A Study of Relationship between Environmental Awareness and Scientific Attitudes among Higher Secondary Students

PARAMANAND SINGH YADAV* and ANITA BHARATI**

Abstract

The present world is witnessing a number of environmental crises, which are the result of the unmindful exploitation of natural resources by human being. There is an urgent need to create environmental awareness among all human beings to conserve, protect and nurture our environmental resources. Consequently, environmental education is included in school curriculum right from the very beginning. The present study was conducted to study the environmental awareness among higher secondary students of Varanasi district of Uttar Pradesh. The findings of the study indicated that environmental awareness has positive relationship with scientific attitude among students and science students were found more aware about their environment as compared to arts students.

Introduction

Environment is a broad term. It includes not only physical or material aspect but psychological, social and cultural aspects as well. Thus, environment consists of material and non-material surroundings of human beings.

Nature provides a limited freedom to man for conducting his exploitational activities. Man is a part of nature and hence can not exert control over nature on the basis of his free-will. When he tries to break the natural laws of nature he is bound to face the serious consequences.

In the contemporary world, the healthy existence of human society is getting worse. This state of affair is due to the unimaginably great volume of environmental maladies or problems which are pushing our planet almost to the brink of mass scale disaster of living

* Faculty of Education, (K.), B.H.U., Varanasi, U.P.

** *Ex. Research Scholar*, Faculty of Education, (K.), B.H.U., Varanasi, U.P.

beings or species on this good habitable earth. The wild storms of criminality and the volume of unsocial passions are dangerously corroding the vitality and integrity of the working people of the world. The harmony of heart has been damaged and the tribunal of conscience has been greatly demolished due to unqualitative environment on this earth. This state of environmental conditions in which the modern man lives can bring into existence unlimited ugly situations and conditions, which can devour much of the potentials of creative and healthy lives of the human society.

Environmental crisis or maladies are the foremost and the most persistently challenging problems which are ready to devour the glories of human existence and are ready to wipe out the human civilisation from this earth. The present century is witnessing such problems of environment crisis which are nothing but the creation of a greedy human society which wants to exploit nature beyond any reasonable limit. Dominantly operative environmental maladies today are always active in informing man to think seriously and choose a way between creative and progressive existence or be ready for annihilation.

Efforts are being made to educate and to solve environmental problems. Environmentalists have taken up an environmental protection aspects in a serious way. It has taken a very strong position after the United Nations Conference on Human Environment at Stockholm in 1972, which was a major event for those concerned with the quality of the world's environment. One of the recommendations of the conference resulted in the creation of United Nation Environmental Programme (UNEP) while other recommendations specially constituted the foundation of framework for cooperative efforts on international level which states that environmental awareness may be adopted by:

- Identifying, analysing and understanding the needs and problems of personal life including healthy vocation, etc.,
- Social life at different levels, viz. family, caste, community, religion, town or village life, state and country, and
- National life including civic, economic etc.[1]

To quote Sir Edmund Hillary, "It is people who create a bad environment and a bad environment brings out the worst in people. Man and nature need each-other and by hurting one, we wound the other. There is so much that needs to be done to halt the destruction of our world environment, so many prejudices and so much self-interest to be overcome".[2]

There is a folk song by Ghanshyam Shilani which starkly portrays the conditions of forests-

"Brothers and Sisters! Wake up, forest has been clean-shaved by the Government and the contractors, hug the trees, don't allow them to be cut, don't allow the wealth of the hills to be plundered".[3]

Environmental Education is a way of implementing the goals of environmental protection. Environmental education is not a separate branch of science or subject of study. It should be carried out according to principle of lifelong integral education".

The environmental education conference at Tbilisi (USSR) in 1977 identified its ultimate aim as "creating awareness, behavioural attitudes and values directed towards preserving the biosphere, improving the quality of life everywhere as well on safeguarding ethical values and cultural and natural heritage, including holy places, historical landmarks, works of arts, monuments and sites, human and natural environment, including fauna and flora and human settlements".[4]

National Environmental Awareness Campaign (NEAC) 2000-2001, started in 1986 for creating environmental awareness at all levels of the society, was continued during the year with the main theme as 'Keep our Environment Clean and Green'.[5]

'The ministry (2000-2001) interacted actively with the UGC, NCERT and the Ministry of Human Resource Development (MHRD) for introducing and expanding environmental concept, themes, issues etc., in the curriculam of schools and colleges'.[6]

The problem can be best tackled if proper awareness and attitude towards environment is developed in man and society both.

Systematised, organised and awakened social mind can be developed only through right type of education and it is through right type of education that appropriate awareness can be created to make life and its environment creative, constructive and progressive. To bring such state of mind, fostering of scientific attitude among individuals for the growth and the development of environmental awareness is essential.

The rationality, sense of curiosity, open mindedness, etc. seem to be meaningfully related with awareness in general and environmental awareness in particular. It was, therefore, decided to study in-depth the nature and extent of environmental awareness among higher secondary students and to determine how it is affected by scientific attitudes.

Statement of the Problem

The problem chosen for the study may be stated as follows:

"A study of Relationship between Environmental Awareness and Scientific Attitudes among Higher Secondary Students of Varanasi City".

Definition of the Terms Used
Environmental Awareness

Environmental awareness is the characteristic quality of man to understand and know the ins and outs of working forces and conditions of the environment.

Environmental awareness is indicative of one's conscious state of being towards one's own environment. In the present study environmental awareness includes both factual familiarity and personal variables as a composite whole. However, it has been defined operationally in the present study as follows:

Environmental awareness is an attitude towards environment which manifests itself in terms of the awareness towards:

1. Physical pollution
2. Psychological pollution
3. Social pollution
4. Cultural pollution

Scientific Attitude

In the present study, scientific attitude has been operationally defined in terms of the following six components: [8]

A. Rationality

1. Tendency to test traditional beliefs.
2. Seeking for natural causes of events and identification for cause-effect relationship.
3. Acceptance of criticism.
4. Challenge of authority.

B. Curiosity

1. Desire for understanding new situations that are not explained by the existing body of knowledge.
2. Seeking to find out the "why", "what" and "how" of an observed phenomenon.
3. Giving emphasis on the questioning approach for novel situations.
4. Desire for completeness of knowledge.

C. Open-mindedness

1. Willing to revise opinions and conclusions.
2. Desire for new things and ideas.
3. Rejection of singular and rigid approach to people, things and ideas.

D. Aversion to Superstitions

1. Rejection of superstitions beliefs.
2. Acceptance of scientific facts and explanations.

E. Objectivity

1. Observation free from personal judgement.
2. Interpretation without making any modification in present social economic and political conditions.

F. Suspended Judgement

1. Unwilling to draw inference before evidence is collected.
2. Unwilling to accept things and facts that are not supported by convincing proof.
3. Avoidance of quick judgement and conclusions.

Research Questions

The main research problem was to examine the relationship of environmental awareness with scientific attitudes. The following were the main research questions which the study attempted to answer.

(1) what is the nature and extent of environmental awareness among higher secondary students?
(2) which factors contribute to the development of environment awareness among higher secondary students?
(3) what is the relationship between the environmental awareness and scientific attitudes among higher secondary students?

Objectives of the Study

The following were the main objectives of the study:

(1) to study the nature and extent of environmental awareness among higher secondary students and factors affecting it.
(2) to study the relationship between environmental awareness and scientific attitudes among higher secondary students.

Hypothesis of the Study

The following were the research hypotheses of the study:

H_{R1}: Demographic variables like age, religion, sex, place of residence, family status, parent's occupation and parent's income affect the environmental awareness of higher secondary students.

H_{R2}: The educational variables like course of study, grade, parent's level of education affect the environmental awareness of higher secondary students.

H_{R3}: Environmental awareness has relationship with scientific attitudes among higher secondary students.

Measurement of the Variables of the Study

The independent variable of this study is scientific attitudes of higher secondary students while dependent variable is environmental awareness.

From review of related literature it was evident that although a lot of work has been done on environmental awareness and scientific attitude separately, but the researcher could not find any study which dealt with these two variables together. This study is an attempt to highlight the relationship between environmental awareness and scientific attitudes.

(i) Environmental Awareness

In this study the environmental awareness is measured with the help of 'Environmental Awareness Test', designed and administered by the researcher. Scores obtained on this test were taken as measure of awareness of the higher secondary students towards environment.

(ii) Scientific Attitude

In this study the scientific attitude is measured with the help of *Kriya Bhavichar Shailly Prashnawali* – designed by Singh, P. N. (1988).

Relationship among Variables

At the initial level, the study was concerned with the measurement of variables, selection of sample and the description of the sample. At the later stage, the study was concentrated on relationship between the independent and dependent variables, i.e. scientific attitudes and environmental awareness respectively.

Population

Population for this study consisted of science and arts students of higher secondary schools of Varanasi City affiliated to U.P. Board.

Sample

In many research situations it is not feasible to involve or measure all members of the population under study. A sample is, therefore, selected and research is conducted only on those members selected in the sample. A sample is defined as a representative part (or subset) of the population selected for the observation and analysis. On the basis of characteristics of the sample, inferences can be made about the characteristics of population in general.

The researcher selected a simple random sample from the population. This type of sample is the best representative of the population whose characteristics are unknown.

The random sample consisted of science and arts students of higher secondary schools of Varanasi city affiliated to U.P. Board. The sample of the present study consisted of 360 science and arts students of higher secondary schools of Varanasi City.

Statistical Treatment

In addition to general descriptive statistical analysis, other treatments such as F-test, t-test, correlation and multiple regression analysis were used to realise the objectives of the study. The contribution of scientific attitude on environmental awareness was estimated through regression analysis.

(1) Environmental awareness test was developed by the researcher himself to measure the environmental awareness among higher secondary students of Varanasi city.

The final form of the test consisted of 62 summated rating scale type items. Each item has five response category viz. strongly agree, agree, undecided, disagree, strongly disagree. For favourable and unfavourable items 5, 4, 3, 2, 1 and 1, 2, 3, 4, 5 scores were given respectively.

The reliability of the test was found to be 0.92 by split half method. The content, construct and intrinsic validity of the test were also established.

(2) Scientific attitude test developed by Singh, P.N. (1988) was used to assess the development of scientific attitudes of higher secondary school students. Split-half reliability of this tool was found to be 0.85 and test-retest reliability was 0.54.

After scoring, the scores were presented on two scoring sheets, one in respect of environmental awareness scores and other for scientific attitude scores.

F-test and t-test at 0.05 level of significance were applied to study the effect of various demographic and educational factors on environmental awareness and the contribution of scientific attitude in the development of environmental awareness among students at higher secondary stage is estimated through regression analysis.

Findings of the Study

The objective wise findings of the study are as follows-

Objective I

To study the nature and extent of environmental awareness among higher secondary students and factors affecting it.

Hypothesis Tested

H_{R1}: Demographic variables like age, religion, sex, place of residence, family status, parent's occupation and parent's income affect the environmental awareness of higher secondary students.
H_{R2}: The educational variables like course of study, grade and parent's level of education affect the environmental awareness of higher secondary students.

The mean was about 74.8% of the maximum score possible in this test. It means that there is more concentration towards upper half of the test.

The mean scores of environmental awareness were found to vary among the sample according to some demographic and educational variables.

The relevant statistical hypotheses were tested at 0.05 level of significance according to age, religion, sex, place of residence, family status, grade, course of study, parent's level of education, parent's income and parent's occupation. The findings related with hypotheses testing of the environmental awareness are described below:

1. There is no significant difference between the environmental awareness scores of the science group and arts group of higher secondary students. The findings of the study are as follows:

From the table it is evident that t-value is significant at 0.05 level of significance. Therefore, it may be said that Arts and Science students do differ significantly in their environmental awareness. The mean score of science students is higher which shows that they have more environmental awareness.

2. There is no significant difference between the environmental awareness scores of higher secondary students belonging to different parent's income groups. The findings of the study are as follows:

From the table, it is evident that t-value is significant at 0.05 level of significance. Therefore, it may be said that the above two groups do differ significantly in their environmental awareness. The mean score of students whose parent's income is in between 'Rs. 2,000 to below Rs. 4,500' is higher which shows that they have more environmental awareness.

Course of Study	*N*	*M*	*S. D.*	*t – value*	*Level of Significance*
Arts	180	226.09	28.75	3.86	0.05
Science	180	237.68	28.26		

(i) Below Rs. 2,000/ Rs. 2,000 to below Rs. 4,500

Parent's Income	*N*	*M*	*S. D.*	*t- value*	*Level of Significance*
Below Rs. 2,000	102	221.49	33.03	2.61	0.05
Rs. 2,000 to Below Rs. 4,500	101	232.53	24.96		

(ii) Below Rs. 2,000/ above Rs. 7,000

Parent's Income	*N*	*M*	*S. D.*	*t – value*	*Level of Significance*
Below Rs. 2,000	102	221.49	33.03	4.66	0.05
Above Rs. 7,000	91	241.37	26.48		

From the table, it is evident that t-value is significant at 0.05 level of significance. Therefore, it may be said that the above two groups do differ significantly in their environmental awareness. The mean score of students whose parent's income is in between 'above Rs. 7,000' is higher which shows that they have more environmental awareness.

From the table, it is evident that t-value is significant at 0.05 level of significance. Therefore, it may be said that the above two groups do differ significantly in their environmental awareness. The mean score of students whose parent's income is in between 'above Rs. 7,000' is higher which shows that they have more environmental awareness.

3. There is no significant difference between the environmental awareness scores of higher secondary students having parents in government service and private service. The findings of the study are as follows:

From the table, it is evident that t-value is significant at 0.05 level of significance. Therefore, it may be said that the above two groups do differ significantly in their environmental awareness. The mean score of students having parents in government service is higher which shows that they have more environmental awareness.

Therefore, the null hypothesis that course of study, parent's income, parent's occupation have no effect on environmental awareness of higher secondary students, are rejected at 0.05 level of significance.

(iii) Rs. 2,000 to below Rs. 4,500/ above Rs. 7,000

Parent's income	*N*	*M*	*S. D.*	*t- value*	*Level of Significance*
Rs. 2,000 to Below Rs. 4,500	101	232.53	24.96	2.58	0.05
Above Rs. 7,000	91	241.37	26.48		

Objective II

To study the relationship between the environmental awareness and scientific attitudes among higher secondary students.

H_{R3}: Environmental awareness has relationship with scientific attitudes among higher secondary students.

Environmental awareness and different dimensions or areas of scientific attitude were positively correlated and

Parent's Occupation	*N*	*M*	*S. D.*	*t- value*	*Level of Significance*
Government Service	190	238.33	25.89	4.57	0.05
Private Service	170	224.69	30.74		

significant at 0.05 level of significance. Coefficients of correlations between them were found as:

Environmental awareness/Aversion to superstition = 0.51582
Environmental awareness/Suspended judgement = 0.40380
Environmental awareness/Open-mindedness = 0.33653
Environmental awareness/Objectivity = 0.28972
Environmental awareness/Rationality = 0.24175
Environmental awareness/Curiosity = 0.12474

It was found that aversion to superstition, suspended judgement, open-mindedness, objectivity, rationality and curiosity were significantly related in sequence with environmental awareness. Hence, environmental awareness has significant relationship with aforesaid dimensions of scientific attitude of students.

Further, multiple regression analysis suggested six independent variables viz. aversion to superstition, suspended judgement, open mindedness, objectivity, rationality and curiosity combined in least square sense in the regression equation did in fact accounted for 33.09 % ($R = 0.5753$, $R^2 = 0.3309$) of the predicted variable, i. e., environmental awareness. It was significant at 0.05 level of significance.

Therefore, the null hypothesis that there is no relationship between the environmental awareness and scientific attitudes among higher secondary students is rejected at 0.05 level of significance.

The relationship between environmental awareness and different dimensions of scientific attitude could be studied with the regression equation in the form:

$$Y = 156.6346 + 0.1759\,X_1 + 1.2481\,X_2 - 0.4641\,X_3 + 0.4851\,X_4 + 3.6171\,X_5 + 2.2324\,X_6$$

Where,

Y = Predicted value of environmental awareness score.

X_1 = Curiosity
X_2 = Objectivity
X_3 = Open-mindedness
X_4 = Rationality
X_5 = Aversion to superstition
X_6 = Suspended judgement

Discussion of the Results

The findings of the study revealed that 33.09 % of environmental awareness may be attributed to the scientific attitude. Remaining portion of variance may be accounted for by other variables.

Out of various educational variables, only course of study is significantly related with environmental awareness and scientific attitude. Science group students are more aware to their environment as compared to arts group. This may be due to the fact that science subjects are more objective, rational and related to physical environment of the surroundings as compared to arts subjects.

Scientific attitude is a must for enhancing environmental awareness among the students. This fact has been emphasised by the finding that scientific attitude is higher among the students who have offered science as a subjects in their studies. Thus, it becomes imperative to include the elementary study of science specially related to environment, in the course of studies in the arts subjects.

Contributions of parent's occupation and income factors seem to be significant in the development of environmental awareness and scientific attitude as well, but the contribution of other demographic variables like age, religion, place of residence are insignificant. This naturally leads one to think that better the economic conditions of the family greater the environmental awareness and scientific attitude. In other words, poverty is detrimental to the maintenance of healthy environment and development of scientific attitude.

Thus, it appears that science education, parent's occupation and income are significantly related in the development of environmental awareness. Poverty is a significant cause of environmental pollution and anti-scientific outlooks.

About 33 % of the variance of environmental awareness may be accounted for the independent variables. Scientific attitudes, viz. aversion to superstition, suspended judgement, open-mindedness, objectivity, rationality and curiosity are important in the prediction of environmental awareness of higher secondary students. The environmental awareness is positively correlated with the scientific attitude of the students.

In the last, it may be concluded that science education, parent's occupation and income, aversion to superstition, open-mindedness, suspended judgement, objectivity, rationality and curiosity are potent factors for developing environmental awareness among higher secondary school.

Conclusions of the Study

On the basis of the findings of this study, it will be too ambitious to arrive at any definite conclusion. The findings of the study are revealing and indicating towards some conclusions. Environmental awareness has positive relationship with different dimensions of scientific attitude of higher secondary students. This means that students with better scientific attitude are more aware towards environmental awareness and vice-versa.

About 33.09 % of the environmental awareness scores of the students may be accounted for by the scientific attitude scores of higher secondary students.

It also indicates that higher secondary students of Varanasi city have developed a considerable amount of environmental awareness among themselves. Science students, students having parents belonging to high income group and students having parents in government service have developed more environmental awareness as compared to their counterparts in other groups.

Educational Implications of the Study

On the basis of a single study it will be bold to suggest some educational implications of the present study. However, on the basis of the findings of the study a few educational implications of the study may be indicated as follows:

(1) Educationist, educational administrators, and teachers must acquaint their pupil about pros and cons of environmental pollution.

(2) Formal system of education should also incorporate in its curriculum, some elements of environmental awareness programmes. This should be a compulsory part of the curriculum.

(3) With the help of various mass media and modern means of communication the concept of environmental and its protection should be published and popularised viz. news paper, radio, TV, film, etc.

(4) It would be more beneficial and effective if special programmes are launched to develop environmental awareness among the students. This is possible only through inclusion of special courses on environmental education in the schools.

(5) Value-oriented education in the light of environmental pollution and environmental awareness should be provided.

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