ELABORATION, APPLICATION AND EVALUATION OF AN ENVIRONMENTAL EDUCATION PROGRAMME

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Abstract

Environmental education is an important, integral part of environmental protection. In the present article we introduce the results of a case study in Greece. The participation of the students in environmental education programmes seems to be the adequate and necessary condition to enhance their environmental knowledge, to change their attitude towards environmental matters, to encourage their environmental activity and favour their ecological way of thinking in general.

Keywords: environmental education, education programme, environmental attitude, environmental knowledge.

1. The Emergence of Environmental Education

Environmental education (E.E.) appeared first in the seventies [1]. In its typical form it tries to provide the necessary knowledge to the first two grades of the education (primary and secondary) with regard to the aforesaid matters and stimulate attitudes, values and behaviours in order to mould not only aware but also conscious and active citizens who shall defend the environment and the future of the Planet through participation procedures [2].

The concept of sustainable development [3] is now discussed not only in university amphitheatres or in the areas of ecology activists but also by international organizations and political fractions of absolutely different ideological orientations. Regardless of the meaning attributed to the above by anybody, a basic constant is the viability of the Planet and the welfare of the countries. From this point of view, the contribution of E.E. is not only significant but necessary as well.

In Greece E.E. has already completed two decades [4]. Although the absence of any systematic evaluation of offers, possibilities and weaknesses is apparent, it is sure that its presence in the Greek schools may have not 'shocked' the existing status, however it has agitated the backwaters, being the result of immobilization for decades.

Hundreds of teachers in both primary and secondary education with insufficient means and without adequate theoretical background, acting on a volunteer basis with groups of students have elaborated Environmental Education Programmes (E.E.P.) trying to signify the existence of 'another school' without the existing limitations and regulative behaviours which often function in a repulsive manner for all the members of the school community, shrinking the role of the school as an area of creativity, release of the students abilities and cultivation of their critical thought [5].

In parallel they try, without the restrictions of syllabuses and time schedules in a really free environment either inside or outside the classroom to approach meanings which are so close and at the same time so far regarding our future and learn a lot about the human and natural environment. Also to enhance awareness through adequate activities and form attitudes and values targeted to an ecological consciousness [6].

2. Methodology

2.1. Purpose and Targets of the Research

In the framework of E.E. it was decided to apply and evaluate an Environmental Education Programme (EEP) at an experimental level during the period 2000–2001 which was not confined in one only environmental variable (e.g. wastes) but it included the most important environmental issues, so as to enable the students to develop a holistic ecological view which, in addition to the increase of their knowledge, would contribute to the strengthening of a positive attitude against environmental matters, the increase of their ability to observe and their activation with regard to these matters, leading to an ecology-targeted thought.

The targets of the research were the following:

A. The analytical planning, systematic application and critical analysis of an E.E.P. addressed to the students of the 6th class of the primary school.
B. The evaluation of the application of the E.E.P. with the comparative study of an experimental group (E.G.) of students participating in the programme with a respective group of students used as a control group (C.G.).

2.2. Importance and Originality of the Research

Questionnaires were given to the students of the two groups before and after the application of the experimental lessons. The answers were of particular importance given that:

- The questionnaires were oriented to the commonly acceptable targets of the E.E.
- They were focused on the knowledge, attitude and observation ability of the students, while at the same time they were intended to examine the interaction between them.

- The whole work enriches, in our opinion, the existing literature, by examining most of the aspects of the environmental problems.
- The experimental lessons and the respective activities are directly applicable for the students of the 6th class of the public school in E.E.P and with the necessary adaptations in the school manuals they may be embodied to most of the syllabus courses, as the case may be.
- The material and planning of the research may be used in other regions of the country and in most of the schools with some modifications.
- It enriches the case studies which are only a small percentage of the researches conducted in the area of E.E.
- It examines variables affected by the pedagogic intervention and this is of particular importance in the area of formal education.

From a review of the existing bibliography it becomes clear that:

- The researches based on case studies such as the present one are still a small percentage of the total researches. There is a preference for large samples and many researches continue to be influenced by a prejudice concerning the validity of the study of small populations.
- There are no researches to approach most of the environmental matters, even on an experimental level. They are usually confined in one or two of them, usually garbage-recycling, power and water resources, mainly for methodological ease in the analysis.
- We thought it was an interesting challenge to construct an E.E.P. including the total of the important environmental problems with direct entries as to the mechanism according to which the students understand, react, participate and act.
- The attitudes of the students do not change within a short period of time and mainly no positive action for the environment is noticed with regard to persons with fragmentary knowledge which is not the result of a suitable pedagogic intervention.
- An E.E.P. designed for students of the primary school presents comparative advantages against respective programmes designed for students of higher classes because convictions, attitudes, values etc. are better formed during the childhood.

2.3. *Research Strategies*

As a basic method for our research the case study was chosen, targeted to the 'verification, strengthening and expansion of the knowledge, the manner in which the children learn and the means employed by the schools for the achievement of their purposes' [7]. The advantage of the chosen method is the opportunity offered to the researcher 'to study in depth an aspect of the problem within a limited period of time' [8].

The core point of our research was mainly to record the knowledge and attitudes of students towards a number of environmental matters having as a starting point the observation of the areas in which they live and act, that is home – school – neighborhood – village, so as to give them the opportunity to become ecologically aware, and through experimental lessons to contribute to the enhancing of their knowledge in a systematic and holistic manner targeting to the development of an 'ecological way of thinking' [9] on the long run. We chose the model of non participant observation [10], trying to avoid problems with our presence in the classroom that would delay the progress of the lessons. In the out of school activities we followed the very well structured non participant observation [11]. Although the specific method has undergone a severe critique as to the ability to generalize individual facts [12], we adopted the aspect supporting that 'the value of a case study is judged by the degree of functions and their suitability and sufficiency for somebody who teaches under similar circumstances' [13].

In the place where the research was conducted we also chose the ethnography as a method of work which enabled us to draw useful information out of discussions with the members of the group regarding the progress of the lessons on the one hand and their influence on the students and their close environment (family, friends, students of other classes etc.) on the other hand. It is noteworthy that 'the ethnographer does not simply observe the behaviour of a specific social group but he goes to the depth searching for the meaning of such behaviour' [14]. An ethnographic study somehow or other describes 'a demand for social or educational change, offering the understanding of a problem from the inside, being itself the first step of the change' [15], fully complying with the principles and targets of the E.E.

From a theoretical point of view, the meanings of research and action are distinguished activities in any framework with their own manner of function and diversity of ideologies. Going back to the twenties but mainly in the forties, the method of research-action [16] appeared in the area of social sciences. It is a 'small scale intervention in the function of the real world and a direct examination of the influence of such intervention' [17]. The type of the specific research contains the social or educational objectives-targets laid down. The research-action interprets the scientific method in a more 'free way' as it focuses on a specific problem within a specific environment. The knowledge anticipated to be acquired is not a generalized one but rather a precise knowledge for the situation in consideration and the purpose served thereby. Its importance in the classroom consists in the admission that 'the children learn how to work in common to solve their problems' [18]. The said method was used in the respective activities conducted in the framework of the 24 experimental lessons. The research-action is suitable when specific knowledge for a specific problem in a specific situation is required or when a new approach must be embodied to an already existing system. In the school area it may be used as a teaching method by replacing a traditional method with a discovery method, as a learning strategy by adopting an integrated method in contrast to the fragmentary teaching, as attitude-value by encouraging the most positive attitudes towards the work and the change of the value patterns of the students in relation to aspects of

the everyday life, and as management and control through the gradual introduction of behaviour change techniques. It has been argued that 'the tradition of the case study in the framework of a research-action methodologically covers the creation of data but it lacking in their interpretation' [19]. The said method, however, may significantly contribute if other methods are used in parallel.

The starting-point of the experiment in the social researches is the formation of at least two groups on the strict condition that they must not be significantly different in the beginning of the experiment. By introducing the independent variable (the 'experimental lessons' and the respective activities) only to the Experimental Group (E.G.), we measured the dependent variable (indices: knowledge-attitude-observance ability, 'green' student) in both groups in order to determine the difference between the two groups. If a statistical significance appeared, this could be attributed to the presence of the independent variable, being the only element of differentiation between the two groups, given the three conditions of Mill [20].

2.4. *Research Questions*

The most important research questions that the research attempted to answer were the following:

- What is the degree of awareness of the students of the 6th class of the primary school of a tourist region which is in parallel characterized as a traditional one?
- Are there any differences in the knowledge-attitudes (convictions) – observation ability among the students?
- Which are the attitudes of the students in combination with their knowledge about environmental matters?
- Which is the degree of their observance ability in the place where they live and act?
- Which is the profile of the green student?
- How and to what extent may an integrated E.E.P. influence the knowledge, attitude and action of the students with regard to environmental matters so as to achieve a high level of ecological way of thinking?
- Was there a differentiation between the E.G. and the C.G. before and after the application of the E.E. Programme?
- Was the differentiation in the E.G. the anticipated one after the application of the programme with regard to the three variables used (knowledge- attitude – observation ability)?
- Were the lessons of the programme successful, the students encountered any difficulties, were the lessons well accepted by the students and was the teacher successful in his mission?
- Were the out of school activities implemented and what kind of problems arose in connection with the above?
- Were the said activities well accepted by the school and the broader social environment of the students of the group?

- Is and to what extent is the application of such programmes in the primary education feasible?
- Is the diffusion of the environmental dimension in the school lessons on the basis of the applied programme feasible?

2.5. Statistical Analysis Method

The 'screening' of the E.G. was effected on the basis of questionnaires before (October 2000) and after (May 2001) the application of the E.E. Programme (1st and 2nd phase). Our choice concerned one school class, the 6th class of the Primary School of Mythemna, Lesvos, being the Experimental Group, and the 6th Class of the Primary School of Petra, Lesvos, being the Control Group. The choice of the two schools was based on common features such as the socio-economic characteristic and cultural level of the parents, the same number of students of the chosen groups, the similar school achievements etc. Trying to collect more detailed data for our research, we also used calendars, notes, discussions with the teacher who coordinated the lessons and the informal observation.

This analysis in the first phase was separately presented for each of the two schools. In this phase the frequencies of the answers of the students to all the questions of the questionnaires (grouped in 18 fields) are presented. The questions were designed on the basis of 18 environmental dimensions and the respective indices for the 'knowledge', 'attitude' and 'observance ability' of the students were created. Each index actually measures the percentage of 'correct' answers in the respective field. The questions which could not be 'correctly'/'mistakenly' answered, were not included in the indices. The statistical analysis was carried out on the basis of the SPSS and included the following:

- Distribution of frequencies
- Measures of central tendency and dispersion
- Linear correlation factors
- Parametric controls of two average independent samples
- Parametric and non parametric controls of two average dependent samples.
- Relevance tables and non parametric controls of independence

In all the cases of statistical controls, $p = 0.05$ was taken as a minimum level of statistical importance.

3. Results of the Research

The evaluation of the efficiency of the application of the E.E. Programme applied is statistically analysed with methods suitable for studies where the sample is small. The analysis concerns both groups (E.G. and C.G.) separately in the two phases of the research, that is before and after the application of the E.E. Programme. After the analysis in each of the two groups in both phases of the research, the results are compared and the findings are presented accordingly.

3.1. *Comparative Study of the E.G. with the C.G. in the 1*st *Phase*

In this part of the study, the general and particular indices of knowledge-attitude-observation ability of the E.G. and of the C.G. are analysed on the basis of the answers of the students to the questionnaires of the 1st phase, a descriptive analysis of the indices and the comparisons between them are given, their multi-dimensional spreading is described, and the profile of the 'green student' is determined accordingly.

3.1.1. *Analytical Study of the Results of the E.G. in the 1*st *Phase*

According to the statistical processing of the questionnaires, the average of the knowledge was found to be 0.54, the attitude 0.62 and the observation ability 0.56. As it appears from the above, the higher index is located in the attitude of the students and it may be interpreted from the general information and messages they receive directly or indirectly but not systematically from the school, the mass media and the local authorities within the framework of the efforts made for the maintenance of the traditional housing. The positive attitude towards the environment does not presuppose systematic knowledge, regardless of the fact that the latter contribute to this direction. The low average of the knowledge is justified by the fact that the students in previous classes had not participated in any E.E. Programmes, given that the course 'I discover the Natural World' does not cover the needs for an integrated education about the environmental matters and only few steps have been taken towards an ecological orientation of the syllabus of the rest courses. The observation ability which presents a rather low average is a matter of interest. To some extent this can be justified by the low average of the knowledge but of course this may not be the only interpretation. Some trees, plants, animals and birds are well known and do not require special knowledge, since they are present in the school garden, in the yards of the students as well as in public areas. From the above it appears that the students are not used to observe and the above made no impression to them or that they ignored the usefulness of the above although existing so close to them.

Descriptive Analysis of Indices per Particular Fields

The following analysis is referred to the knowledge-attitude-observation ability indices, as the latter resulted from their grouping.

- The average of knowledge about important environmental problems is 0.42, water resources 0.15, consumption-food 0.59, forests-flora-fauna 0.76, agro-chemicals 0.60, energy 0.32, interior pollution 0.61, sound pollution 0.53, garbage-recycling 0.20 and traffic problems 0.90.

- The average of attitudes towards important environmental problems is 0.44, water resources 0.63, consumption-food 0.60, forests-flora-fauna 0.59, agro-chemicals 0.60, energy 0.55, and garbage-recycling 0.54.
- The average of observation ability regarding water resources is 0.95, consumption-food 0.46, forests-flora-fauna 0.90, energy 0.42, interior pollution 0.50, sound pollution 0.63, and garbage-recycling 0.35.

Correlations between Indices per Particular Fields

- As to the correlations between the general indices of knowledge, attitude and observation ability, it appears that there is a correlation between attitude and observation ability. The observation ability of the students with regard to specific environmental matters contributes to their positive attitude. The ecological attitude of the students of the group towards environmental matters in this phase is irrelevant to their level of knowledge and enhances their observation ability. From the above it appears that the knowledge has no significant effect on the observation ability or on the attitude.

Profile of the 'Green' Student

According to the available data, the profile of the green student was found to be 0.55 (average) with minimum value 0.28 and maximum value 0.82, that is a low environmental level from the aspect of knowledge and attitude of the students of the Exp. Group before the commencement of the lessons. It was also found that only few students are exceptions to this rule.

3.1.2. Analytical Study of the Results of the C.G. in the 1st Phase

The average of the knowledge was found to be 0.58, the attitude 0.67 and the observation ability 0.53.

Descriptive Analysis of Indices per Particular Fields

The following analysis is referred to the knowledge-attitude-observation ability indices, as the latter resulted from their grouping.

- The average of knowledge about important environmental problems is 0.46, water resources 0.42, consumption-food 0.68, forests-flora-fauna 0.69, agro-chemicals 0.58, energy 0.48, interior pollution 0.70, sound pollution 0.63, garbage-recycling 0.68 and traffic problems 0.79.

- The average of attitudes towards important environmental problems is 0.49, water resources 0.82, consumption-food 0.65, forests-flora-fauna 0.66, agrochemicals 0.74, energy 0.44, garbage-recycling 0.66, and traffic problems 0.63.

- The average of observation ability regarding water resources is 0.84, consumption-food 0.38, forests-flora-fauna 0.81, energy 0.53, interior pollution 0.25, and sound pollution 0.77.

Correlations between Indices per Particular Fields

- As to the correlations between the general indices of knowledge, attitude and observation ability, it appears that there is a correlation between attitude and observation ability and a marginal correlation between knowledge and attitude. The observation ability of the students with regard to specific environmental matters contributes to their positive attitude. The ecological attitude of the students of the group towards environmental matters in this phase has a marginal correlation to their level of knowledge, which was found to be poor as it was already noticed. From the above it appears that the knowledge has no effect on the observation ability and only a marginal effect on the attitude.

Profile of the 'Green' Student

The profile of the green student was found to be 0.61 (average) with minimum value 0.42 and maximum value 0.88, that is a low environmental level from the aspect of knowledge and attitude of the students of the Control Group as well. Only few students are exceptions to this rule.

3.2. Comparison of the Results between E.G. and C.G. in the 1st Phase

- The following analysis is referred to both the total indices of knowledge-attitude-observation ability and marks of the green student, and the particular indices as defined above. The average of knowledge in both schools are similar, that is 0.54 and 0.58 respectively; both of them are low. The above apply to the matter of attitudes as well: the averages are 0.62 0.67, respectively. In comparison to the average of knowledge, the respective average of attitudes is higher in both schools.

3.2.1. Analytical Study of the Results of the E.G. in the 2ⁿᵈ Phase

According to the results, the general average of the knowledge was found to be 0.83 with minimum value 0.48 and maximum value 0.92. The general average of attitudes was found to be 0.78 with minimum value 0.58 and maximum value 0.88. The general average of observation ability was found to be 0.62 with extreme values 0.36 and 0.92. The highest index of the 2ⁿᵈ phase appears in the knowledge of the students, apparently as a result of the lessons taught, being impressively higher from the respective index of the 1ˢᵗ phase. Second is the index of attitude which appears increased as well, and the observation ability index follows. These two indices appear increased due to the experimental lessons and activities which took place in the school of the Exp.Group.

Descriptive Analysis of Indices per Particular Fields

The following analysis is referred to the knowledge-attitude-observation ability indices of the 2ⁿᵈ phase of the research per particular fields, as in the 1ˢᵗ phase.

- The average of knowledge about important environmental problems is 0.70, water resources 0.93, consumption-food 0.83, forests-flora-fauna 0.97, agro-chemicals 1.00, energy 0.70, interior pollution 0.95, sound pollution 0.75, garbage-recycling 0.95.
  The lowest performance appears in matters of energy and important environmental problems. The complexity of the problems may be attributed to the low average (in comparison with the rest indices which, however, are higher than the respective ones of the first phase).
- The average of attitudes towards important environmental problems is 0.63, water resources 0.85, consumption-food 0.69, forests-flora-fauna 0.73, energy 0.90, agrochemicals 0.95, garbage-recycling 0.81, traffic problems 0.83. A very positive attitude of the students is noticed with regard to the total of the matters approached, and this is recorded in the applied E.E. Programme. The lower index of attitude towards the important environmental problems is probably due to the fact that the latter are not directly perceived.
- The average of observation ability regarding water resources is 1.00, consumption-food 0.55, forests-flora-fauna 0.93, energy 0.55, interior pollution 0.55, sound pollution 0.65 and garbage-recycling 0.43. According to the above indices, the observance ability of the students relating to the water is 1.00 because the students now are aware of its importance and observe that it is related to the water resources existing in their environment. The index relating to the forests-flora-fauna is also high. Following the lessons taught and activities undertaken as aforesaid, the students can recognize trees, plants and animals of the region, and owing to their awareness from the knowledge acquired, their observation ability is remarkably enhanced. All the other indices except of the index relating to the garbage-recycling are at a satisfactory level.

Correlations of Indices per Particular Fields

- As to the general correlation between knowledge-attitude-observation ability, there appears a new positive correlation between attitude and observation ability. That means the students with a positive attitude towards the environmental matters are the observers of the relevant phenomena as well.

Profile of the 'Green' Student

The profile of the green student in the 2nd phase of the research was found to be 0.82 (average), that is a very high index.

3.2.2. Analytical Study of the Results of the C.G. in the 2nd Phase

The changes noticed in the filling of the questionnaires of the C.G. in the 2nd phase in comparison with the 1st phase were statistically insignificant.

3.2.3. Comparison of the Results between E.G. and C.G. in the 2nd Phase

A comparative analysis of the general and categorized average indices of knowledge, attitude and observation ability of the two groups is given below.

- The mark of the green student in the E.G. is 0.82 and in the C.G. it is 0.61. The application of the E.E.P. contributed to the higher performance of the E.G. The general average of knowledge in the E.G. is significantly higher than the respective of the C.G. (0.83 against 0.57). This difference is absolutely natural given that in the present phase the experimental lessons have been completed and the knowledge of the students of the E.G. is objectively higher than that of the C.G. where no such lessons were taught. The averages of attitude in both groups are 0.77 and 0.66 respectively. The E.Group precedes but the value now is lower in comparison with the index of knowledge. As already mentioned, this difference is marginal, however the knowledge and mainly its combination with the activities in the framework of the E.E.P. have influenced the students so as to precede the students of the other group. The average indices of observation ability are even lower in comparison with the respective indices of knowledge and attitude (0.62 and 0.54 respectively). The average of the E.G. is again higher and this is probably due to the awareness of the students and the activities which took place and were related to the students' observations.
- The C.G. precedes constantly with regard to all the particular indices. It is noteworthy that in some groups of knowledge (e.g. water resources) the difference in favour of the first group is almost double and only in the field of sound pollution the averages are close to each other.

- As to the attitude, the averages of the E.G. are higher from the respective ones of the C.G., however the deviations are much lower in comparison with the knowledge indices. The attitude towards the water resources and the consumption-food are similar. A significant deviation appears in the fields of energy (the average of the first group exceeds the double of the second one) and traffic.
- The averages of the observation ability of the E.G. in the categorized questions of the environmental matters are higher than the respective ones of the C.G. (except of the sound pollution) as it happens with the attitude indices. Higher averages for both groups appear in the fields of water resources and forests-flora-fauna.

3.3. Comparison of the Results between the 1st and 2nd Phase in the E.Group and Respective Comparison in the C.Group

3.3.1. Comparison of the Results between the 1st and 2nd Phase in the E.Group

- The mark of the green student appears a clear difference between the two phases. The average from 0.55 goes up to 0.82, the maximum value from 0.82 before the commencement of the procedure goes up to 0.94, while the minimum value from 0.28 goes up to 0.36. It must be noted that all the 20 students show positive differences. The average of knowledge shows an impressive increase: from 0.54 it goes up to 0.83. The maximum values before and after the procedure were 0.78 and 0.92 respectively, while the minimum values were 0.33 and 0.48 respectively. The total of members of the E.G. shows positive differences, as it happens in the marks of the 'green' student. The students of the E.G. in the attitudes show two negative and eighteen positive differences. The averages before and after the procedure were 0.62 and 0.77 respectively, while the respective maximum values remained at the same level (0.88) in contrast to few ones which changed (from 0.45 to 0.58). A difference appeared in the general average of the observation ability which changed from 0.56 to 0.62, while the respective maximum values before and after the procedure were 0.80 and 0.92 respectively, and the minimum ones 0.25 and 0.36 respectively. Equivalencies appeared in the results of four students of the group, negative differences in three students and positive in 13 students. From the above it appears that the applied E.E.P. influenced the three indices in consideration, mainly the knowledge and attitude and less the observation ability. As to the knowledge, the explanation is self-understood. The students heard, saw, studied and were activated in matters relating to the environment. The attitude was not directly related to the knowledge, as aforesaid, but it changed as a result of the combination of the change of values and knowledge acquired mainly in the activities where the students participated. The lower increase of the observation ability index may be objectively explained – due to limited time – by less activities relating

to specific observations of the students on matters they dealt with and lack of the relevant culture. The habit plays an important role and continuous efforts are necessary in order to change the observation ability of the students in general.

3.3.2. *Comparison of the Results between the 1ˢᵗ and 2ⁿᵈ Phase in the C.Group*

From the data analysis it appears that no statistically important differences appeared between the two phases of the research neither in the general nor in the particular indices.

3.4. *General Conclusions*

From the above analysis relating to data of both the E.G. and C.G. in the 1ˢᵗ and 2ⁿᵈ phase of the research, we reach the following conclusions:

- In the first phase of the research, when the questionnaires were given before the commencement of the lessons, the level of knowledge of the students of both groups relating to environmental matters was rather poor with ignorance and confusion prevailing in matters such as water resources, important environmental problems (greenhouse effect, acid rain, ozone layer). On the contrary, the students of the E.G. showed a lot of knowledge in matters of forests-flora-fauna, while the students of the C.G. showed an enhanced level of knowledge in matters of sound pollution, and garbage-recycling. The environmental attitudes were higher than the knowledge in both groups but here the level was low in matters such as energy and important environmental problems, while on the contrary we noticed positive attitudes towards water resources and forests-flora-fauna in the E.Group. The observation ability of the students was found to be close to the level of knowledge. In matters such as water, forests and flora-fauna, the students had observed various matters questioned, while in matters relating to consumption-food their observation was weak. The matter of garbage-recycling in the E.Group and the matter of interior pollution in the C.Group escape observation. We must point out that there was no statistically important correlation between knowledge and attitude or between knowledge and observation ability, but only between attitude and observation ability (in both schools).
- In the second phase the results of the C.G. did not present statistically significant differences in relation to the first phase and in contrast to the E.G. where all the general and particular indices changed. The knowledge in this phase precedes the attitude, while the observation ability follows. The knowledge index was naturally high after the implementation of the specific E.E.Programme covering the total of the matters of the questionnary. In many categories of matters, the average reached 1.00 while in other ones it came

close to this number. In some categories of matters the index increased six times (water resources) while in others a significant increase was noticed as well (important environmental matters and energy). The same apply to the index of attitudes. In the observation ability some increases appear in both the general average and the particular indices but they are much less than the respective ones in the indices of knowledge and attitude. It must be noted that, like in the 1st phase, a correlation between attitude and observation ability was noticed, while the other combinations of the correlations (with the knowledge) are not statistically significant.

- Both groups are equivalent in the 1st phase, as it appears from the comparative analysis of the indices. In the 2nd phase the picture changes. All the indices are much higher in the E.Group: knowledge, attitude, observation ability and profile of the 'green' student. Besides, there are cases where the particular indices of the first group are double of the respective ones of the second group. This fact is directly related to the applied E.E. Programme which did not only aimed at acquiring knowledge but it was designed to favour the change of the students' attitude towards the environmental problems and their participation towards the solution of the same, that is to favour their ecological way of thinking which presupposes adequate knowledge, positive attitudes and respective actions.

4. Proposals

4.1. Educational Proposals

We are of the opinion that the results of this research are useful in the planning of Environmental Education Programmes either at the level of the Ministry of Education or at the level of University Institutions or at the level of school units of the primary or secondary education.

1. The participation of the students in E.E.Programmes seems to be the adequate and necessary condition to enhance their environmental knowledge, to change their attitude towards environmental matters, to encourage their environmental action and favour their ecological way of thinking in general.
2. The careful analysis of the results – before and after the experimental lessons – provides useful information in matters where a lot of confusion is prevailing. It may stimulate an effort to give an ecological direction to the syllabus of the primary education, since the environmental knowledge is not only susceptible of pedagogic interventions but it may have a significant effect on other equally important variables such as the attitude, the observation ability and the action towards the solution of problems.
3. Since the present work is classified in the category of case studies, its conclusions may contribute to similar researches with respective student populations of other regions, however without being generalized so as to include the total of the student population.

4. The E.E.Programmes must be carefully designed taking into consideration the place of implementation and the members of the group who are to participate. They may exceed the pattern of formal education giving this way the opportunity to the participants to use new technologies, where necessary, and combine lessons with other activities within the natural or social environment.

5. The E.E. groups organized in schools must come to contact with local agencies directly or indirectly entrusted with the management of environmental matter, mainly with environmental groups so as to enrich their experiences in environmental action.

6. The experimental lessons in their entirety may be easily applied and enriched accordingly at the level of a school unit, since they are intended to satisfy this purpose.

7. The same remark applies also to the activities organized in the framework of the programme.

8. The questionnaires may serve as a pilot pattern for similar researches, since they include questions from a wide variety of environmental matters.

9. We think it necessary to understand and study a number of ecological concepts by the student population. The school manuals, mainly the one under the title 'I discover the natural world' intended for the 5th and 6th class of the primary schools, must be enriched in the first phase through teaching procedures; the relevant concepts may be then diffused in all the other school manuals. An independent course may be introduced in the long run but this presupposes a special training of the teachers and a serious discussion about the restrictions and infrastructure problems encountered by a number of school units.

10. The evolutionary relationship between man and nature should be presented in a systematic manner in the school textbooks.

11. The Environmental Education should not be limited to the dissemination of the environmental ethics or to the enhancement of the awareness of the students but also to help towards the development of an ecological way of thinking. This presupposes a serious background of environmental knowledge supported by the participation of the students in various activities.

12. The planning of the courses of natural science, history and geography should give the opportunity to enrich the students' knowledge with data and elements from the local society (at a province level at least) so as to enhance their interest and help them to know better the place where they live and act.

13. The above courses should be enriched with the use of modern audiovisual equipment to facilitate the teaching, understanding, interest and participation of the students.

14. The school libraries should be supported with environmental material (books, periodicals, maps, CD-ROM) easily accessible for students and teachers.

15. The E.E. Programmes applied in the schools should be evaluated so as to achieve the improvement of the existing situation by extracting useful conclusions.

4.2. Research Proposals

1. After the completion of the specific case study it is necessary to continue the research work towards a better understanding of the procedures that may enhance the environmental knowledge and prompt the students to develop an ecological way of thinking so as to influence their environmental attitudes and environmental action.
2. We think necessary the elaboration of similar researches and the correlations of their results so as to contribute to the creation of more sophisticated E.E.Programmes.
3. This study may serve as a pilot pattern for similar researches with regard to both the experimental courses-activities and the model of analysis of case studies.
4. The questionnaires used may be repeated after a reasonable time period so as to locate any changes noticed in the meanwhile.
5. Similar researches should be elaborated with students of all the classes of the primary education so as to have a complete picture of the problems encountered.

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