Chapter 4
Summary & Conclusions
Chapter -IV  

Summary and conclusions

4.1 Introduction

Today the delicate ecosystem of our earth is facing a danger of destruction on a large scale. In the name of development man has over exploited the natural resources and has polluted the environment. Several species of flora and fauna are already extinct from the surface of earth and many more are on the verge of extinction. Forests are decreasing at an alarming rate, land is losing its fertility, and world climate is changing due to global warming. The major components of the biosphere including the atmosphere, the ocean, soil cover, the climate system and the range of animal and plant species have all been altered by the intensity of human exploitation of the earth’s resources in the twentieth century. The problem is becoming worse due to ever expanding population of the world.

There are many campaigns for environment awareness and for banning activities that endanger environment. However, these are only external and superficial measures that do not get to the grass root level of the problems. The cry of the time is that we need to change the basic attitude of people towards the nature only than any step towards preserving the environment will become effective and here Environmental Education can play a very crucial role. The most comprehensive definition of Environmental Education has been given by IUCN/Commission of Education and Communication, CED, (1988) which states:

‘Environmental Education is a process in which individual gain awareness of their environment and acquire and exchange the knowledge, values, skills, experiences and also the determination which will enable them to act
individually and collectively to solve present and future environmental problems.” Environmental Education is a continuous, life-long process involving education about the environment, in the environment and for the environment.

Goal of Environmental Education as stated in Belgrade Charter: A Global Framework for EE (1976) is to develop world population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skills and attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

Many International Agencies such as UNESCO-UNEP (IEEP), IUCN, WWF, UNCED made many efforts to address EE issues through Conventions and Conferences like Tbilisi Conference. They emphasized the framework for actions through appeals, action plans, resolutions and declarations. They all regarded "Environment Education as a vehicle for change" and education can be achieved only with the joint efforts of different international agencies and realized the importance of a holistic approach to deal with environmental problems (IGES, 2001).

Overall impacts of International action in the field of EE and training since the Tbilisi Conference are as follows:

- The efforts have contributed in widespread awareness of the need for EE.
- It has helped in the formation of concepts and the working out of the methodological approaches in the field of EE.
- It facilitated the incorporation of an environmental dimension into the educational processes of the Member States.
Realizing the importance of Environmental Education, its activities gained momentum in different countries, under the leadership of International Environmental Education Program (IEEP), led by UNESCO of the United Nations Environment program (UNEP) after, a range of activities, including the collection, dissemination and exchange of information among institutions, publication of materials for use in the curriculum development, teacher education, study visits, demonstration project and the development of a pool of experienced resource persons to provide consultancy services to the member countries occurred during this time. The impacts of these activities resulted in the adoption of Environmental Education in formal, informal and non formal educational programmes. These activities included the development of curriculum guidelines and new teaching materials, the revision of syllabi to infuse an environmental perspectives, the adoption of whole school approaches to curriculum planning of EE and the establishment of specialized Environmental Education Centers (IGES, 2001).

In spite of instituting laws, policies and programmes a number of environmental challenges still prevail and concerted efforts are required to promote Environmental Education at all levels of education in order to sustain environment (MOES, 2003).

In India, in spite of the deteriorating status of the environment, study of Environment has not received so far adequate attention in our programmes. Recognizing this, the Hon’ble Supreme Court directed the UGC to introduce a basic course on environment at every level in college education. Accordingly, the matter was considered by UGC and it was decided that a six months compulsory core module course in Environmental Studies may be prepared and compulsorily implemented in all the University/ colleges of India.
The experts committee appointed by the UGC has framed the core module syllabus for Environmental Education for undergraduate classes.

The three universities namely, GNDU, Amritsar, Punjabi University, Patiala and the PU, Chandigarh are following the syllabus and the guidelines given by the UGC.

In the present evaluation study, ‘evaluation’ involves judging the existing status of Environmental Educational at undergraduate level, both in quantitative as well as qualitative terms. The present study tries to evaluate the stated objectives and the whole teaching learning process of Environmental Education undergoing at undergraduate level in the colleges under the three universities i.e. Guru Nanak Dev University, Amritsar, Panjab University, Chandigarh and Punjabi University, Patiala.

4.2 Emergence of the Problem

Review of the related literature highlighted that though EE has been integrated into the curricula in many countries and also in India, but still it is in evolutionary stage and needs to be planned and implemented in proper manner. The Supreme Court of India has made the teaching of EE compulsory at the undergraduate level but still the status of EE has not improved in Punjab. To know the status of teaching of EE we need detailed evaluation of the objectives, instructional methods, instructional materials and evaluation techniques etc. As very little work has been done regarding the evaluation of EE programmes in Punjab, therefore the researcher got interested in evaluating the Environmental Education at undergraduate level in Punjab.

4.3 Statement of the Problem

An Evaluative Study of Environmental Education at Undergraduate Level.
4.4 Defining the Statement

There is need to define various terms used in a statement as Whitney (1998) said “To define a problem means to put a fence around it, to separate by careful distinction.” Various terms used in the statement are defined as follows:

**Evaluation**

It means to ‘assess’ or ‘decide ‘the value of something. Evaluation is the systematic assessment of the worth or merit of some object, the word ‘object’ could refer to a programme, policy, technology, person, need, activity, and so on. The present evaluative study includes the complete study of teaching-learning process of Environmental Education followed by the colleges of the three Universities viz Guru Nanak Dev University, Amritsar; Punjabi University Patiala and Panjab University, Chandigarh at undergraduate level. It involves the objectives of Environmental Education, the content, text books, teaching methods, teaching-learning activities, the teacher and the evaluation techniques. The researcher has evaluated the course content of EE Programmes of the colleges under the three Universities through the perceptions of the principal, teachers and the students.

**Environmental Education** It is a comprehensive life long process. It includes the study of environment and the inter relationship between the human beings and natural system and their impact on each other. Environmental Education is an organized effort to teach about how human beings can manage their behaviors in order to live sustainably by maintaining a balance with the nature. Environmental Education aims to teach people about the natural world and particularly about ways in which ecosystem works. Environmental Education aims to change people’s perceptions about the value of natural world and to make man understand the impact of natural system on humans and human society. Environmental Education brings awareness about the environment and
its related issues. Environmental Education also brings changing in the attitude of an individual towards the environment.

**Undergraduate classes** – It includes the classes after (10+2) i.e. B.A., B.Sc., B.Com, BBA, BCA.

### 4.5 Objectives of the Study

The objectives of present study are given in three sections:

#### Section-I

1. To study the course content of Environmental Education programme in the three Universities viz, Guru Nanak Dev University, Amritsar; Punjabi University, Patiala and Panjab University, Chandigarh in the context of UGC guidelines.

2. To find out and compare the perceptions of principals in the colleges of the three Universities regarding the following; Objectives of EE; relevance of the subject; teachers teaching EE and evaluation techniques in the subject of Environmental Education at undergraduate level.

3. To find out and compare the perceptions of teachers teaching in the colleges of the three Universities regarding the following: objectives of EE; relevance of the subject; content; instructional materials; instructional methods; teaching learning activities; resources and evaluation techniques in the subject of Environmental Education at undergraduate level.

4. To find out and compare the perceptions of students studying in the colleges of the three Universities regarding the following: relevance of the subject; content; instruction materials; instruction methods; teachers teaching EE; teaching learning activities and evaluation techniques in the subject of Environmental Education at undergraduate level.
5(a). To find out the problems faced by the Principals regarding the subject EE in the colleges of the three Universities at undergraduate level.

5(b). To find out the problems faced by the teachers teaching the subject of EE in the colleges of the three Universities at undergraduate level.

5(c). To find out the problems faced by the students studying the subject of EE in the colleges of the three Universities at undergraduate level.

6. To find out the suggestion given by the principals, teachers and students of the colleges of the three universities for improving the teaching learning process of the subject of Environmental Education at undergraduate level.

Section-II

7. To compare the Environmental Awareness Questionnaire (EAQ) score of the students studying in the colleges of the three universities.

8. To compare the Environmental Awareness Questionnaire (EAQ) score of the students from the rural and urban colleges of the three universities.

9. To compare the Environmental Awareness Questionnaire (EAQ) score of female and male students studying in the colleges of the three universities.

Section-III

10. To compare the difference in the Pre-Post Test EAQ scores of the students studying in the colleges of Panjab University, Chandigarh.

11. To compare the difference in the environmental awareness of students in relation to their residence, gender and subject stream.

11(a). To find out the difference in the environmental awareness of students residing in rural and urban areas.

11(b). To find out the difference in the environmental awareness of female and male students.
11(c). To find out the difference in the environmental awareness of science, commerce and humanities students.

11(d). To study the interactional effect of gender and residence on the environmental awareness of students.

11(e). To study the interactional effect of gender and subject stream on the environmental awareness of students.

11(f). To study the interactional effect of residence and subject stream on the environmental awareness of students.

11(g). To study the interactional effect of gender, residence and subject stream on the environmental awareness of students.

12. To find out the difference in the Pre-Post test attitude scores of the students studying of Panjab University, Chandigarh.

13. To find out the difference in the attitudes of students towards environment in relation to their residence, gender and subject stream.

13a. To find out the difference in the attitude of students residing in rural and urban areas towards environment.

13b. To find out the difference in the attitude of female and male students towards environment.

13c. To find out the difference in the attitude of science, commerce and humanities students towards environment.

13d. To study the interactional effect of gender and residence on the attitude of students towards environment.

13e. To study the interactional effect of gender and subject stream on the attitude of students towards environment.

13f. To study the interactional effect of residence and subject stream on the attitude of students towards environment.

13g. To study the interactional effect of gender, residence and subject stream on the attitude of students towards environment.
14. To find out the correlation between the attitude towards environment and environmental awareness.

1.14 Hypotheses of the Study

1. There is no significant difference in the perceptions of principles of the colleges of the three Universities regarding the following; Objective of EE; Relevance of the Subject; Teachers Teaching EE and Evaluation techniques followed in the Environmental Education at undergraduate level.

2. There is no significant difference in the perceptions of teachers teaching EE in the college of the three Universities regarding the following: objectives of EE; relevance of the subject; content; instructional materials; instructional methods; teaching learning activities; resources and evaluation techniques in the subject of Environmental Education at undergraduate level.

3. There is no significant difference in the perceptions of students studying in the college of the three Universities regarding the objectives; relevance of the subject; content; instructional material; instructional method; teaching learning activities; resources and evaluation procedure of the subject of Environmental Education at undergraduate level.

4. There is no significant difference in the Environmental Awareness Questionnaire (EAQ) scores of students studying in the colleges of the three universities.

5. There is no significant difference in Environmental Awareness Questionnaire (EAQ) scores of students from rural and urban colleges of the three universities.

6. There is no significant difference in Environmental Awareness Questionnaire (EAQ) scores of female and male students studying in the colleges of the three Universities at undergraduate level.
7. There is no significant difference in the Pre-Post test EAQ scores of the students studying in the colleges of Panjab University, Chandigarh.

8. There is no significant difference in the environmental awareness of students in relation to their residence, gender and the subject stream.

8a. There is no significant difference in the environmental awareness of students residing in rural and urban areas.

8b. There is no significant difference in the environmental awareness of female and male students.

8c. There is no significant difference in the environmental awareness of science, commerce and humanities students.

8d. There is no significant interactional effect of gender and residence on the environmental awareness of students.

8e. There is no significant Interactional effect of gender and subject stream on the environmental awareness of students.

8f. There is no significant interactional effect of residence and subject stream on environmental awareness of students.

8g. There is no significant interactional effect of gender, residence and subject on the environmental awareness of students.

9. There is no significant difference in the Pre-Post test attitudes scores of the students studying in the colleges of Panjab University, Chandigarh.

10. There is no significant difference in the attitude of students in relation to their residence, gender and the subject.

10a. There is no significant difference in the attitude of students residing in rural and urban areas towards environment.

10b. There is no significant in the attitude of female and male students towards environment.

10c. There is no significant difference in the attitude of science, commerce and humanities students towards environment.
10d. There is no significant interactional effect of gender and residence on the attitude of students towards environment.

10e. There is no significant interactional effect of gender and subject stream on the attitude of students towards environment.

10f. There is no significant interactional effect of residence and subject stream on attitude of students towards environment.

10g. There is no significant interactional effect of gender, residence and subject stream on the attitude of students towards environment.

11. There is no positive correlation between the attitude towards environment and environmental awareness of students.

4.7 Delimitation of the Study

(1) The area of the study is delimited to undergraduate colleges affiliated to Panjab University, Chandigarh; Guru Nanak Dev University, Amritsar and Punjabi university, Patiala.

(2) The study is delimited to the Principals of the colleges, the teacher teaching the subject of Environmental Education and the students studying the subject of Environmental Education at undergraduate level.

(3) The study is limited to degree colleges only.

4.8 Design of the study

Descriptive Survey method was employed for the present study. This method is concerned with surveying, describing and investigating the existing phenomenon or issues, conditions and relationships that exists. The purpose of the study was to evaluate Environmental Education at undergraduate level; therefore descriptive survey method was used to undertake the study. To study the effect of residence, gender and subject on environmental awareness and
attitudes towards environment a 2x2x3 Factorial Design was used. The variables of residence, gender and the subject were the independent variables whereas the environmental awareness and attitude towards environment constituted the dependent variables. The independent variable of residence was varied at two levels – rural and urban. The variable of gender was varied at two levels – male and female. The variable of subject was varied at three levels – science, commerce and arts.

4.9 Sample

The population of the sample consisted of principals, teachers and students of the colleges under Panjab University, Chandigarh Guru Nanak Dev University, Chandigarh and Punjabi University, Patiala.

Stratified random sampling technique was employed for the selection of the sample. To study the perception of the principal, teachers and the students regarding different aspects of EE, 60 principals, 60 teachers and 600 students (300 Male and 300 Female) were drawn from the rural and urban colleges of the three Universities.

To study the difference in the EAQ scores of the rural and urban college students as well as male and female students, a sample of 600 (300 rural and 300 urban) was drawn from the colleges of the three universities was constituted in which 300 were female students and 300 were male students.

To test the difference in the environmental awareness (EAQ scores) and attitude towards environment (TEAS scores) of the students after studying EE, sample of 300 students was drawn from five randomly selected colleges of Chandigarh affiliated to Panjab University, Chandigarh. The sample of the students for studying the difference in environment awareness and attitude towards environment after studying the subject of EE was distinguished as rural and
urban on the basis of the residence of the students. The students were categorized as science, commerce and arts student on the basis of the stream the student has taken at the undergraduate level. The sample of the students was taken from the first year of the undergraduate class.

4.10. Tool Used:

To measure the required dimensions of the study the researcher herself prepared different types of tools. The following tools were used:

1. Questionnaire for the principals
2. Questionnaire for the teachers
3. Questionnaire for the students
5. An Environmental Awareness Questionnaire (EAQ) developed by the investigator
6. Taj Environmental Attitude Scale (TEAS) developed by Taj (2001)

Along with the questionnaire wherever necessary, interviews were conducted with different categories of respondents, for clarifying their doubts, for answering their queries, as well as to elicit additional responds.

4.11. Data collection

To avoid the danger of distorted data the investigator preferred to contact the respondents personally. The personal contact provided the researcher an opportunity to have correct answers by explaining various questions in detail, wherever the respondent was unable to comprehend. Although this process of collection of data led to many difficulties and was quite time consuming yet the data obtained could be claimed to have a greater degree of accuracy, precision and free from biases.
4.12. Statistical Techniques used

In the present study different statistical techniques were employed to analyse the data keeping in view the objectives and hypotheses. The following statistical techniques were used for analysis of data:

1. Statistical techniques were used like counting of frequencies, calculating percentages of principals, teachers and students’ perceptions with regard to various aspects of EE at undergraduate level. Chi-square values were calculated to find out significance of differences between perceptions of teachers, students and principles of the three universities regarding different aspects of EE.

To study differences the EAQ scores and attitude scores of the student t-test and ANOVA was used.

2. Descriptive statistics such as mean, median, mode standard deviation, skewness and Kurtosis were worked out to study ascertain the nature of distribution of scores on the variable of environmental awareness and attitude of students towards environment.

3. Analysis of variance was employed to study the main effects and interaction effects.

4. Pearson’s Product Moment method was used to compute inter-correlation among the variables.

4.13 Major Findings and conclusions

Based on the findings of the Evaluative study of Environmental Education at undergraduate level, the following conclusions can be drawn:

4.13.1. Conclusions regarding course content of the Environmental Education programmes of the three universities
1. The experts committee appointed by the UGC has framed the core module syllabus for Environmental Education for undergraduate courses of all branches of Higher Education.

2. The core Module Syllabus for Environment Education includes class room teaching and Field Work. The syllabus is divided into eight units covering 50 lectures. The first seven units will cover 45 lectures which are class room based to enhance knowledge skills and attitude to environment. Unit eight is based on field activities, which will be covered in five lecture hours and would provide student first hand knowledge on various local environmental aspects.

3. Panjab University was the first university in India to start the EE in colleges affiliated to the university after the ruling of Supreme Court of India which was passed in 1991.

4. The Panjab university has framed its own syllabus on the guidelines prescribed by UGC and is not following the exactly following the syllabus prescribed by UGC.

5. The PU has included 15 topics in its syllabus to be covered in 25 hour lectures.

6. Examination pattern followed by PU is also different from the guidelines of UGC.

7. The examination paper of EE is of 50 marks consisting of Fifty multiple choice questions. All questions are compulsory and the qualifying mark is 33%(17 marks out of 50)

8. PU has not included any field work in its syllabus as prescribed by UGC.
9. Punjabi University, Patiala started the teaching of EE in colleges affiliated to the university in 2009. EE was introduced in the first year of all the undergraduate classes. The syllabus and guidelines of UGC was followed by the colleges affiliated to the university. In the year 2010 the university decided to start the course in second year of the undergraduate classes so this year EE is not being taught in the colleges affiliated to Punjabi University.

10. Punjabi university is completely following the syllabus and examination pattern prescribed by the UGC. The syllabus includes 75 marks theory and 25 marks of field visits. Total 50 lectures are allotted for teaching of EE.

11. GNDU, Amritsar started the subject of EE in colleges affiliated with the university after the Hon’ble Supreme Court of India made the teaching of EE compulsory in all the colleges. The syllabus and guidelines of the UGC was followed by the colleges affiliated to the university.

12. GNDU is completely following the syllabus and examination pattern prescribed by the UGC. The syllabus includes 75 marks theory and 25 marks of field visits. Total 50 lectures are allotted for teaching of EE.

13. The examination paper of EE in case of GNDU and Punjabi University is subjective type and carries 75 marks.

4.13.2. Conclusions regarding the personal characteristics of the teachers teaching EE in the colleges of the three universities.

1. Majority (56.6%) of the teachers teaching EE lies in the age group of 20-30 years.

2. Majority (85%) of female teachers were teaching EE in the colleges of the three universities.
3. Comparatively greater percentage (43%) of teachers are from humanities stream. Only 11.6% teachers teaching EE are postgraduate in Environmental Sciences and 40% teachers are from science stream.

4. Majority (53.3%) of the teachers teaching EE are working on adhoc basis in the colleges of the three universities. 40% teachers teaching EE are regular whereas 6.6% teachers are kept as Guest faculty.

4.13.3. Conclusions regarding the different aspects of Environmental Education being followed in the colleges of the three universities

Objectives of EE

The principals do not differ regarding the objectives of the EE and all the principals at the three universities agreed with the three statements that objectives of EE are (i) (a) clearly stated (b) attainable and (c) satisfactory

Majority of (62%) the principals agreed that the objectives are not achieved above 50% which indicate low level of achievement of objectives of EE in the colleges.

The perceptions of the teachers of the three universities differed regarding the objectives of EE and majority of the teachers agreed that the objectives of the UGC are clearly stated, appropriate and attainable.

The teachers of the three universities differed in their perceptions regarding the extent of achievement of objectives and majority (85%) of the teachers felt that the objectives of EE are partially achieved (40%-60%).

Relevance of the subject

The principals of all the colleges agreed that the SC court ruling for making the teaching of EE compulsory at undergraduate level is appropriate and EE
definitely gives awareness about the environment to the students but it should not be forced on the students rather it should be opted out by choice.

71.67% of the principals of the universities opined that EE should be taught as separate subject like other subjects studied by the students but it should not be made compulsory for all the students to study.

Comparatively more percentage of urban college principals favoured teaching of EE at school level than rural college principals.

Majority of the teachers (76.6%) agreed that EE should be included as a compulsory subject but they suggested that it should be taught as a separate subject like other subjects opted as choice of the students not as a compulsory burden on the students.

Majority of the teachers agreed that due importance is given to subject of EE by Principals (98.0%) and teachers (96.0%) but not by students (50%) and administration.

The teachers of the three universities differed in their perceptions regarding the relevance of EE and majority of the teachers agreed that EE gives awareness to students about environment (95%), brings change in attitude towards environment (80%) and make the student concerned for environment conservation (88.3%).

Majority of the students (72% to 79%) agreed that the inclusion of the compulsory subject of EE is a right decision (72.5%), need of the present time (79.5%) and best way of creating awareness about the environment (79.97%).

Significantly higher percentages of the students (56.7%) want EE to be taught at school level.
Majority of the students (74.5%) wanted EE to be taught as separate subject like other subjects but it should not be made compulsory for all the students to study.

The students knew the relevance of EE and majority (69%-100%) of them agreed that EE gives awareness about the environment (100%), has brought change in their attitudes (69%) and has increased their concern for the environment (68.3%).

Content

The teachers of the three universities differed in their perceptions regarding syllabus of EE. The teachers of the three universities mostly agreed (66.7%) that the syllabus of EE is in concurrence with the objectives of UGC, is comprehensive (76.7%), interesting(61.7%) and relevant to current environmental issues (90%). Significantly greater percentage (53.4%) of the teachers disagreed that the syllabus of EE gives awareness about the local issues to the students .The researcher also found that syllabus followed by PU is different than syllabus followed by GNDU and Punjabi University.

The students of the three universities differed in their perceptions regarding the syllabus of EE as the chi square values were significant at .05 level. The students of the three universities agreed that the syllabus of EE gives awareness about the environment (72.1%) ,is interesting(70.3%) and relevant in present context(67.5%) but disagreed that the syllabus gives awareness about local issues(51.8%).

Majority of teachers (55%) differed in their perceptions regarding completion of the syllabus of EE in the allotted lectures. Majority of the teachers disagreed that the syllabus of EE can be easily in the allotted period.

The teachers told the researcher that though they complete the syllabus in time but they could not teach it properly in limited number of lectures. PU teachers
told the researcher that it is not possible to teach the syllabus in 25 lectures as allotted by PU.

Regarding the practical component in the syllabus all the GNDU and Punjabi university teachers agreed that the practical part gets covered in the allotted lectures.

GNDU and Punjabi University are following the same syllabus of EE in which the theory is of 75 marks and 25 marks are for the field work or the practical work. In the field work the students are supposed to prepare a report of visit to any river, forest, local polluted sites, study of common plants etc. 5 lectures are allotted by UGC for the field work. The field work is internally evaluated by the teachers.

PU do not have any practical component in its syllabus.

Changes in the content

All the teachers of the three universities equally agreed on the statement that the syllabus of EE need change. Though the teachers of the three universities mostly agreed that the syllabus of EE is in concurrence with the objectives of UGC, is comprehensive, interesting and relevant to current environmental issues but they felt that the syllabus lacks interdisciplinary approach and is more theoretical in nature. EE is a practical subject so major part of the syllabus should be the practical component.

The changes suggested by teachers in the syllabus includes practical component to be added to the syllabus, Local issues to be added to the content., Topics like health and diseases, Hygiene, food adulteration, etc should be added to the content. The teachers told the researcher that there is lack of holistic approach in syllabus of environmental concepts into real life experiences, The content of EE lacks information on systematic lifestyles and what individuals should do
and should not do for the conservation of environment through their personal daily activities.

Significantly greater percentage of students (46%) wanted change in the syllabus whereas 40% students do not want change in the syllabus. 13.7% students were not sure about the change in the syllabus of EE.

The changes suggested by the students was practical component to be added, local – specific issues to be added, topics like food adulteration, diseases, HIV-AIDS, Health – Related issues, wild life and its conservation, agricultural practices and daily routine activities helpful in conserving the environment etc should be added. The students want the syllabus to be activity oriented and practical in nature.

The topics liked by the students include Pollution, Global warming, Bio-Diversity, Ozone Depletion and types of Pollution.

**Instructional material**

The teachers of the three universities differed in their perceptions regarding availability of the text books. Majority of the teachers agreed that the textbooks in EE were available in the college library (86.7%), markets (91.7%) and were in the regional languages (93.3%) and were also according to the prescribed syllabus (91.7%).

Majority of the teachers (60-63%) agreed that the textbooks were good with regard to vocabulary (63.3%) and printing (60%) but the teachers opined that the textbooks were not upto the mark with regard to the content (55%) and illustrations (51.6%) in the books.
The students of the three universities significantly differed in their perceptions with regard to textbooks of EE as the chi square values were significant on the statements related to the textbooks of EE. Majority of students agreed (78.8%) that the textbooks were easily available in the market and college library (&&%), were according to the prescribed syllabus(76.2%) and covers the theory part completely(100%). Significantly more percentage of the students (58.8%) were not satisfied with the quality of the textbooks available. The textbooks also need to cover the practical part in the EE.

Greater percentage of teachers (53.3%) agreed for change in the textbooks.

The changes suggested by the teachers in the textbooks include, more detailed explanation of content, more illustrations, more pictures, inclusion of practical component of the syllabus and spelling mistakes to be avoided.

Significantly greater percentage (31.2%) of students favoured change in the textbooks. The changes suggested by the teachers in the textbooks include, more detailed explanation of content, more illustrations, more pictures, inclusion of practical component of the syllabus and spelling mistakes to be avoided.

Majority of the students (81.6%) of the three universities preferred Indian authors in comparison to foreign authors (1.6%) as they find the language of books of Indian authors simple to understand and the books are also available in the library and the markets.

The students differed in their perceptions regarding the availability of environment related books in the library and greater percentage of the students (58.3%) are not even aware of the environment related magazines in the college library.
**Reference material**

The teachers of the three universities differed in their perceptions regarding the availability of the reference material in the market and the college library. Majority of the teachers (68.3%) agreed that the reference material is easily available in the market and college library. The teachers also agreed for encouraging the students to consult internet services for EE.

The students differed in their perceptions with regard to the use of reference or instructional material other than the textbooks in the subject of EE. The students were not using any reference books or reference material except the book prescribed by their teacher.

**Use of AV aids**

Majority (76.6%) of the teachers of the colleges of the three Universities were not using AV aids in teaching of EE.

Significantly lesser percentage of rural teachers were not using any AV aids in teaching if EE. The teachers gave the reasons for not using AV aids as lack of time, overcrowded classes and lack of resources. The teachers told the researcher that they have very hectic schedule and they are left with no time and energy to use the AV aids in the class.

The students differed in their perceptions regarding the use of AV aids by their teachers and majority of the student (90%) opined that the teachers are not using AV aids in teaching of EE.

Majority (90%) of the students agreed that their teachers are not using any AV aids for teaching EE. The reasons the students gave for the teachers not using the AV aids were Lack of time, Overcrowded classes, Overburdened teachers, Lack of seriousness among teachers for the subject, Non-availability of AV Aids and Financial constraints.
Instructional Methods

The teachers do not differ in their perception regarding the use of different instructional methods. The perceptions of the teachers were different for only two instructional methods namely problem solving method and the inquiry method.

Lecture method (100%) and discussion method (66.6%) was mostly used by the teachers for teaching EE whereas demonstration method, activity method, field trip method, project method, problem solving method, assignment method and inquiry method are rarely used by the teachers for teaching EE. Use of Demonstration method ranged from rarely (83.3%) to mostly (3.3%). The use of activity method (78.3% to 21.6%), field trip method (93.3%-6.6%), project method (83.3% to 16.6%) assignment method (90% to 10%) ranged from rarely to sometimes. The teachers gave the reason for not using different methods as overcrowded classes, time limitations and lack of required resources.

The perceptions of the students of the three universities were not completely different from each other with regard to the instructional methods used by their teachers in teaching EE as chi square values were significant for only three instructional methods (demonstration method, activity method and project method) and non significant for one instructional method (Discussion method). For the remaining six methods (Lecture, Lecture cum discussion, field trip, assignment, problem solving and inquiry method) chi square was not applicable.

The findings of the perceptions of the students regarding the use of different methods by the teachers contradict the perceptions of teachers regarding the use of different methods. As perceived by teachers the usage of activity method (78.3% to 21.6%), field trip method (93.3%-6.6%), project method (83.3% to 16.6%) assignment method (90% to 10%) ranged from rarely to sometimes, whereas usage of problem solving method varied from rarely

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(76.6%) to sometimes(16.6%) for PU teachers but the students told the researcher that activity method, field trip method, assignment method problem solving method and inquiry method are rarely used by the teachers.

**Period of EE in the time table**

The researcher found that due importance was not given to the period of EE as was given to other subjects in the time table as a result the students also does not take the period seriously.

The teachers of the three universities differ in the number of lectures allotted for EE. GNDU and Punjabi University have allotted 50 lectures for teaching of EE whereas PU has allotted only 25 lectures. The researcher found that in many of the PU colleges the teachers were taking only 5-10 lectures and completing the syllabus within that period.

**Field Visits**

Majority (83.3%) of teachers disagreed that they took the students to field visits. Only 16.6% teachers agreed that they take students on field visits. The findings of the researcher shows that though the subject of EE is about the environment but the students are not being given any exposure or experience of the environment. The subject of EE is only being taught in the four walls of the classrooms.

The teachers gave the reasons for not taking the students on field visits as lack of time, overcrowded classes, lack of funds

Majority (90.6%) of the students disagreed that field trips are organized by the teachers. Significantly greater percentage of GNDU students agreed that Field trips were organized by teachers.
Chi square was significant for three places namely botanical garden, industry and cultural sites which shows that students differed in their perceptions regarding visit to these places. 2% GNDU students and 1.3% PU students have visited the botanical garden whereas only 0.6% Punjabi university students have visited some industry. Chi square values were non significant regarding visit to zoo and local places. Only 0.6% PU students agreed for visiting the zoo. Regarding the visit to local places 96.3% students agreed that they have been taken on a visit to local places like vermicompost units, rivers etc..

Relevance of field visits

All rural and urban college teachers of the three Universities agreed on relevance of field visits to EE. All rural and urban college teacher of the three universities agreed that field visits improves the environmental awareness and attitudes towards environment.

All rural and urban college teachers of the three universities agreed that field visits supplement curriculum with real experience of outdoor environment and helps in understanding role of EE in understanding environment. 68.3% teachers agreed that EE helps in interdisciplinary learning.

Field work/Project Work

Only GNDU and Punjabi University colleges teachers are giving field work/project work to students as it is in the syllabus. PU colleges teachers are not giving any field work/project to students as it is not in the syllabus.

Similarly the students of colleges of the GNDU and Punjabi University, Patiala agreed that they were given field work as it is in their syllabus. The field work carries 25 marks and is internally evaluated by teachers of the College and grades are allotted to students.

The PU, Chandigarh, have not included field work in their syllabus.
The students of all the universities strongly agreed that field work is useful for the subject of EE as it gives first hand experience of the environment.

**Teacher**

80% of the principals said that the teachers teaching EE in the colleges are not postgraduate in environmental science

Mostly adhoc (66.67%) teachers are teaching EE in rural as well as in urban colleges. In majority of the colleges the teaching of EE was given to those teachers who were less experienced (freshers) or who were kept on adhoc basis because no honorarium was paid for taking extra classes of EE, therefore senior and experienced teachers refused to take extra period of EE.

The perceptions of the students differed regarding the teachers teaching EE

190(31.6%) Punjabi University, 170(28.3%) GNDU and 150(25%) PU students of urban and rural disagreed that the teachers of EE are qualified in Environmental Sciences.

Comparatively rural college student of all Universities disagreed more than urban college students with regard to qualification of the teachers in Environmental Sciences.

83.3% students agreed that teacher cover the theory part completely whereas 16.6% students disagreed with the statement. 150(25%) Panjab University, 140(23.3%) GNDU and 120(20%) Punjabi University students of urban and rural colleges agreed that teachers complete the allotted lectures for teaching EE by the University.

Majority of the students (75%) find their teacher competent and agreed that the teachers completed the allotted lectures and also completed the syllabus but
majority (85%) of the students disagreed that the teachers for teaching EE are qualified in environmental sciences.

**Honorarium**

Principals of the three universities gave different opinion regarding paying honorarium to teachers for teaching EE. Principals of the colleges of PU agreed that honorarium is paid the teachers for teaching EE whereas all the principals of GNDU and Punjabi university disagreed that any honorarium is paid to the teachers. The teachers working in the colleges affiliated to GNDU and Panjabi university were not paid any honorarium for teaching EE. Only the teachers of PU affiliated colleges were paid honorarium for teaching EE. They were paid Rs.250/ for a period.

The teachers of GNDU and Punjabi university were not getting any honorarium for teaching EE and so what justice they will do with the subject which they consider as an additional burden.

The GNDU and Punjabi University teachers told the researcher that they were already taking 25-30 periods per week for teaching their own subjects and teaching of EE (mostly 3-4 Periods per week) is an additional burden on them, that too without any honorarium. The teachers also said that when the extra period of teaching EE was given to them they were told to be paid Rs.250/- per period but it was never paid.

Teacher of the three universities gave different opinion regarding honorarium is being paid for teaching EE. Only teachers of Panjab University agreed that honorarium is paid for Environment Education where teachers of GNDU and Punjabi university disagreed that honorarium is paid for teaching EE.
Teaching Learning Activities

All rural and urban college teachers of the three universities agreed that they organize environment related activities in the college.

Chi square values were found significant for the two activities, Awareness rallies and poster making competitions. The teacher of the three universities gave different opinion regarding these activities.

Only 6.6% PU teachers agreed of organizing awareness rallies, whereas only 3.3% GNDU and 13.3% PU teachers agreed for organizing poster making competitions.

For other activities which include Quiz competitions, seminars/extension lectures and tree plantation drives the chi square values were not found significant.

For all activities urban college teachers agreed more in comparison to rural college teachers in organizing environment related activities in the college.

The teachers of the three universities gave lack of time, overcrowded classes, lack of funds, lack of interest in students and overburdened teachers as the reasons for not organizing environment related activities in the college.

Students of urban and rural colleges of the three Universities also agreed equally on the statement that environment related activities are organized by the teachers in the college.

The perceptions of students of the three universities significantly differed regarding the environmental related activities organized in the colleges. Significantly Panjab university students agreed more with regard to organization of different environment related activities in the colleges whereas Punjabi
University colleges students disagreed more with regard to environment related activities being organized in the colleges.

Also, significantly greater percentage of urban college students agreed for the organizing of different activities by the teachers in the college than rural college students. The perceptions of the students were taken for the different activities organized in the college on environment related themes.

**Bulletin Board**

Majority (80%) of the teachers disagreed that there is bulletin board for displaying EE news and environmental related articles 170(28.3%) of GNDU, 160 (26.6%) Punjabi University and 160(26.6%) PU students of urban and rural colleges disagreed that there is provision of bulletin board in the colleges. 3.3% GNDU, 6.6% Punjabi University and 5% PU students were not sure about the provision of bulletin board in the college.

**Eco Club**

Majority (61.6%) of the teachers disagreed that the college has an Eco Club.

The researcher was surprised to find that some teachers (10%) were not even sure about the college having an Eco Club.

Majority (90%) of the students disagreed regarding the presence of Eco-Club in the college.

PU University agreed of Eco Club in the college, but majority of them were not sure about the name of the Eco- Club.
Resources

Human resources

Majority of the teachers opined that the colleges do not have adequate teachers (70%) and supporting staff (86.6%) for EE.

All the teacher of the three universities equally agreed that degree of utilization of teachers was quite high 80-100%.

26.6% of Panjab University colleges teachers and 16.6% GNDU opined that the utilization of supporting staff was 0-20% and 16.6% PU colleges teachers reported their utilization between 20-40%.

Thus it can be seen that utilization of supporting staff need to be enhanced.

Majority of the teachers opined that the competence of the human resources (teachers and the supporting staff) in the colleges is not satisfactory and need to be improved to improve the status of EE.

Majority (70%) of the teachers have not attended any seminar, workshops or refresher course related to environment. Thus, it can be concluded that majority of teachers have no training for teaching EE.

Mostly the teachers (53.3%) rated the relevance of the seminars/ workshops and refresher courses attended at 5-6 scale.

The teachers found the seminars, workshops or refresher courses related to environment relevant. Teacher in the colleges three Universities agreed on the usefulness of skills learned to teach EE during these seminars and refresher courses. 80% of the teachers said that the degree of utilization of skill acquired is 40%-60%.
Physical resources

Majority (63.3%) of the teachers the college building was adequate whereas the classrooms (39.8%), playgrounds/Lawns (63.3%) and the laboratories (39.6%) were partially adequate.

Urban college teachers of three universities the utilization of the college building and classrooms was between 80-100% while with regard to the utilization of playground lawns and the laboratories the teachers perceptions were between 0-20%. According to rural and urban college teachers of the three Universities the degree of utilization of colleges building and classroom was between 80% -100% and 0%-20% for playground/ lawns and laboratories.

It can be concluded that though EE is a practical subject which should not be taught in four walls of the classroom but the findings of the researcher shows that the physical resources which include the playground/lawns and the laboratories are not fully utilized by the teachers.

Majority of (30-60%) of the teachers were of the opinion that the quality of the physical resources available in the colleges was good.

The teachers of the three universities have same perceptions regarding the adequacy of the information resources. Majority of the teachers rated the library resources (68.3%) and the computers (61.6%) were inadequate. The researcher found that in many of the colleges computers were present but they were not in working conditions and are lying.

Perceptions of rural and urban college teachers of the three universities varied between 0-20%(86.6%) and 20-40%(13.3) degree of utilization for library resources and 0-20% (68.3%) to 40-60%(11.6%) degree of utilization for Computer facility.
Most of the libraries were also not having environment related books and magazines. The researcher was also surprised to find out that majority of the teachers were not computer literate and could not work on computers.

The utilization of information resources is not satisfactory in the colleges regarding the subject of EE.

According to 53.3% rural and urban college teachers, the quality of library was satisfactory. In case of computers 55% felt that the computers of good quality whereas 36.6% teachers felt the computers are of satisfactory quality.

Majority (65%) of the teachers felt that financial resources are inadequate and their degree of utilization is from 20%-100%.

**Evaluation techniques**

The perceptions of the teachers differed regarding the evaluation techniques used by them in evaluating the performance of the students in the subject of EE. Significantly greater percentage of the teachers used oral test (68.3%) more in comparison to the written test (53.3%). Field work evaluation was done only by the GNDU and Punjabi University colleges teachers as it is not in the syllabus of PU.

The perceptions of majority of the students were significantly different regarding the evaluation procedure followed by teachers in the subject of EE. chi square values were significant for oral test and field work evaluation whereas chi square values were non significant for written test at 0.05 level. The students opined that teachers preferred oral test (68.3%) more in comparison to the written test (53.3%) for evaluating the performance of students in EE.

The perceptions of the students of the universities differed with regard to the preference of the evaluation procedure as the chi square values are significant for all the four evaluation methods (Written test, oral test, field work evaluation
and assignment method) with regard to the preference of the students at 0.05 level. Majority of the students preferred written test (83.3%) and field work evaluation (81.6%) as methods of evaluation.

Significantly greater percentage of students (96.7%) agreed for mixed pattern of evaluation which involves both objective and subjective type of questions

**Change in evaluation techniques**

The perceptions of the principals differed regarding the evaluation procedure of EE and significantly greater percentage (30.0%) of PU principals opined for change in evaluation procedure whereas GNDU (31.6%) and Punjabi University principals (33.3%) are satisfied with the existing evaluation procedure.

The teachers differed regarding satisfaction with the evaluation procedure as the chi square value is significant at .05 level and majority (61.6%) of them opined for change in the evaluation procedure.

The teachers suggested that uniform pattern of evaluation should be followed by the three universities. Marks of EE should be added to final score of students and practical component to be added. The teachers suggested that EE paper should be mixed type (Subjective & objective)

The students differed in their perceptions regarding their satisfaction with the methods of evaluation followed by their respective universities. Majority of the GNDU (26.6%) and Punjabi university (33.3%) students were satisfied with the evaluation procedure than PU students (8.3%) whereas greater percentage of PU (68.3%) students wanted change in the evaluation procedure.

The changes suggested by the students of the three universities include same pattern of evaluation to be followed by all the universities, mixed type of paper
having both subjective and objective type of questions), addition of practical component along with theory and marks of EE should be added to the final score only then the students will take it seriously. Some students told the researcher that their performance was very good in EE, but it did not give any benefit to them in their total scores over others so why to work on this subject. Uniform pattern of evaluation should be followed by the three universities.

**Status of EE in the colleges**

20.0% GNDU, 23.3% Punjabi University and 10% PU college’s principals were 40%-60% satisfied with teaching of EE in the college whereas 11.6% GNDU, 10% Punjabi University and 10% PU principals gave 60%-80% level of satisfaction.

Greater percentage of the teachers (50%) was 40%-60% satisfied with teaching of EE in the colleges whereas 36.6% teachers were 20-40% satisfied. Comparatively PU teachers are more satisfied with their teaching of EE than GNDU and Punjabi university teachers.

**4.13.4. Conclusions on the basis of analysis of EAQ scores and attitude scores of the students**

1. The students studying in the colleges of PU have more environmental awareness than the students studying in the colleges of GNDU and Punjabi University students.
2. Students from urban colleges of the three universities possessed more environmental awareness in comparison to the rural college students of the three universities.
3. Female students studying in the colleges of the three Universities have higher environmental awareness than the male students studying in the colleges of the three universities.
4. The students showed more environmental awareness after studying the subject of EE at undergraduate level as there post test EAQ scores were higher than pre test scores. Thus after studying the subject of EE the students have gained more environmental awareness.

5. Students from urban areas possessed higher environmental awareness in comparison to the students from rural area.

6. Sciences students have more environmental awareness than commerce and humanities students.

7. Urban female students have more environmental awareness than the rural female students.

8. Rural and urban male students do not differ in their environmental awareness.

9. Female Science students have more environmental awareness than males science students.

10. Male and female students from commerce and humanities stream do not have significant difference in their environmental awareness.

11. Rural and Urban Science students do not have significant different in their environmental awareness.

12. Commerce and humanities streams have more significant effect on environmental awareness of urban students than rural students.

13. The attitude of students have become more favourable towards the environment after studying the subject of Environmental Education as the post test attitude scores of the students studying in the colleges of PU was more than pre test attitude scores.

14. Female students have more positive attitude towards environment than male students.

15. Science students have more positive attitudes towards environment than commerce and humanities students.
16. There is no significant difference in attitudes of rural and urban male students of PU, Chandigarh towards the environment.

17. There is no significant difference in the attitudes of rural and urban female students towards environment.

18. Female science students and female humanities students have more favourable attitudes towards environment than male science students and male humanities students.

19. Environmental awareness and attitude toward environment are correlated to each other. The students who have higher environmental awareness have more favourable attitude towards environment.

4.13.5 Findings of the researcher regarding the course content of EE programmes in the colleges of the three universities through personal observation.

1. The principals and the teachers were not fully aware of the objectives of EE prescribed by UGC.

2. The principals of the colleges were not ready to respond and it was after great effort that the researcher was able to collect data from them.

3. The teachers and the students were ready to respond and gave their perceptions regarding the different aspects of EE.

4. The principals and the teachers agreed in the questionnaire that EE should be included at the undergraduate level but they personally felt that the students are already overburdened with their own disciplinary choice and an additional subject of EE will only increase their burden.

5. The content of EE taught in the colleges was only theoretical and no practical work is being carried out in the subject.
6. Majority of the teachers teaching EE were not qualified in environment sciences and most of them were from humanities stream particularly in colleges of Punjab University, Patiala.

7. The teachers teaching EE from humanities stream were not clear about many technical terms related with environment like ecosystem, biomes, non-biodegradable wastes etc.

8. The humanities teacher were not very comfortable in teaching EE as they felt that it a science subject and teachers from science background or qualified in environmental sciences should teach it.

9. The teachers were mainly using lecture method in the classroom teaching. Other relevant methods for EE like field visits, problem solving, inquiry method etc. were not used by the teachers.

10. The teachers were not using any AV aids in the teaching of the subject.

11. The teachers were generally using text books as the instructional material. Generally they are following only one book and do not refer to other books related to EE.

12. The teachers and the students were not using the library and computer (internet services) for the subject of EE.

13. The period of EE was not fixed in the time table and kept on shifting the whole session.

14. The researcher found that though the teachers said that they completed the allotted lectures for the subject of EE as prescribed by the university, but in many colleges teachers were taking only 5-10 lectures of EE and the syllabus was finished within that period.
15. The teachers were not taking the students do any field trips as they have no time and are overburdened.

16. The teachers were not paid any honorarium for teaching EE in case of colleges of GNDU and Punjab University and in some colleges of PU an that is also one of the reasons for their lack of interest in teaching this subject.

17. The researchers found that though few activities related to environment were organized in college, like celebration of environment day, Ozone day, tree plantation drives etc, but such activities were only occasionally organized.

18. Majority of the colleges were not having bulletin board to display environment related materials and news.

19. Majority of the colleges do not have Eco-clubs in the colleges.

20. The researcher found that though college buildings of most of the colleges was adequate but the playgrounds and the lawns where students can have first hand experiences of nature was not adequate and was not properly maintained.

21. The library resources were also inadequate. The libraries of the college do not have many environment related magazines and reference books in the subject of EE.

22. The researcher found that though the computer were adequate in the colleges but they were not in working condition in many colleges and the computers do not have internet facility.

23. The researcher felt that both students and the teachers take the subject of EE as an additional burden.
24. Both the teachers and the students were not satisfied with the evaluation procedure in EE. As the marks of EE are not added to the final scores of the students, the students do not take and study the subject seriously.

25. The teachers and students felt that EE should be a opted out as a choice by the students and not as a compulsion.

26. The researchers found that the teachers who were postgraduate in Environmental Sciences finds difficulty in their placement as they are only kept on adhoc basis and as such no regular post are advertised by the Government and the colleges.

27. The researchers found that majority of the teachers have never attended any refresher courses or seminars/workshops related to environment and EE.

28. The researcher found that the status of teaching of EE was not satisfactory and need improvement regarding different aspects of EE.

4.14 Problems faced by the principals, teachers and the students regarding the subject of EE

4.14.1 Problems faced by the principals in providing EE in the college are discussed below:

- Lack of funds
- No aids /funds provided by government or universities.
- Lack of qualified regular staff.
- Lack of support and clear guidelines for teaching of EE in the colleges by the university/government.
• No refresher courses or orientations programmes are organized by the university regarding training for the teachers to teach EE.

• The colleges which do not have science stream in the college find difficulty in arranging for the teacher to teach EE as the teachers from Arts and Commerce streams can not do justice with the subject.

4.14.2 General Problem faced by the teachers teaching EE in the colleges of the three Universities:

• No honorarium paid for teaching EE

• Overburdened schedule of teachers

• No training programme regarding teaching of EE

• Limited no. of lectures allotted to teach EE

• No proper place for EE in the time table.

• Overcrowded classes.

• Lack of qualified staff.

• Lack of funds for organizing environmental related activities

• Lack of serious attitude of administration and students towards EE as it as not a compulsory subject.

• Lack of practical’s in EE which makes the subject mere theoretical.

• Sometimes the Arts, Commerce and Science stream students are mixed in the same class so explaining to the mixed class is very difficult.

• Evaluation procedure not proper. Marks of EE not added in final total score of the students.
4.14.3 General Problems faced by students while studying EE.

- Shortage of time to study extra subject of EE
- Overburdened students with their own disciplinary choices.
- Arts and commerce students of the three Universities said that they find the syllabus too technical, whereas the science students told the researcher that they already have studied what is being taught in EE, then why the extra burden to study it again.
- A period of EE is either too early or too late which doesn’t suit the students.
- Overcrowded classes which results in indiscipline in the class
- Lack of qualified and competent staff for teaching EE.
- Textbooks do not contained detailed explanation of the content
- Lack of use of innovative methods by the teachers.
- Lack of practical component in the content
- No field visits are organised.
- Environment related activities are also not frequently organised.
- Evaluation procedure not proper

4.15 Suggestions given by the Principals, teachers and the students for improving the status of EE at undergraduate level

The suggestions given by the principals, teachers and the students have been discussed below:
4.15.1 Suggestions given by the principals of the colleges of the three universities with regard to EE

- Government should appoint regular and qualified staff for teaching EE.
- Funds should be provided to colleges for keeping staff for teaching EE.
- EE should be taught as a separate subject like other subjects and not compulsorily forced on the students.
- If EE is taught as separate subject then only candidates with postgraduate degree in Environmental Sciences will find proper placement.
- Marks of EE should be added to the final score, so that students take the subject seriously.
- Mere theory of EE will not serve any purpose. Practical should be added to the subject.
- Seminars/workshops/extension lectures should be organized on the topics related to environment in the colleges as well as Universities.
- Excursions and field trips should be organized.
- Syllabus of EE should include local issue related to environment.
- Syllabus should include topics like personal hygiene, population explosion, organic farming, health and diseases, First Aid etc.
- Collaboration with local organizations and NGO’s to be encouraged for the environment cause.
- Refresher Courses and Orientation programmes should be regularly organized by the universities for the teachers teaching EE.
4.15.2 Suggestions given by the teachers teaching EE in the colleges of the three universities.

Appointment of regular and qualified staff for teaching EE

- Aid/grant to be provided to colleges for EE by Governments and the University.
- EE should be a compulsory subject like other subjects.
- Marks of EE should be added to the final score.
- Practical component to be added to the syllabus of EE.
- Paper should be both objective as well as subjective.
- Local issues to be added to the content.

4.15.3 Suggestions given by the students studying in the colleges of the three universities with regard to EE

- Practical work should be added to the subject.
- Marks of the subject should be added to the final score.
- It should be taught as a separate subject like other subjects and should not be compulsorily forced on students.
- Field work should be included.
- Seminars/Workshops/Extension lectures to be regularly organized on environment issues.
- Field visits to be organized regularly.
- More environment related activities to be organized.
- Evaluation procedures need to be changed.
• Syllabus to be more practical rather than mere theoretical.

• Local issues and environment problems of Punjab like Water Crisis and water pollution to be included in syllabus.

### 4.16 Educational Implications of the study

The present study will help the policy makers, curricular planners, Administrators and the teachers to improve the effectiveness of the Environmental Education programmes at higher levels if the following suggestions are considered:

• Strong Environmental Education Policies should be made keeping in mind the national as well as local specific needs of the country. The curriculum planners should give attentions to local specific issues

• Explicitly stated learning-objectives contribute to quality education for both students and teachers. Based on the findings of the present studies the objectives should be clearly stated and attainable. The objectives of EE should address both cognitive and affective domain.

• The most essential part of curriculum design is the making of decisions related to content. Content development should be done taking into consideration on learning objectives, context, level of learners, the culture and tradition of the local community. Orientation of the content of EE should be toward inculcating among students environmental ethics and concerns and developing favorable attitudes towards the environment. Mere giving awareness about the environment will not serve the purpose of teaching EE. Interdisciplinary and holistic approach should be considered while planning EE curriculum.
• EE is an interdisciplinary subject. Each subject is related to environment in some or other way. We need to environmentalize all the subjects with environment concerns and ethics only then the objectives of EE can be achieved.

• The classroom teaching is still dominating the teaching-learning of EE at higher levels of education. Innovative instructional methods such as activity method, project work, field trip, problem-solving, inquiry method, CAI etc should be used in teaching of EE. Instructional methods should be activity based and learner centred.

• Activities like Field Work, project work, formation of eco clubs should be encouraged as it will give first hand experience to students about the environment and helps to understand environment in better way.

• Instructional materials enhance the learning experiences. The real challenge of EE is to create appropriate instructional materials which can capture the children's interest, facilitate the attainment of the expected learning outcomes and address local specific environmental issues. Lack of use of instructional materials by the teachers was considered as the major constraints in implementing EE programme. The teacher should give emphasis on local materials as they are no-cost or low cost aids which can be used for environmental activities.

• Bulletin boards in the classrooms or strategic points should display environment related news and articles to facilitate and improve the quality of teaching of EE. The multimedia approach using a combination of printed and audiovisual material has been found to be the most relevant approach for EE.
• Environmental problems are public issues as such they receive considerable attention from the radio, television internet, local newspapers etc. Thus the teachers and the colleges should develop a plan to use relevant and appropriate media to teach EE effectively. Community participation should be encouraged in environment related activities. The joint efforts of educational institutions and the community can result in developing favourable attitude towards the environment.

• Evaluation is an integral part of teaching learning of students in EE. The focus of present evaluative procedure is completely on objectives in cognitive domain. Emphasis should be placed on assessing objectives in affective domain also. Such evaluation should be done by observing students participating in the different, activities related to EE Others techniques of evaluation such as field work evaluation, project work evaluation should be included and necessary rating scales and checklists should be developed.

• The teachers are the most important resource in education system responsible for implementing the processes. The teachers teaching environmental Education should be qualified and environmentally conscious individual who can work for the cause of the environment. The EE teachers should have knowledge about curriculum planning and pedagogy. They should have the skills to develop environment concerns and ethics among students. For this effective teacher training programmes are essential. Teacher training programme like seminars, Workshops, orientation programmes should be regularly organized on environment related themes.

• The EE teacher training programmes should focus to acquaint the teachers with relevant and appropriate innovative practices related to
instructional methods, instructional materials and evaluation techniques. The training must be organized frequently to update the teachers with the new trends in EE.

- Physical and Information Resources are also important in contributing to the effectiveness of learning. It is the responsibility of the teachers to use these physical resources effectively. A mechanism needs to be evolved to ensure optimum utilization of Physical and Information Resources like college playground, lawns, laboratories and computers.

- Library needs to be well equipped with books related to environment and to enhance the utilization of library facility. Separate time may be allotted in the time table for library. Internet has revolutionized the teaching-learning and it has vast potential to educate students regarding environmental issues, problems, concerns etc. Adequate computers in working condition and with internet facility should be available to teachers and teachers should be trained in using computers and internet services in class-room teaching and for their professional growth.

- Adequate facilities for financial resources should be made for carrying out environment related activities in the colleges and to procure and develop other resources required for teaching EE.

Suggestions if taken into consideration while planning, organizing, implementing and evaluating EE at higher levels of education will definitely help in improving the present status and effectiveness of EE programmes in the colleges of the three Universities in Punjab.

4.17 Suggestions for further research

Suggestions for further research are:
As the present study was only limited to the three universities namely, GNDU, Punjabi University and PU, research studies can be taken including other universities in Punjab.

Study can be replicated at different levels of education

Comparative study can be carried out to compare Environmental Education in Punjab and other states of India.

Comparative study can also be carried out to compare Environmental Education in India and other countries.

Studies can be conducted by taking other variables like environmental concern, environmental ethics etc.