Asian J. Exp. Sci., Vol. 19, No. 1, 2005, 103-113

Analytical Study for Implementing Environmental Education to the Curriculum: Significance, Issues and Measures

Kiran Sharma*[1] and Ravi Sharma[2]

1. Assistant Professor, Department of Zoology
   Govt. Motilal Vigyan Mahavidyalaya, Bhopal - 03
2. JRF- UGC, Indian Institute of Forest Management
   Bhopal - 03.

Abstract : In this study we focus the issue of implementation of environmental education to enhance the participation, attitude and knowledge level concerning the environment. Our objective of the study is to determine whether there is significant difference of courses such as environment science in influencing environmental knowledge, participation and attitude among the students having same basic level of educational background. The approaches implemented in the study include systematic literature sighting and analysis, participatory and consultative approach. The results obtained from the survey conducted in different educational institutions in different departments having environmental science as the subjects were analyzed. The students were selected randomly and were assessed for their attitudes, participation and knowledge concerning the environment. The basic Likert type scale was designed in the questionnaires for obtaining the data in the quantitative form. The data was analyzed by using the basic statistical techniques and interpretations were made. This study highlights very contrasting results. It has been proved that students with environmental education show more positive attitude, knowledge and overall participation level, but when the correlation was found between the attitude and participation level scores among the students of environmental category, the results indicated very weak correlation. It indicates that many serious gaps are present in the implementation of environmental education. Overall this study highlights that the environmental education be implemented and expanded at all levels which could result into the sustainable development of the environment and biodiversity conservation especially in Madhya Pradesh that has enormous biodiversity potential.

Key words : Environmental Education, Participation, Attitudes, Knowledge and Sustainable Development.

Introduction :

According to the goal concisely described by the Environmental Protection Agency's definition of Environmental Education is that

* Corresponding Author : Dr. Kiran sharma email rsharma@iifm.org, ravisharma-160yahoo.co.in

Environmental Education is a process that leads to responsible individual and group actions…..Environmental Education should enhance critical thinking, problem solving and effective decision- making skills. Environmental Education should engage and motivate individuals as well as enable them to weigh various sides of an environmental issue to make informal and responsible decisions.

(Federal Register, 1992)

Also, the major prints in the objectives set out the Tbilisi Intergovernmental Conference on Environmental Education (1978) includes awareness, sensitivity, attitudes, skills, participation to be developed in achieving the environmentally literate and responsible citizen. The state of the environment has long been a subject of debate (Tikka *et al.*, 2000). Environmental problems can not be solved solely by biological or technological inventions (Newhouse, 1990) because the most serious obstacles to preserving the wildlife are related to economic growth and the constant growth in demand and consumption by the human population (Maloney and Ward, 1973). Environmental educators are interested in knowing how effective their programs are. Environmental education takes place in many different forms: in- class programs, outdoor classrooms on school grounds, day- field trips to nature centers and natural areas and residential programs of two or more days (Dettman-Easler and Pease, 1999).

Various researchers have tried to measure the effectiveness and amount of in-classroom environmental education taking place (Jaus, 1982; Kinsey and Wheatley, 1984; Monroe and Kaplan, 1988; Perduce and Warder, 1981; Schwaab, 1983; Simmons, 1989; Singletary, 1992). It is realized that education is the only one of the factor contributing to learning and thinking in a cognitive learning process (Jenkins, 1979) which motivates people's attitude and knowledge concerning the environmental issues. Results from the several studies of summer camp programs were effective in enhancing the environmental attitudes (Carlson and Baumgartner, 1974; Christy, 1983; Ross and Driver, 1977- 1978; Shepard and Speelman, 1986). Most previous studies have concentrated on attitudes towards the environment in general. Furthermore, it is logical to assume if a child has strong positive attitudes towards wildlife, then he or she may also have attitudes towards protecting and enhancing wildlife through habitat protection, pollution control and so

forth. Researchers have also examined the relationship between attitude towards the environment and environment- related behaviour (Ma and Bateson, 1999).

In this study we focus the issue that implementation of environmental education enhances the participation, attitudinal and knowledge level concerning the environment. The research question that is to be proved by this study is to find out whether there is a significant difference between the environmental science students and non- environmental groups, in influencing the attitude, participation and knowledge level among them. Also the degree of association between the attitudinal level concerning the environment and the participation level has been worked out. Some basic assumptions that have been made are, some factors like gender, family status and income etc. These have not been taken into consideration, as they will not have any effect on the implementation of the environmental education program in the curriculum.

Methods :

The methodology adopted to achieve the specific goal, consists of mostly survey work through the designed questionnaires as tool for finding level of participation, knowledge and attitude among the students towards the nature, as followed in most of the environmental education studies. The approaches implemented in the study include:-

1. Systematic literature sighting and analysis.
2. Participatory approach
3. Consultative approach.

The survey was conducted in the month of August 2004 in different Educational Institutions and Zoology Departments with specialization in different subjects at the Postgraduate level along with the compulsory papers. The specialization paper includes the fisheries science, environmental science and entomology as the specialization papers. The students were selected randomly for surveying their attitude, participation level and knowledge concerning the environment. The reason of this type of selection was to select such samples that have same basic educational background but differ in having environmental science as special subject in their

curriculum. In total number of students sampled for the survey were 26 (13 students having environmental science as specialization paper and 13 students having other specialization subjects excluding environmental science) (Table 1).

Table 1 : Number of students sampled for survey based on their specialized paper

Students surveyed having other subjects	Students having environmental science as subjects
13	13

The questionnaires were distributed to the students and were requested to fill their forms. The questionnaire covered a wide range of questions based on the three issues:

(a) Their keenness for participation in nature and environment related activities.

(b) Their knowledge of environmental issues, and

(c) Attitudinal queries.

Several items in the questionnaires were adapted from other studies (Bart, 1972; Tufor, 1984; Westervelt and Llewellyn, 1985; Dettmann-Easler and Pease, 1999). The remaining items were created by us. The first set of questions included the questions of multiple choices on activities and for assessing their keenness in participation. Objective tests are widely used to measure intelligence, aptitude and achievements (or attainment). Some of the items were in Yes/No format also, while most of the other was presented in a multiple-choice format (Choppin and Purves, 1969). The second sets of questions were designed so as to assess their knowledge level concerning to the environmental issues. While the third set of questions were designed to monitor and examine their attitudes towards the environment. Each of the attitudinal items was measured on a five point Likert Scale ranging from strongly agree to the strongly disagree which suggested that methods developed for constructing objective tests of cognitive abilities could be applied to the construction and use of scales for measuring attitudes. The Likert method of constructing and applying attitudes scales is by far the most common as it resembles most nearly the objective test approach. The points

in this case were by giving the value of '5' to the alternative in each question that was regarded as the most positive toward the nature and '1' for the most negative alternative (Tikka et al., 2000). The maximum overall score that can be obtained was 85, while the least score that can be obtained is 14.

Statistical Analysis :

The computer packages like MS excel and SPSS package were used to analyze the survey data. As the sample size of the survey sampled was less than 30 and also the distribution is not known, we use the Mann-Whitney U test (used mostly for the ranked data and the data whose distributions are not known) at the $p < 0.05$ level of significance (*i.e.,* 5% level of confidence interval). Also an attempt was made to find out the degree of association between the attitudinal level concerning the environment and their participation level among the students. The association was measured by using the Spearman's rank correlation method.

Results and Analysis :

We used the Mann-Whitney U test to find out whether the students having environmental science as subject in their curriculum have any effect on knowledge, participation level and attitudes towards the environment as compared to the other groups not having any environmental science papers. The scores obtained by the students were shown in table 2 below:

The difference in their scores was assessed at the 0.05 level of significance. That is, it is unlikely (less than 5 times in 100) that the significant pairs of observations were observed by chance alone. This finding indicates that the students having environmental science as subject in their curriculum definitely shows more positive knowledge, participation level and attitudes towards environment (Mann-Whitney U test, $z = 4.31$, $N = 26$, $p < 0.05$). These results can also be studied by just comparing the total scores of each group of the students in their categories that indicates higher scores for the students of environmental science than the non- environmental science group (768 as compared to the 523).

Table 2 : Scores obtained by the two groups from the survey.

Subject	Scores	Subject	Scores
Environment	57	Others (Excluding Environmental science)	40
Environment	54	Others	39
Environment	58	Others	43
Environment	52	Others	40
Environment	60	Others	37
Environment	68	Others	39
Environment	66	Others	39
Environment	59	Others	37
Environment	54	Others	51
Environment	58	Others	49
Environment	78	Others	33
Environment	53	Others	37
Environment	51	Others	39
Total	**768**	**Total**	**523**

Degrees of association in their Attitudes and participation level :

In order to find out the degree of association in between the scores obtained by the environmental students (n = 13) of attitudes and their participation level, Spearman's rank correlation method was used. The study yields a very contrasting results in connection between their attitudes and participation level (r_s = 0.109, n= 13). The results for correlation have been illustrated in the Table 3. Thus, indicating a very- very week correlation between the scores of both levels as the value of $r_s << 0.3$.

Table 3: Correlation found between the attitude level and participation level among the students of environmental science group.

			PARTICIP	ATTITUDE
Spearman's rho	PARTICIP	Correlation Coefficient	1.000	0.109
		Sig. (1-tailed)	–	0.361
		N	13	13
	ATTITUDE	Correlation Coefficient	0.109	1.000
		Sig. (1-tailed)	0.361	–
		N	13	13

Dicussion and Recommendations :

The Mann-Whitney U test analysis revealed that the students were having environmental science as subjects in their curricula have shown more positive response towards their participation, attitudes and knowledge regarding the environment. These results indicate the concerned agencies to frame the policies to implement environmental education as a compulsory part of the curriculums at each level of education whether it is collegiate, precollegiate or school level. This is also important because it has been understood and also shown by various studies that it is only the environmental awareness among the youth that could result into the sustainable development of the environment and biodiversity conservation especially in state like Madhya Pradesh that has an enormous biodiversity potential.

The second part of the results illustrates the weak correlation between the scores of the participation level and the attitude among the students of the environmental group. This is a serious issue of concern as there is environmental education in the curriculum showing overall positive move towards the knowledge and attitudes, but on the other hand the participation level is not upto the standard as their attitude was shown in the survey. This shows that there are some gaps present in the implementation of the environmental education, which should be removed

or minimized by the proper initiation and the proper framework of the policies. It is recommended that the major emphasis should be given to the out- door field based activities instead of only classroom knowledge. This has also been proved in many previous studies that the best combination for learning environmental concepts and awareness is outdoor activities with- in- classroom reinforcement (Dettman-Easler and Pease, 1999). The measures of the effectiveness and amount of in- classroom environmental education taking place has being studied by various researchers which shows that exposure to environmental education in the classroom has atleast a minimal effect on knowledge and attitudes. Too often many educators teach only resource information without mentioning uses, or they focus on only one use (Francis *et al.,* 1993). As suggested by Gigliotti (1990), this approach weakens the ecological soundness of their messages and often perpetuates environmentally irresponsible myths.

Thus, overall it is strongly recommended by this study that environmental education should be implemented as a compulsory part of the education in all curricula at all levels and more attention should be paid to the practical knowledge instead of only classroom lectures citation. The schools, colleges and the institutions implementing the environmental education should prepare their criterions and frame clear aims and objectives for creating awareness among the youth. It is also emphasized that for sustainable development of the environment, the efforts in the environmental education should be made by considering systematically integrating environmental education with practical knowledge and adapting a holistic approach towards it so that the increase in attitudes and awareness can motivate the students in participation also. This has also been reaffirmed that in order to achieve sustainability, an enormous co-ordination and integration of efforts is required in a number of crucial sectors and rapid and radical change of behaviours and lifestyles, including changing consumption and production patterns. For this, appropriate education and public awareness should be recognized as one of the pillars of sustainability together with legislation, economy and technology. Thus, environmental education should be dealt as education for the environment and sustainability.

Implementation of Environmental Education for Sustainability :

Environmental Education is the education that seeks to develop a population that has the knowledge, skills, values, and motivation to solve environmental problems and work for sustainable development. This definition can be a reality only if some active measures are implemented so that the environmental education can contribute towards the knowledge and participation of the youth. Following are some suggestions that can be taken into consideration before or while implementing the environmental education in the curriculum.

- Preparation of framework, aims and objectives of implementing environmental education by the environmental educators, institutions and concerned agencies.
- Systematic coordination and integration of agencies concerned with environmental education and institutions.
- Systematized preparation of course designs which can motivate students/ youths towards participation along with the knowledge level and attitude towards the environment. This can be achieved by holistically integrating environmental education with practical knowledge along with the classroom reinforcement by lecture demonstration.
- Linking and integrating formal education with the non- formal education.
- Training of educators, teachers concerned with environmental education so that they can pass on ethics of conservation and awareness to the youth/ students efficiently.
- Proper implementation of technology for creating awareness among the youth.
- Above all, the environmental education should be used as a tool or as a pillar for bringing different crucial sectors to create public awareness along with legislation, economy and technology. This has also been mentioned in the Thessolaniki declaration that environmental education should be dealt as education for environment and sustainability.

References :

Bart W.M. (1972) : A hierarchy among attitudes towards animals., *J. Env., Edu.* **3(4),** 4-6.

Carlson J. E. and Baumgartner D. (1974) : The effects of natural resource camps on youths., *J. Environ. Edu.,* **5(3),** 1- 7.

Choppin B. H. and Purves A. C. (1969) : Comparison of open-ended and multiple choice items dealing with literacy understanding., *Res. Teach. Eng.*, **3,** 15- 24.

Christy W. R. (1983) : An assessment of the effects of two residential camp settings on environmental attitude development., *Dissertation Abstracts International,*. 44, 0282A. (University Microfilms No. 83-12304).

Dettmann-Easler D. and Pease J. L. (1999) : Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes towards wildlife., *J. Environ. Edu.,* **31(1),** 33-39.

Federal Register (1992) : *Definition of environmental education*, October 16.

Francis M. G., Banner R. E. and Rasmussen G. A. (1993) : A model for Environmental Education in Natural Resources., *J. Environ. Edu.,* **24(4),** 22- 25.

Gigliotti L. M. (1990) : Environmental education: What went wrong? What can be done?, *J. Environ. Edu.,* **22(1),** 9-12.

Jaus H. (1982) : The effect of environmental education instruction on children's attitudes toward the environment., *Sci. Edu.,* **66(5),** 689-692.

Jenkins J. J. (1979) : Four points to remember: A tetrahedral model of memory experiments. In : Levels of Processing in Human Memory L. S. Cermak and F. I. M. Craik (Eds.), (pp. 429- 446). Lawrence Erlbaum Associates, Hillsdale, NJ.

Kinsey T. G. and Wheatley J. H. (1984) : The effect of an environmental studies course on the defensibility of environmental attitudes., *J. Res. Sci. Teaching,* **21(7),** 675- 683.

Ma and Bateson D. J. (1999) : A multivariate analysis of the relationship between attitude toward science and attitude toward the environment., *Environ. Edu.,* **31(1),** 27-32.

Maloney M. P. and Ward M. O. (1973) : Ecology: lets hear it from the people. An objective scale for the measurement of ecological attitudes and knowledge., *American Psychologist.*, **28,** 583- 586.

Monroe M. and Kaplan S. (1988) : When words speak louder than actions: Environmental problem solving in the classroom., *J. Environ. Edu.,* **19(3),** 38-44.

Newhouse, N. (1990). Implications of attitude and behaviour research for environmental conservation., *J. Environ. Edu.,* **22,** 26-32.

Perdue R. R. and Warden D. S. (1981) : Environmental Education and attitude change., *J. Environ. Edu.,* **12(3),** 25-28.

Ross D. M. and Driver B. L. (1977- 1978) : Benefits of residential and non- residential youth summer camps., *J. Out. Edu.,* **22,** 14-20.

Schwaab K. E. (1983) : Instructional methods : Their use and effectiveness in environmental education., *J. Environ. Edu.,* **14(2),** 8-12.

Shepard C. L. and Speelman L. R. (1986) : Affecting Environmental attitudes through outdoor education., *J. Environ. Edu.,* **17(2),** 20-25.

Simmons D.A. (1989) : More infusion confusion: A look at environmental education curriculum materials., *J. Environ. Edu.,* **20(4),** 15- 18.

Singletary T. J. (1992) : Case studies of selected high school environmental education classes., *J. Environ. Edu.,* **23(4),** 35- 40.

Tbilisi Intergovernmental Conference on Environmental Education (1978). *Towards an action plan: a report on the Tbilisi Conference on Environmental Education* (Paper developed by the FICE Subcommittee on Environmental Education). Washington, DC: U.S. Government Printing Office.

Tikka P. M., Kuitunen M. T. and Tynys S. M. (2000) : Effects of educational background on students' attitudes, activity levels and knowledge concerning the environment., *J. Environ. Edu.,* **31(3),** 12-19.

Tufor J. K. (1984) : Changes in students attitudes toward s conservation resulting from outdoor education: A case Study., *Dissertation Abstracts International.,* DAI- a45/05.

Westervelt M. O. and Llewellyn L. G. (1985) : Youth and Wildlife. (Washington, DC: U.S. Fish and Wildlife Service.).