental education component of the Greek schools curricula covers almost every subject and its extent is larger than most of the other states of the European Union<sup>4</sup>. The recent reforms in the Greek education system maintained this aspect. Further, environmental education may benefit from the introduced holistic approach in teaching, this however has to be proven.

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<sup>2</sup> For example: "to understand ... their environment, .... to construct attitudes of respect towards the people, the environment, ..." (from the objectives for the Science curriculum of the 5<sup>th</sup> and 6<sup>th</sup> grades of primary education), "to understand the importance of the natural environment and of the saving of natural resources, to develop initiatives for the protection of the environment and the management of natural resources ..." (from the objectives for the Science curriculum of the middle school – Gymnasium grades 7 to 9).

<sup>3</sup> Artemis Athanassakis, "Environmental Education in Primary schools and the attitudes of the teachers", Rethymno 1992, PhD dissertation in the Department for Primary Education of TheUniversity of Crete (in Greek).

<sup>4</sup> Result obtained in the context of an Erasmus project (ICP-89-0026/05).

As expected, Science subjects are the ones in which environmental education issues exist to an extent higher than in the other subjects. The Technology and the Language and Literature<sup>5</sup> subjects follow. Moreover, Science subjects in the first four grades of primary education have been extended into one subject titled “*Study of the Environment*”. Into this subject themes from Science (study of the natural environment and of living organisms) and from social, religious, economic, historical, cultural, and national life have been incorporated. The relevant issues are studied in relation with the human life and pursuits. This subject is developed from the 1<sup>st</sup> to the 4<sup>th</sup> grade (ages 6 to 10) of the Primary school. In its objectives are included “... *the development of cognitive mechanisms to know, to understand and to value the environment, natural and human, in their interrelations and dynamics ...*”, “... *the development of ... attitudes, ... values, ... to allow their smooth inclusion to the (social) environment as active citizens...*”, “... *to develop sensitivity towards the human existence and the willing towards the improvement of the quality of life...*”, etc.

It can be concluded that at the level of planning, the environmental education is quite well incorporated into the formal curriculum of the Greek schools<sup>6</sup>. Actual school practice is characterized by the following<sup>7</sup>:

Social environment. In general, social environment not only does not inhibit an holistic environment education but expects it. However actual behaviour may impede its effectiveness. This is especially observed when the subject of study is closely related to issues of strong local interest. Similarly a controversial social behaviour may cause problems<sup>8</sup>.

Teachers and Teaching. The holistic approach in environmental teaching puts special demands on the teacher and his (her) teaching. Otherwise confusing fragmented knowledge will be the result. There are no reliable direct data on the competence of the (Greek) teachers. A positive aspect, however, is the extensive training programs they are offered to and a zest towards environmental education. Environmental education, in order to be effective, must include direct observations of the environment (natural and human) from which data are obtained, a comparison and correlation of these data and a discussion (kind of evaluation) on the effects of different (human or otherwise) activities and alternative approaches. In a previous research (see note 3) only 2 out of 10 teachers plead<sup>9</sup> that they incorporate direct observations of the environment (natural

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<sup>5</sup> In the (Greek) Language and Literature subjects, the study of essays from the Greek literature, from ancient to contemporary times, is an integral part. Many of these essays include descriptions of the social life and/or the natural environment. This together with the differences in style, syntax and grammar may provide excellent opportunities for environmental education.

<sup>6</sup> This must be judged in conjunction with the organized informal activities on environmental education (see other sections later on). The observation reflects a more general sensitivity of the Greek society towards the environment. This sensitivity is observed also in other cases. For example, in the Greek constitution the (protection of the) environment takes a considerable part. Problems, however, arise either because of ignorance or wrong application or simply because the corresponding regulations are not respected.

<sup>7</sup> For a more extensive review see P. G. Michaelides, “Environmental education issues in primary schools”, *Synchroni Ekpaideysi*, Vol 71, 1993, pp 71-81 (in Greek).

<sup>8</sup> In these cases the children in school learn something that their familiar persons do not respect. A common example in Greece is the development (or the supposed “development”) of an unspoiled as yet place to a vacation resort.

<sup>9</sup> According to their response in a questionnaire.

or human) into their teaching while 4 out of the 10 said they did none of this kind. All the teachers make extensive (and most of them exclusive) use of the textbook and the figures, pictures etc contained therein. On the other hand, a large percentage of them replied that they do use themes of local interest in the discussions within the context of environmental education. This shows evidence that the social context of the schools does not inhibit these actions although there are no data on the kind of discussions made, specifically on the value and/or treatment of the “opponents” arguments.

Syllabus. Apart from the specific on environmental education course “Study of the Environment” (grades 1 to 4 of primary school), almost the whole syllabus of the courses on Science in the primary and in the secondary (lower and upper) schools are appropriate for environmental education. Indicative subjects from the Science curriculum in the Primary schools are “*The Man, the Plants and the Animals*”, “*The Man in Natural environment*”, “*Production of goods, Use of Machinery*”, (sections from the syllabus of the “Study of the environment” in grades 1 to 4 of the primary school), “*Protect the Environment (water purification, ..... refuse and recycling)*”, “*Recapitulation of the basics on Plants and Animals from the Study of Environment*” (sections from the syllabus of “Science” in grades 5 and 6 of the primary school), etc. A critical review of the contents of the corresponding courses shows that the themes chosen and their organization is adequate. The total syllabus however is too large to be taught within the time schedule envisaged.

Textbooks. Every course that is taught in the schools of Greece is accompanied by a textbook produced under the supervision of the Government and given to all the pupils free of charge. Whenever appropriate, textbooks are also accompanied by laboratory or observation sheets and additional material (cd, pictures, summary encyclopaedias, ...). A teachers guide is also given to the teachers. Their contents are uneven ranging from the very good and excellent down to just adequate. The tendency to suggest positive attitudes towards the environment is evident although this is not always adequately supported. A general orientation towards the cognitive aspects, especially of factual knowledge, of environmental education is observed. This tendency prevails almost exclusively in the higher grades. Emotional and social aspects of the environmental education exist mainly in the textbooks for the first grades. The discussion topics are adequate for the pupils age. Although many of the topics reflect to Greece, scenes from contemporary Greece scarcely are included. Very important is the inclusion of open questions a prerequisite for the development of creative thinking. This is abundant in the smaller grades but disappears in the higher grades where factual knowledge prevails. In higher grades, the various topics are discussed rather unilaterally; only one side (the “positive” or the “negative”) is exposed with counter arguments missing and left to the initiative (if existent) of the teacher. Because of “inertia” from the past, teachers, in general, follow closely and solely the textbook despite the guidelines that “... *textbooks contents are only to exhibit the main inquiring ... may be used as the start for further investigation ...*” The scientific soundness is sometimes questionable and quite often incorrect terminology is used<sup>10</sup>. Waste management is considered within the context of avoiding or remedy a problem. Recycling is rarely mentioned. The

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<sup>10</sup>It seems that the authors of the textbooks in their concern to use simple, easily understood language have also transcribed the technical terms expressed by Greek words of older times into their contemporary equivalents.

notion of sustainable exploitation of the environment is missing. These drawbacks have initiated the preparation of new textbooks the ones now in use being written in the early eighties.

**2.-A Summary of Teaching Guidelines.** Environmental education may be considered within many contexts". In these contexts different perspectives and methodologies are employed. However common considerations in all do exist. Some considerations on the content that the environmental education should have, are given below.

Factual knowledge on the environment. It refers to information and data on the environment. Depending on the perspective and the teaching model adopted, this knowledge is given, is retrieved from the literature or derived from direct observations. Although, in the majority of cases the natural environment is meant, data and information on the human environment are equally necessary. The kind and type of this knowledge must of course be accordant with the age of the pupils. A point missed in most of the relevant discussions is that environmental issues depend on many parameters, the relative importance of which is uncertain while some of the parameters are yet unknown. As a result, the “*sound scientific knowledge*” of today may be proved erroneous tomorrow. So, the common drawback of the positivism in the schools which implies that scientific knowledge is kind of a divine law has to be challenged. On the same arguments, a solution to an environmental problem in one case cannot be taken a priori as an also effective solution elsewhere. Summarizing, the factual knowledge in environmental education refers (should refer) to the natural and the human environment, to their constituents and the relations between them and to their effects on the Human life.

Development of Skills. Based on the factual knowledge discussed previously about the environment, environmental education pursuits the development of skills such as:

- To decide if an environmental situation needs an intervention,
- To choose between different choices, to justify the acceptance or denial of a proposed intervention or to propose an intervention in order to deal with environmental issues,
- To assess the impact of a proposed environmental activity,
- To act individually and collectively on environmental issues (it includes the formation, the shaping, the mobilization ... of public opinion about these and relevant issues),

Emotional Development. The development of attitudes and behaviours is also included into the objectives of environmental education. Sometimes the phrasing used needs clarification (e.g. ...*to learn to respect the environment* ... what and how this respect is understood differs from person to person) or leads to contradictions (e.g. ... *to learn to leave natural environment intact (or unspoiled)* ... does that mean not to construct houses, roads, ports, .... not to cultivate land, ...). Emotional development is usually

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<sup>11</sup>A commented summary may be found in the *Proceedings Environmental Education in the Context of Education for the 21<sup>st</sup> century prospects and possibilities, Larissa 6-8 October 2000, Editor Vasiliki Papadimitriou* (texts are in English or in Greek)..

achieved through paradigms (or apprenticeship) so it is a difficult task for the formal education which is mainly oriented towards cognition. However in the case of environmental education emotional development may be also an efficient approach.

Based on the previous objectives, we may include to the teaching objectives:

- The development of a consciousness that in choosing and assessing an environmental solution is a process continuously seeking justification. Past experience shows that however soundly a solution was justified at that time, it is a temporary solution and newer data may annul it<sup>12</sup>. In other words, the complexity of real situations and the possible neglect of potentially important factors enforce a continuous re-evaluation<sup>13</sup>.
- The recognition of specific environmental values and the consequent development and maintenance of corresponding attitudes and behaviours. For example *the environment is a common share* consequently the attitude to recognize to other people *the same rights and obligations oneself has* or the notion that the *unspoiled natural environment* is (in many cases) a positive value should lead to the development and maintenance of *environmentally friendly behaviours*<sup>14</sup>, etc.
- The development of a positive attitude towards environmental issues. For example, wastes from households, industry and other activities used to be considered as a nuisance to get rid off. Within this perspective a Murphy's Law kind of statement<sup>15</sup> is often justified while another approach is presented next.
- The development of the attitude to consider waste as a source of raw material. This notion, properly exploited may lead to the development of sustainable development attitudes and to the invention of new efficient and affordable ways of waste management<sup>16</sup>.

The previous considerations are specific to the environmental education but they must also be encompassed into the general objectives of the schools. The main objectives of the Greek compulsory education<sup>17</sup> schools' include *the cognitive, emotional and social personal development of every pupil without any prejudice due to origins, race,*

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<sup>12</sup>A classic example is the use of DDT. It was extensively used during the fifties and sixties to kill mosquitoes and combat malaria. Because of long term effects, its use is now forbidden.

<sup>13</sup>The crucial point here is the need for a continuous re-evaluation. As long as this is not a common impartial practice then, based on their past experience, people will feel justified to deny e.g. any use of mutant products, especially food products or any advance of biotechnology, for example in medicine.

<sup>14</sup>This means that any changes and their extent to the (natural) environment must be justified by the necessity to serve a higher value (for example human life) and that the extent of such possible changes must be in parity with the service intended. This is a difficult subject in practice and is related to the development of a complete hierarchical set of values (character).

<sup>15</sup>*In order to clean something you have to pollute something else. But you may pollute everything without cleaning anything* (Arthur Bloch "Murphy's Law complete", Methuen Press 1987).

<sup>16</sup>An example of such a perspective may be found in N. Iniotakis, C. B.VD. Decken, C.J. Israelides, K. Katsaboxakis, P. Michaelides, D. Oikonomou and P. Papanikolaou, "Ecological and Economical Utilization of Waste-Water from Olive-Oil production with Physiochemical and Biotechnological Methods", international Conference on the Treatment and Use of Sewage Sludge and Liquid Agricultural Wastes, Athens 1-4 October 1990. Proceedings published by Elsevier Applied Science, pp.393-399.

<sup>17</sup>Primary and lower secondary (middle) schools are included (Grades 1 to 9).

*gender*, ... . For the primary school, in particular, the cognitive aspects of the curriculum focus on the method and skills rather than on factual knowledge, the use of which is mainly to support the development of the cognitive skills. Within this context, specific guidelines for the planning of environmental education courses in primary schools have been prepared. These guidelines have already been incorporated into the initial education curriculum of prospective primary school teachers<sup>18</sup>. These guidelines are derived from a model in which teaching within the context of environmental education is considered within a twofold holistic approach; **a**/issues of study should be examined as a whole (e.g. through a project type teaching) under all perspectives and not as separate Science, social, economic, etc issues, and **b**/learning should be pursued to all levels of the cognitive, the emotional and the social sector. The application of this model may be checked against a series of “check points”, a summary of which is presented below<sup>19</sup>:

- The incorporation of direct observations to the teaching,
- The extent of factual knowledge that is presented, is retrieved from the literature or is derived from pupils’ own investigations,
- The extent to which the factual knowledge is sufficient, contemporary and in parity with pupils understanding ability,
- The extent to which the issue under study is analyzed and its constituents are interrelated between themselves and with other issues, especially the human activities and pursuits,
- The extent to which different opinions and (or) choices are defended and the method of settlement of the different priorities,
- The extent to which alternatives, based on the same actual data, are investigated and assessed,
- The extent to which contemporary issues of local interest are included,
- The extent to which good or bad practices of everyday life are located for acceptance or disapproval,
- The extent to which conclusions are derived (as opposed to conclusions being presented),
- The extent to which the whole procedure leading to the conclusions is reviewed in order to locate crucial factors<sup>20</sup> and the extent of their validity.

Some more specific points are also worth mentioning. These points were initiated from the corresponding existing textbooks.

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<sup>18</sup>Methodology of Teaching in Science, an undergraduate course of the Department for Primary Education of The University of Crete see details in P. G. Michaelides “Science in the Department for Primary Education of The University of Crete”, 7<sup>th</sup> Pan-Hellenic Conference of the Pedagogic Society of Greece, Naupaktos 13-15 November 1998, proceedings pp 941-951 (in Greek).

<sup>19</sup>See more details in the reference at note 7.

<sup>20</sup>e.g. the validity and completeness of existing data, the parameters taken into account and their relative importance, the possibility of any neglected parameters, etc.

- Emotional development should be within a hierarchy of values otherwise controversies will appear<sup>21</sup>. For example if the values of an “*unspoiled environment*” and of an “*environmentally healthy place for housing*” are taught fragmented then a conflict may arise (because we usually spoil the environment in order to construct houses). Similarly, the value of *preserving different species* (e.g. the seal) presented as an absolute value may give rise to conflicts with the value of human life preservation e.g. in the case of nomads who depend on hunting for their needs.
- Sometimes, in the pursuit of an objective another is ignored or, worse, is hindered. In an example from the textbook, trying to explain the responsibilities of the various civil authorities, the responsibility of the citizens was totally neglected<sup>22</sup>.
- Quite often, an environmental hazard (e.g. pollution from industrial activities or from the extensive use of pesticides and fertilizers in agricultural activities) is presented and disapproved without any mentioning to its causes or the existence of alternative choices. Such a fragmentary approach may favour conflicts between different parts of the society (for example those involved in the activity and the rest of the public who will demand the activity to cease).
- In a more general way, when an environmental hazard is presented alternatives that could keep any benefits should be investigated instead of the complete refusal. For example instead of the denial of a waste disposal place serving a whole community alternative waste management methods may be investigated and proposed.

**3.-Informal environmental education<sup>23</sup>.** Environmental education in Greek schools exist under two schemes, Formal environmental Education, as discussed previously, and Informal environmental education. The Informal environmental education is on an optional basis. Under this scheme, a group of pupils under the guidance of one (or two) teachers undergo to study a specific theme related to the environment. This activity takes place outside the time schedule of the formal school operation. These activities are strongly supported by special prefecture directorates of environmental education. Within the existing framework, Environmental Education Centres are also foreseen as a joint activity between schools or between schools and local authorities. In almost all

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<sup>21</sup>This point is more important for the primary education where most of the pupils are in the age of one parameter correlation ability.

<sup>22</sup>An urban square full of refuse is presented and the residents appear to complain to the mayor who is not collecting the rubbish, the mayor raises the issue in the Council, a decision to form a committee is taken, etc, while the main cause of the citizens throwing the refuse there in the open seems as a normal social conduct.

<sup>23</sup>The data in this section are from Michaelides P., Kimionis G. “Fifteen Years of Environmental Education in the Prefecture of Rethymno - First assessment, conclusions and perspectives” proceedings of the conference on “Optional Education programs in Schools”, University of Patras, 28-30 May 1999, pp 350-358 published by Mpagakis G (ed.) Athens 2000, Metechmio publishers (in Greek).

the regions of Greece one or more such centres have already been established or are under formation.

Informal (optional) environmental education was introduced on a systemic (and pilot) basis in 1983-84. It was established as an officially supported optional school activity in 1990 and since then it is an important constituent of the school activities<sup>24</sup>. The objectives of these activities are in accordance with the trends set out in the Tbilisi Conference i.e. the development of awareness, knowledge, attitudes, skills, and participation within the pupils and within the exposition made earlier.

The environmental education activities are further distinguished to Short and Long term activities. Short term activities are oriented towards raising the awareness of the pupils on environmental issues. They are effected with study visits of a duration of one day or less (“educational excursions”) and quite often are combined with the official curriculum or with other activities on the locality of the schools. This type of Short term activities is mostly used by the schools in Primary education. Secondary schools endeavour mostly on the Long term type of activities. The Long term environmental activities are usually carried out as a project of some duration. All these activities, Short term and Long term, are on an optional basis. Teachers and pupils volunteer to form an environmental education group and undertake such a task. All the teachers irrespectively of their specialty may guide an environmental education group<sup>25</sup>. There is no limit on the number of such groups a school may form. These activities are also informal as they are not taken into account in the official school certificates<sup>26</sup>. They also have no officially prescribed action plan. Instead, each environmental education group develops its own action plan. However, if an environmental group wants to receive State support<sup>27</sup>, they have to apply to the directorate of environmental education. The application must be accompanied by an action plan. For the long term activities a minimum duration of 5 months is required. The study must address issues related to the closer or wider environment of the school. The study approach must be holistic. At the end of the school year most schools usually make a specific festival in which the results of the environmental groups are presented. Sometimes these results are

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<sup>24</sup>See for example, Law 1892/90 art.111 par.13, Presidential Decree 161/23-6-00, Ministerial Decision 4867/28-8-92, 1242/8-3-93, Ministerial circulars 3026/27-8-90, 1242/8-3-93, 2352/28-4-93, 4995/21/9-94, 2277/23-3-95, 3219/11-5-95, 6799/8-9-95, 4915/16-9-96, 5861/23-10-97, 6611/20-11-97, 2290/24-3-98, 4402/15-7-98, 4881/11-9-98, 6773/8-12-98, 4446/10-11-2000, 4757/23-11-2000, 5317/9-10-2001, 5959/6-11-2001, 6215/19-11-2001.

<sup>25</sup>A 34% of the teachers involved in these environmental education groups are teachers for Language, Literature and History. Another 28% are teachers for Science. Although these are the most numerous specialties, their percentage is higher than their relative numbers in the schools. This is especially true for the Science teachers who form environmental education groups about 3 times more frequently than the rest. It is also characteristic that the specialties of the 60 prefecture directors are: 29 (48%) Science, 11 (18%) teachers with other Science or Technical background (e.g. agronomist, engineer, etc), 10 (17%) Language, Literature and History, 3 (5%) Mathematics, and the rest 7 (12%) other specialties.

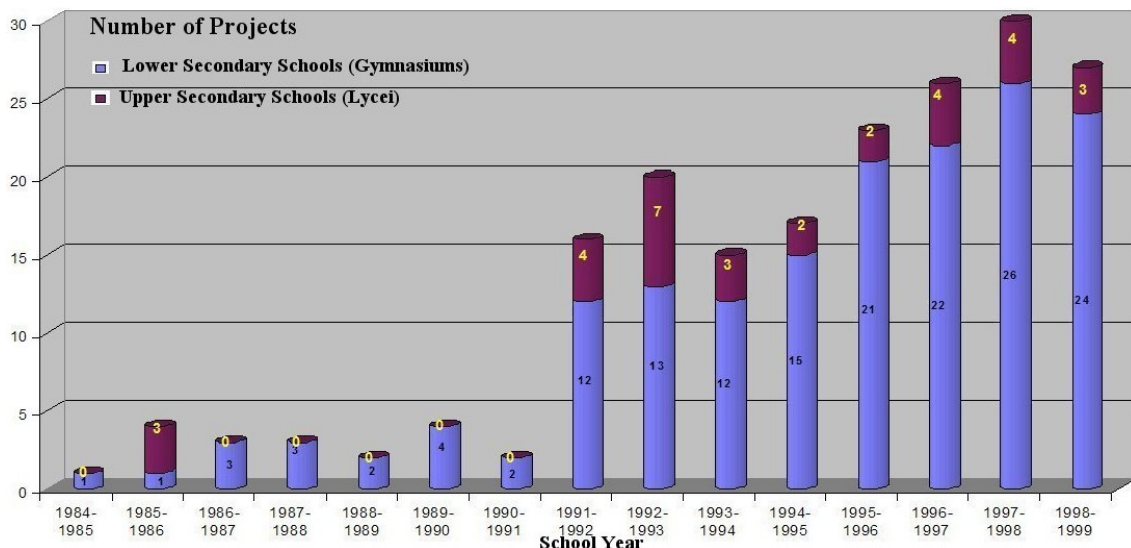
<sup>26</sup>However, written evidence may be given by the school based on reports from the guidance teachers.

<sup>27</sup>It is usually financial support to cover (part of) the expenses for transportation and accommodation (if necessary). Other sources of financial support for these activities include the municipalities, the unions of parents, local enterprises, etc.



outstanding<sup>28</sup>. For the prefecture of Rethymno, a typical prefecture in Greece, it was found (it refers mainly to long term activities):

1. Natural and human environment issues are studied in parity. A breakdown of the total number of projects according to their title shows<sup>29</sup>: Natural Environment issues (recycling, planting, cleaning, etc) 10%, Environmental issues of global importance (CO<sub>2</sub> effect, ozone depletion, acid rain, ...) 11%, Local Natural Environment issues 24%, Social and Economic issues 18%, issues on the Local Culture and tradition 30%, Urban environment issues 7%.
2. After the pilot period of 1984-1990, the number of environmental education groups shows a slow but steady increase, depicted in the following corresponding diagram.
3. Gymnasiums (Lower secondary schools- grades 7 to 9) seem to be more active in environmental education. This is true for the total number of projects (83% of the projects were carried out in Gymnasiums) and for their participation (the percentage of Gymnasiums with environmental education activities is more than

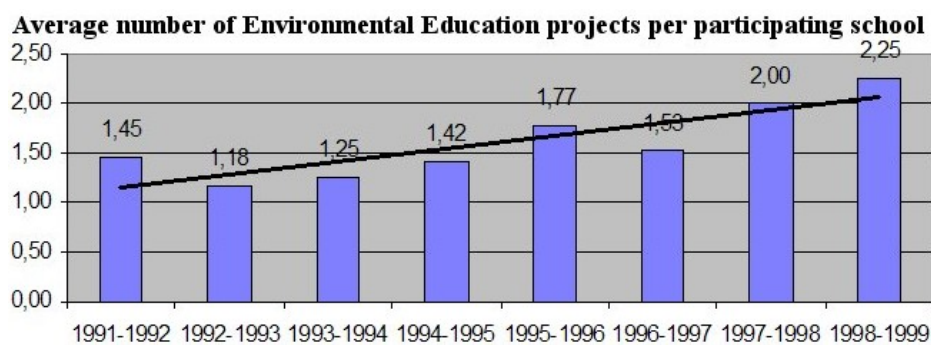


two times the corresponding percentage of the Lyceum (Upper Secondary education – High school). This may be due to pupils in Lyceum using more of their time to prepare for the University entrance examinations.

<sup>28</sup>As an example, the “Rethimnodonomika” (meaning On the names of the streets of Rethymno), a work carried out by the EPL High School of Rethymno. In this work an index of the streets of Rethymno were presented together with a short description on the reasons this specific name was used. For example, if the name referred to a person a short biography was included as an explanation, if it referred to a location the explanation included a review of the historical events, etc. In these explanations recollections on the events or the persons from the elder locals were also included. It is still a very good resource on the local history.

<sup>29</sup>The classification was effected according to the title of every project carried out. In a few cases of ambiguity, the specialty of the guidance teacher was also taken into account.

4. An interesting finding is that while some schools are involved only occasionally (or not at all) with optional environmental education activities, many schools persistently form environmental education groups, most of them more than one group. The average number of environmental education groups per school is higher in the Gymnasiums (~9.5%) than in the Lyceum (~3.6%). In parallel with the increase in the number of participating schools, shown previously, an increase to the average number of projects per participating schools is also observed, as shown in the corresponding diagram.
5. Schools in the rural areas are involved to environmental education activities in a greater extent than the schools in the cities. This is true for the absolute number of



projects (31% for the city schools, 69% for the rural areas schools), for the extent of participation (a 30% increase in the participation of rural areas schools relative to that of the cities) and for the average number of environmental education groups per school (5.9 in the city schools, 8.4 in the rural area schools). The greater participation of the Gymnasiums, mentioned previously, is also observed. This difference between the city schools and the rest may be attributed to the fact that in the large cities, pupils have also other choices, for example private lessons on music, foreign languages, etc. This point seems to be supported by the detailed data but needs further investigation<sup>30</sup>.

6. The percentage of teachers involved in the optional environmental education projects is rather low around 10% in every year. About 26% of them (or 2.6% of the total number of teachers) guide more than one environmental group concurrently. The percentage of the teachers involved in environmental education activities with a specific environmental education training is about 20% (or 2% of the total number of teachers). There are no data that these trained teachers perform better or are involved in environmental education activities in an extent greater than the rest<sup>31</sup>. These numbers refer to the teachers in the secondary education. Data on the involvement of teachers in the Primary education, who are mostly involved

<sup>30</sup>The ratio of the projects carried out by Gymnasiums to the projects carried out by Lyceum is 2.7 for the city schools and 7.4 for the schools in the rural areas. In other words, city area Gymnasiums are also involved in environmental education activities in a smaller extent compared with the Gymnasiums in the rural areas. Another possible parameter may be the age of the teachers in the cities and in the rural areas. The current administrative measures for the placement of teachers in schools has the effect that in the rural areas younger teachers are placed.

<sup>31</sup>Note however that the number of teachers involved in more than one environmental education projects and the ones with specific training are comparable. These percentages show a slow but steady increase over the years 1994-2000.

on short term environmental education projects (environmental awareness activities) may be inferred by comparing the involvement of the pupils in environmental awareness activities (see data and comments in the next chapters). In a previous study (See note 3) it was found that ~20% of the primary school teachers declared that they are frequently involved in environmental education activities outside the school. Another 40% declared that they do it rarely or not at all (the rest 40% did not respond to the relevant question).

7. The size of environmental education groups in terms of pupils per project and of pupils per teacher shows a systematic decrease which, combined with the increase in the absolute numbers of programs, indicates selection procedures the criteria of which are unknown and may imply social consequences.
8. The annual percentage of the pupils participating in the optional environmental education school activities is of the order of less than 10%. This point is studied in more detail in the following sections on the Long and on the Short term activities.

**4.-Informal environmental education - Long term activities.** According to past data from the Greek Ministry for Education every year about 10% (or less) of the pupils in the (public secondary) schools throughout Greece participate to (long term) environmental activities, a figure comparable to the data for the prefectures of Chania and Rethymno depicted in **Table 1**<sup>32</sup>. During their studies in primary and secondary

**Table 1.** Participation of Pupils in Long Term Environmental education activities

School year	1994-95	1995-96	1996-97	1997-98	1998-99
% of pupils	13.8	11.9	11.4	14.2	13.8

(Lower and Upper) education, a total of about 41% of the pupils participate in environmental education (long term) activities, some of them (~30.3%) more than once as is depicted in **Table 2**, for the General Education (Lyceum) and the Technical

**Table 2.** Pupils' participation Frequency to Environmental education activities

Number of activities	None	1	2	>2	Total
% of total pupils	59	28.6	10.6	1.8	100
% of pupils involved	-	69.7	25.8	4.5	100

Vocational Education (TEE) 2000 high school leavers from the prefectures of Chania and Rethymno. While most of the pupils are engaged in environmental education (long term) activities during their secondary education, many of them were involved during Primary education time as is depicted in **Table 3**. Long term informal environmental education activities in Primary schools were officially introduced after 1991-92 and are usually effected with the elder children i.e. grades 6, 5 and (to a very less extent) grade 4. A characteristic finding (not directly shown in Table 3) is that

<sup>32</sup>Data in this section are taken from Michaelides P., Kimionis G. (2000), "The participation of the pupils in voluntarily Environmental Education Projects" in: Papadimitriou V. (ed.) proceedings of conference "Environmental Education in the Context of Education for the 21st Century", Larissa October 6-8, 2000, pp. 111-119 (in Greek). The results are from 500 anonymous questionnaires (response rate 43.4%) to high school would be leavers from the prefectures of Chania and Rethymno before the end of school year 1999-2000. A 9.7% of the respondents (12 grade) was involved to environmental education activities during that period.

**Table 3.** Pupils' participation Frequency according to school level

D= Demotiko (Primary), G=Gymnasium (Lower Secondary), L=Lyceum (High School)

School	D only	G only	L only	D & G	D & L	G & L	D,G&L	Total
% total	4.6	14.7	13.8	2.4	0.9	3.7	0.9	41.0
% involved	11.2	36.0	33.7	5.7	2.2	9.0	2.2	100
Totals D 8.8% and 21.3%			Totals G 21.7% and 52.9%			Totals L 19.3% and 47.1%		

almost all the pupils involved in environmental education long term activities during primary education are also involved during Middle or High school while pupils involved for the first time during Middle school, in general, do not repeat it in High school. If this is due to a difference in the teaching between primary and secondary teachers or to other reasons needs further investigation. Learning outcomes from these activities are indicated in **Table 4**. The pupils involved state that they acquired knowledge (71.3%) and they changed their attitudes (54.6%) and their behaviours (54.1%). The main focus towards factual knowledge is evident.

**Table 4.** Learning outcomes (% of pupils involved)

Change in:	None	A little	Great	Very great	Significantly
<b>Knowledge</b>	1.1	27.6	48.3	23.0	71.3
<b>Attitudes</b>	5.8	39.5	39.5	15.1	54.6
<b>Behaviours</b>	5.9	40.0	40.0	14.1	54.1

**5.-Informal environmental education - Short term activities.** The activities for environmental awareness constitute a significant part of environmental education and, at the same time, they enrich the range of the school activities during the school year. Compared to the more systematic long term environmental activities discussed previously, the activities for environmental awareness are easier to organize and they may be incorporated to or supplement the formal school curriculum. They are especially suitable to small ages allowing easier assimilation of notions related to the environment and, when combined with local environmental issues, they may promote social and emotional development. The participation of pupils to environmental awareness activities for the prefectures of Chania and Rethymno is shown in **Table 5**<sup>33</sup>.

**Table 5.** Pupils' participation Frequency to environmental awareness activities

D= Demotiko (Primary), G=Gymnasium (Lower Secondary), L=Lyceum (High School)

School	D only	G only	L only	D & G	D & L	G & L	D,G&L	Total
% total	23.1	17.9	5.1	10.3	0.5	4.6	2.6	64,1
% involved	36.0	28.0	8.0	16.0	0.8	7.2	4.0	100
Totals D 36.5% and 56.8%			Totals G 35.4% and 55.2%			Totals L 12.8% and 20.0%		

The content of these environmental awareness activities is presented in **Table 6**. In comparison with the long term environmental activities, presented previously, an increase to the percentage of the pupils involved and a predominance towards issues of the Natural environment are shown. The higher involvement of primary education is also evident. To interpret these data we must also note the following:

<sup>33</sup>Data on this section are taken from Michaelides P., Kimionis G., Charalambidou F., "The Participation of Pupils in Environmental Awareness Activities", 3rd Pan-Hellenic Conference "Didactics of Science and the Application of New Technologies in Education", Rethymno May 9-11, 2002 (in Greek). The data presented here are considered as representative for the whole of Greece.

**Table 6.** Breakdown of environmental awareness activities

	<b>Tree Plant</b>	<b>Cleaning</b>	<b>Recycling</b>	<b>Art</b>	<b>Constructions</b>
<b>%</b>	58.4	58.4	52.0	10.4	13.6

- Responses to the questionnaire included only the categories shown in **Table 6** although the questionnaire allowed other types of activity to be recorded.
- Most of the pupils had participated more than once to different activities,
- Tree planting and Cleaning is a popular activity, heavily advertised and promoted by the government and local authorities,
- Recycling is perceived as a necessity although it poses inherent difficulties. Quite often it is related to constructions and art.
- Art (role playing, drama, ...) with subjects from environmental issues (of local interest) may develop consciousness on personal relations, expectations from the society, ways of life, etc. This activity is often underrated as an environmental awareness activity especially if it is effected within the context of a school festivity.
- Data on primary school refer mainly to the upper grades i.e. the 6<sup>th</sup>, the 5<sup>th</sup> and (to a lesser extent) the 4<sup>th</sup> grade. Reasons may be: a/the pupils of smaller age do not realize these as specific environmental awareness activities, b/teachers avoid out of the school activities with small age children, e.g. because of the higher safety requirements, c/these activities are considered as normal class teaching, especially if it is done during the time of the teaching of a relevant school subject, for example the “Study of the Environment”.

From the data shown here and in the previous chapters, it is evident that a significant percentage of the pupils leave school without being involved in any of the (optional) environmental education activities. Although all have some environmental education within the context of the formal school curriculum (see sections 2 and 3), the optional environmental education school activities are important for an environment conscious society because:

- Environmental education within the formal school syllabus is taught mainly as an application focusing to a deeper understanding of the subject being taught. Consequently, the study of issues related to the environment is fragmented, dealing only with aspects related to the theme of study.
- In contrast, the optional environmental education activities are focused also on the social (economic, behavioural, ...) aspects of environmental issues. Consequently, the study is (should be) holistic covering not only factual knowledge but social implications also.
- Because of the above characteristics, the (optional) environmental education activities constitute a natural context for project work and for group work (which are frequent objectives of school education) and, also, for the development of social skills (which are indispensable for the multicultural permissive societies presently in dawn).

Measures that could be taken to increase the participation to the (optional) environmental education school activities include:

- Training, mainly in service training, of the school teachers to environmental education issues, especially on issues of holistic, interdisciplinary, project work and group work approaches,
- Encouragement to introduce and use new environmental education approaches, e.g. project work, group work, infused model approaches, case studies, organized interventions through bodies in the society, synergy with other school activities, etc,
- Enhancement of the supporting infrastructure e.g. Environmental Education Centres and networks, special budget, appropriate amendments on the school regulations to facilitate out of the school activities, etc,
- Creation of opportunities for the participation of pupils, e.g. increase of free school time, synergy with other school activities, etc,
- The introduction of special “celebrating” days,
- The introduction of motives to the school teachers (for example increased salaries or promotion perspectives) and the shift of character of these activities from optional to compulsory should also be discussed taking into account the existing controversial arguments in Greece. Within the current situation, participation is limited to the passionate teachers and pupils, a situation favouring educational quality. Making these activities compulsory or introducing motives will certainly increase participation but there is the risk that the motives and the figure norms of formal education will prevail on the quality aspects.

**6.-Epilogue.** It is evident that environmental education constitutes a significant part of the education activities in Greece. All pupils are exposed to some form of environmental education within the formal curriculum while many of them participate also to the optional environmental education activities. Although some data indicate a focusing towards factual knowledge<sup>34</sup>, there are no systematic data on the actual content of these activities, the kind of teaching effected and the learning outcomes referring to the cognitive emotional and social skills developed. As explained in the previous sections, environmental education activities present inherent advantages to the teaching and the development of cognitive, emotional and social skills, provided the appropriate teaching approach is chosen. An appropriate teaching approach seems to be the one proposed by **Byron Massialas** in his book “The school a Workshop for Life<sup>35</sup> (in Greek)” for the teaching of social studies. Indeed environmental education activities, especially the informal ones, taught in the holistic way briefly exposed in sections 1.- and 2.- earlier present inherent advantages to the teaching approach proposed in this book. For example:

- The whole range of cognitive, emotional and social skills (see for example Table 1.1 in page 64 of the book referred to previously) may be developed (see also the summary of teaching guidelines earlier).
- The environmental education subjects under discussion are more easily apprehended by pupils, especially pupils of smaller age, because in a first level (natural environment) they refer to directly observed situations and in a second

<sup>34</sup>A characteristic that prevails mostly throughout the schools in Greece.

<sup>35</sup>Βύρωνα Μασσιάλα "Το σχολείο Εργαστήριο Ζωής: Εισαγωγή στη Μεθοδολογία της Διδασκαλίας των Κοινωνικών Σπουδών", Εκδόσεις Γρηγόρη.

level (social consequences) they refer to situations of the pupils' own social environment consequently they are known to them.

- Environmental issues attain a special interest in our societies. Regulation on environmental issues is being introduced at an increasing rate in EU and Member State levels in the form of directives, legislation, recommendations, (compulsory) information etc. Many of these regulations raise controversies. Consequently even at the exclusive level of social studies, environmental education issues are also appropriate.
- The (optional) environmental education activities constitute, as stated earlier, a natural context for project work and for group work (which are frequent objectives of school education) and, also, for the development of social skills (which are indispensable for the multicultural permissive societies presently in dawn).

## Η Περιβαλλοντική Εκπαίδευση στο Ελληνικό Σχολείο

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**Σύνοψη.** Στην εργασία αυτή παρουσιάζεται συνοπτικά η Περιβαλλοντική Εκπαίδευση στα σχολεία της Ελλάδας. Ως προς το τυπικό υποχρεωτικό αναλυτικό πρόγραμμα, θέματα Περιβαλλοντικής Εκπαίδευσης υπάρχουν στο περιεχόμενο όλων, σχεδόν, των μαθημάτων της πρωτοβάθμιας και της δευτεροβάθμιας εκπαίδευσης με μεγαλύτερο έκταση στα μαθήματα των Φυσικών Επιστημών. Επιπλέον, για τις πρώτες 4 τάξεις της υποχρεωτικής εκπαίδευσης υπάρχει και ειδικό μάθημα με τίτλο "Μελέτη του Περιβάλλοντος" στο οποίο ενσωματώνονται στοιχεία από το φυσικό και το ανθρωπογενές περιβάλλον με σκοπό: α/την απόκτηση γνώσεων σχετικών με το περιβάλλον και την αλληλεπίδραση του ανθρώπου με αυτό, β/την ανάπτυξη στάσεων "φιλικών" προς το περιβάλλον, και, γ/την ανάπτυξη κοινωνικών (συμμετοχικών) δεξιοτήτων κατά την ανάπτυξη των θεμάτων του μαθήματος.

Με τις μορφές αυτές, η Περιβαλλοντική Εκπαίδευση στο τυπικό αναλυτικό πρόγραμμα των σχολείων της Ελλάδας ενυπάρχει, ως σχεδιασμός, σε έκταση πολύ μεγαλύτερη από τα αντίστοιχα προγράμματα άλλων χωρών της Ευρωπαϊκής Ένωσης. Η πραγματική κατάσταση όμως επηρεάζεται από πολλούς παράγοντες όπως: α/ ο κοινωνικός περίγυρος, ο οποίος αν και, γενικά, διάκειται ευνοϊκά, έχει αντιφατικές καθημερινές πρακτικές, β/οι δάσκαλοι και ο τρόπος διδασκαλίας που σε μεγάλο βαθμό περιορίζονται μέσα στην τάξη και το βιβλίο, γ/το περίγραμμα ύλης και οι οδηγίες διδασκαλίας που αν και καλύπτουν όλα τα θέματα εξαντλούν τον διδακτικό χρόνο, δ/τα βιβλία τα οποία αν και αποτελούν πολύ μεγάλη βελτίωση σε σχέση με τα προηγούμενα χρειάζονται ανανέωση και προσαρμογή. Ο γενικός σκοπός τόσο του μαθήματος "Μελέτη του Περιβάλλοντος" όσο και των περιβαλλοντικών θεμάτων στα πλαίσια των άλλων μαθημάτων καθώς και οι αντίστοιχες οδηγίες διδασκαλίας οδηγούν σε μια ολιστική διδακτική προσέγγιση για την απόκτηση γνώσεων, την ανάπτυξη κοινωνικών (συμμετοχικών) δεξιοτήτων και την καλλιέργεια στάσεων με πραγματικά περιβαλλοντικά θέματα από το άμεσο περιβάλλον των μαθητών και μαθητριών. Στα πλαίσια αυτά, η διδακτική προσέγγιση που αναπτύσσει ο Β. Μασιάλας στο "Το σχολείο Εργαστήριο Ζωής: Εισαγωγή στη Μεθοδολογία της Διδασκαλίας των Κοινωνικών Σπουδών, Εκδόσεις Γρηγόρη" αποτελεί χρήσιμο εργαλείο. Πέρα από τις δραστηριότητες του τυπικού αναλυτικού προγράμματος, στα σχολεία έχουν θεσμοθετηθεί επίσης και προαιρετικές δραστηριότητες Περιβαλλοντικής Εκπαίδευσης. Οι δραστηριότητες αυτές γίνονται σε ομάδες και διακρίνονται σε μεγάλης διάρκειας δράσεις Περιβαλλοντικής Εκπαίδευσης (περιβαλλοντικά έργα - projects) κατάλληλα για τους μεγαλύτερης ηλικίας μαθητές και σε μικρότερης διάρκειας (ημερήσιες) δραστηριότητες περιβαλλοντικής ευαισθητοποίησης κατάλληλα για τους μικρότερης ηλικίας μαθητές. Τα θέματα μελέτης είναι κυρίως από το άμεσο περιβάλλον των μαθητών με τα θέματα από το φυσικό και από το ανθρωπογενές περιβάλλον να εκπροσωπούνται σύμμετρα. Οι δραστηριότητες αυτές είναι σημαντικές, με την πλειονότητα των μαθητών να συμμετέχει.

Ως προς την κατανομή αυτών των δραστηριοτήτων, αυτές γίνονται σε μεγαλύτερη έκταση στο Γυμνάσιο. Επίσης, τα σχολεία της επαρχίας παρουσιάζουν μεγαλύτερη δραστηριότητα. Χαρακτηριστικό επίσης είναι πως υπάρχει ένας όλο και μεγαλύτερος αριθμός σχολείων που οργανώνει συστηματικά και συνεχώς τέτοιες δραστηριότητες.