CHAPTER V

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CONCLUSIONS AND SUGGESTIONS

5.1 The Study in Retrospect

The present study has been designed to understand the facilities available and activities conducted in the schools for enhancing environmental awareness, and to understand the environmental awareness of higher secondary school students. It also intended to prepare learning modules in environmental science for enhancing environmental awareness among higher secondary school students. The summary of the study is presented below:

5.1.1 Objectives of the study

The specific objectives of the study are the following:

1. To study the facilities available and activities conducted in the schools for enhancing environmental awareness among higher secondary school students.

2. To study the environmental awareness of students at higher secondary level with respect to the environmental issues.

3. To prepare Learning Modules in Environmental Science at the higher secondary level.

4. To test the effectiveness of the prepared learning modules in environmental science at higher secondary level.
5. To compare the effectiveness of the prepared learning modules over conventional textbook oriented approach with respect to environmental awareness of higher secondary school students.

6. To compare the effectiveness of the prepared learning modules over conventional textbook oriented approach with respect to achievement in environmental science areas of higher secondary school students.

7. To compare the effectiveness of the prepared learning modules with conventional textbook oriented approach on achievement in environmental science areas particularly under the categories of objectives Knowledge, Understanding, Application and Skill.

5.1.2 Hypotheses of the study

The hypotheses formulated for the present study are the following:

1. The facilities available and activities conducted in the schools for enhancing environmental awareness of higher secondary school students are very limited.

2. The higher secondary school students have low awareness regarding environmental issues and aspects.
3. The learning module prepared in the environmental science areas would be effective in enhancing environmental awareness among higher secondary school students.

4. The modular approach would be more effective than conventional textbook oriented approach in enhancing achievement of higher secondary school students in the environmental science areas.

5.1.3 Methodology in Brief

As the present study was intended to prepare and test learning modules in Environmental Science, Survey and Experimental methods were used. In the present study survey method is used to identify the facilities available and activities conducted in the schools for enhancing environmental awareness of higher secondary school students and to understand the awareness level of higher secondary school students with respect to the environmental issues. The present study was conducted on a final sample of 2200 students and 40 teachers from various higher secondary schools in Pathanamthitta district, Kerala state, selected on the basis of proportionate random sampling technique. For the survey, a questionnaire, a standardized environmental awareness test and an interview technique were adopted. The data thus obtained were analysed using appropriate statistical techniques. Based on the findings, learning modules were
prepared for enhancing environmental awareness and achievement in environmental science areas among higher secondary school students. The effectiveness of the learning modules prepared were tested using an experimental approach.

The experimental method is used to test the effectiveness of the prepared learning modules. The research design adopted for the experiment was pre-test, post-test parallel group design. The experimental group receives the treatment condition and both experimental and control groups were measured and compared on the independent variables for testing the significance of the difference. The experiment was conducted in the two divisions of Government Higher Secondary School, Kadapra, Pathanamthitta District. The final sample for the experiment consisted of 120 students of two divisions (50 students each) and was selected by comparing their previous year achievement and general mental ability. Environmental Awareness Test and Achievement Test (pre-test) were conducted before starting the experiment. The experimental group was taught using the prepared learning modules, and the control group in the conventional text book oriented approach. When the classes for the selected topics were over, the same environmental awareness test and achievement test were administered to both the groups as post tests. A retention test was also conducted after a couple of weeks. The pre-test scores and post-
test scores and the retention test scores obtained were subjected to appropriate statistical analysis.

5.2 Major Findings

The major findings that have emerged from the present study are the following:

5.2.1 Environmental science areas included in the Higher Secondary Curriculum

In the analysis of the higher secondary school syllabus it is found that the Botany text book of the plus two class contains the environmental science areas. In the unit Ecology and Environment, ecological concepts are explained superficially and not deeply. The topics included are:

- Natural resources and conservation
- Population and the Environment
- Biotic community
- Ecosystem, Pollution, waste management
- Forest conservation and Management
- Interaction between species
- Green house effect
- Ozone depletion
Global environmental change

Species interaction

The learning activities provided will not help the students to understand the ill effects of pollution, green house gases, population explosion, use of pesticides, identify the reasons for global environmental change and ozone depletion etc. The necessity of protecting the endangered species and the national wild life sanctuaries are not emphasized in the higher secondary curriculum.

The environmental awareness of the students who studied the above topics are not satisfactory as it was evident from the environmental awareness test given to them as pre-test. Thus it is clear that though the topics of environmental importance are present in the higher secondary curriculum, they are not sufficient for enhancing the environmental awareness.

5.2.2 Facilities provided and activities conducted in the schools for enhancing environmental awareness – Responses of Teachers

1. Responses of the majority of the teachers revealed that text books prepared for the higher secondary school students are not sufficient for enhancing environmental awareness.

2. A major percentage of teachers responded that the school library is not provided with sufficient books on environmental science.
3. Responses of the teachers revealed that sufficient reading materials related to environmental science areas are not provided to the students.

4. According to majority of teachers science club activities are very less in higher secondary schools

5. The study found that the majority of teachers are not getting sufficient time to conduct activities of the science club.

6. Responses of the teachers made it clear that most of the teachers under study rarely encourage students to participate in seminars and discussions related to environmental significance.

7. The study found that the vast majority of the teachers do not participate in the environmental education programmes.

8. The study revealed that most of the teachers do not use audio-visual aids like pictures, magazines, paper cuttings etc. while teaching environmental topics. Teachers made it clear that audio-visual aids are not provided in the schools.

9. The study revealed that majority of the teachers are against doing and making any major damage to nature that affect ecological balance.

10. Teachers under study are of the opinion that we should protect our nature and educate the students to protect the nature.
5.2.3 Suggestions to improve environmental awareness among students – Responses of Teachers

1. Seminars and exhibitions should be arranged in the schools related to the local environmental issues and problems.

2. Students and teachers should visit places of ecological importance

3. The national and international days of ecological importance should be celebrated in the schools.

4. Nature camps should be arranged in schools participating all the students especially during the cleanliness week.

5. Activities of the nature club should be encouraged in schools.

6. Sufficient funds should be provided to schools for arranging environmental programmes and activities.

5.2.4 Facilities available and activities conducted in schools for enhancing environmental awareness – Responses of students

1. Majority of the students under study responded that the text books prepared for the higher secondary school do not help in understanding the environmental issues effectively.

2. Majority of the higher secondary school students under study responded that the discussion of teachers do not help them to increase environmental awareness sufficiently.
3. The study revealed that majority (60%) of the students at higher secondary level is not at all responding to issues affecting the local environment.

4. The students responded that there is not sufficient books and journals in the school library related to environmental issues.

5. The study revealed that forty-five percentage of students do not have the habit of reading books on ecological importance.

6. The study also revealed that majority of the teachers are using lecture as the method of teaching. Modern instructional strategies like activity method, project method, field study method, problem solving method are not used by majority of teachers frequently.

7. From the response of the students it is found that majority of the schools are not organizing various programmes related to environmental issues and problems. Only a small percentage of students reported that the schools are arranging various programmes for their students to develop environmental awareness (Talk by experts 10%, seminar 20%, Discussion 18%, Quiz competition 20%, Essay competition 12%, experiments with participation of students 6%, science projects 9%).

8. Majority of the students, (80%) at higher secondary level responded that field trip is not arranged in their schools.
9. The study makes it clear that nature camps are not arranged in most of the schools.

10. Majority of the students (60%) responded that campus cleaning programme is not arranged in their schools.

11. A major proportion of students responded that they are interested in participating science club activities. Only a very small percentage of students responded that they are least interested in participating science club activities. It is revealed from the study that only twenty percentage of students at higher secondary level are very much interested in participating the science club activities.

5.2.5 **Suggestions to improve environmental awareness - Responses of students**

1. Fifty six percentage of students suggested that the method of teaching should be activity centered. They also suggested the need of arranging field trips for teaching environmental science areas. While thirty eight percentage of students at higher secondary level suggest that the text books should be improved, thirty five percentage of students suggested that reading materials should be provided to the students. Forty seven percentage of students suggested that audio-visual media should be used by teachers to teach the topics under environmental science areas.
5.2.6 Environmental Awareness of higher secondary school students

5.2.6.1 Assessment of the Environmental Awareness of higher secondary school students – whole sample

(i) It is found that almost majority of the students under study have low environmental awareness (48.13%).

(ii) A moderate number of students under study (34.27%) have high environmental awareness.

(iii) Only a small number of students (17.59%) have average environmental awareness.

5.2.6.2 Assessment of the Environmental Awareness of higher secondary school students – sub samples.

i. The study found that forty eight percentage each of boys and girls of higher secondary schools have low awareness with respect to the environmental issues. Thirty four percentage each of boys and girls have high awareness with respect to the environmental issues and aspects. It is also found from the study that only seventeen percentage of boys and girls are having average awareness with respect to the environmental issues and aspects.
ii. The study found that forty four percentage of the urban and fifty two percentage of the rural students have low environmental awareness and thirty two percentage of the urban and twenty nine percentage of the rural students under study have high environmental awareness. Only a negligible percentage of students under study have average environmental awareness (Urban 23.4% and Rural 18.3%).

iii. The study found out that forty nine percentage of students of government higher secondary school and forty four percentage of students of private higher secondary school have low environmental awareness in the environmental issues and aspects. While twenty nine percentage of students of government higher secondary school and thirty eight percentage of students of private higher secondary school have high environmental awareness, only twenty one percentage of government higher secondary school students and fourteen percentage of private higher secondary school students have average awareness with respect to environmental issues and aspects.
5.2.7 Effectiveness of the prepared learning modules in enhancing environmental awareness among higher secondary school students

Prepared learning modules are more effective than the textbook oriented approach in enhancing environmental awareness among higher secondary school students. The conclusion is substantiated by the following findings.

5.2.7.1 The analysis shows that there is significant difference between the experimental and control groups.

The critical ratio is 6.48, and it is significant at 0.01 level. The mean scores of the experimental group is much greater than that of the control group. So it can be inferred from the findings that the prepared learning modules are very effective in enhancing environmental awareness of higher secondary school students.

5.2.7.2 (i) By using the analysis of variance it was proved that learning modules are superior to conventional method of textbook approach in enhancing environmental awareness of higher secondary school students. The Fy value (42.09) is greater than the table value (6.87) for df 1/118 and it is significant at 0.01 level.

(ii) The analysis of co-variance of the scores of the pre-test and post-test of the experimental groups was computed.
Here Fy.\text{x} value (90.89) is greater than the table value (6.87). The difference between the scores of the two groups is significant at 0.01 level.

(iii) While comparing the adjusted means, the ‘t’ value obtained (9.56) is greater than the table value (2.63). Hence there is significant difference between the two groups.

Thus it is clear that the students learned with the help of the prepared learning modules attained more environmental awareness than the students taught in the conventional text book oriented method.

\textbf{5.2.7.3} The analysis shows that there is significant difference between the experimental and control groups with respect to their awareness in each of the environmental issues.

Natural resources and conservations (CR=8.169, \textit{P}<0.01), Forest conservation and management (CR=5.479, \textit{P}<0.01), Air pollution (CR=5.375, \textit{P}<0.01), Water pollution (CR=5.255, \textit{P}<0.01), Noise pollution (CR=6.565, \textit{P}<0.01), Soil and pesticide pollution (CR=2.519, \textit{P}<0.05), Waste management (CR=3.962, \textit{P}<0.01), Global warming (CR=3.779, \textit{P}<0.01), Ozone depletion (CR=3.611, \textit{P}<0.01), Species interaction and Biodiversity (CR=7.05, \textit{P}<0.01).
The mean of the experimental group is greater than that of the control group in all the above components. So it can be inferred that the prepared learning modules are very effective in enhancing awareness in the environmental science areas.

5.2.7.4 The analysis of co-variance applied to the pre-test and post-test scores of students in the experimental and control groups showed that the two groups differ significantly in their post-test scores in their environmental awareness as a whole and on each issue.

For Environmental Awareness as a whole - $F_{y.x} = 9.89$

Natural resources and conservation - $F_{y.x} = 78.16$

Forest conservation and management - $F_{y.x} = 45.08$

Air pollution - $F_{y.x} = 41.10$

Water pollution - $F_{y.x} = 24.22$

Sound pollution - $F_{y.x} = 46.06$

Soil pollution - $F_{y.x} = 5.28$

Waste management - $F_{y.x} = 13.82$

Green house effect - $F_{y.x} = 12.30$

Ozone depletion - $F_{y.x} = 18.14$

Species interaction and Biodiversity - $F_{y.x} = 49.70$
The above $F_y.x$ values are greater than the table value (6.87), and are significant at 0.01 level.

When the adjusted means of the post test scores of students in the Experimental and Control group were tested for significance, it was found significant.

For Environmental issues as a whole - $t = 9.56$ (P<0.01)
1. Natural resources - $t = 8.84$ (P<0.01)
2. Forest conservation & management - $t = 6.73$ (P<0.01)
3. Air pollution - $t = 6.42$ (P<0.01)
4. Water pollution - $t = 4.99$ (P<0.01)
5. Sound pollution - $t = 6.80$ (P<0.01)
6. Soil pollution - $t = 2.30$ (P<0.015)
7. Waste management - $t = 3.75$ (P<0.01)
8. Green house effects - $t = 3.53$ (P<0.01)
9. Ozone depletion - $t = 4.26$ (P<0.01)
10. Species interaction and biodiversity - $t = 7.06$ (P<0.01)

The above ‘$t$’ values are greater than the table value (2.63) and are significant at 0.01 level except for soil pollution.

Hence the higher secondary school students in the experimental group attained more environmental awareness than the control group with respect to each of the environmental issue.
5.2.8 Effectiveness of the prepared learning modules on achievement of higher secondary school students with regard to environmental science areas

5.2.8.1 The prepared learning modules are more effective than conventional textbook approach in enhancing the achievement of higher secondary school students in the environmental science areas. The conclusion is substantiated by the following findings.

i. The analysis of the post-test scores show that (t value 4.20) the two groups differ significantly in their achievement in environmental science areas. So there is significant difference between the experimental and control groups. The mean scores also help to state that the experimental group is in the advantageous position. It can be inferred from the interpretation of the findings that the learning modules provided in the experimental group helped the students to achieve better than the students taught in the conventional method. So it can be concluded that the prepared learning modules are more helpful in enhancing their achievement in environmental science areas.

ii. By using analysis of variance it was proved that the learning modules are superior to conventional method of textbook
oriented approach in enhancing the achievement of students in environmental science areas at higher secondary level. The Fy value (17.65) is greater than the table value (6.87) for df 1/118 and hence the Fy value is significant at 0.01 level.

iii. The analysis of co-variance of the scores of the pre-test and post-test of the experimental and control groups shows that the Fyx value (37.43) is greater than the table value (6.87), the difference between the scores of the two groups is significant at 0.01 level.

iv. While comparing the adjusted means the ‘t’ value obtained (6.12) is greater than the table value (2.63). Hence there is significant difference between the experimental and control groups with respect to their achievement in environmental science areas.

Thus it can be inferred that learning modules followed in the experimental group helped the students to achieve better than the textbook oriented approach.

5.2.8.2 Effectiveness of the prepared learning modules on achievement of higher secondary school students in the category of objectives – Knowledge, Understanding, Application and Skill.

Learning modules are more effective in achievement in the environmental science areas at the different categories of objectives
knowledge, understanding application and skill over the conventional method of text book approach. This conclusion is substantiates by the following findings:

I. The analysis of the post-test scores shows that the experimental and control groups differ significantly in their achievement in different categories of objectives. Knowledge, Understanding, Application and Skill. (Knowledge \( t = 5.214 \), Understanding \( t = 3.549 \), Application \( t = 2.708 \), Skill \( t = 5.043 \))

The above 't' values are significant at 0.01 level. Therefore it can be inferred that the prepared learning modules are very effective in enhancing achievement under the category of objectives – Knowledge, Understanding, Application and Skill.

II. The calculated \( F_y \) values (knowledge 27.18, understanding 12.60, application 7.33, skill 25.43) are greater than the table value (6.87) and are significant at 0.01 level, in the analysis of variance. Hence there is significant difference in the achievement of environmental science areas at the different category of objectives – Knowledge, Understanding, Application and Skill among the two groups.

III. The analysis of co-variance of the pre-test and post-test of the experimental and control groups with respect to the different category of objectives show that the \( F_yx \) values (Knowledge-25.84, Understanding - 27.93, Application - 14.51, Skill -33.31)
are greater than the table value (6.87), the difference between the scores of the two groups is significant at 0.01 level.

When the adjusted means scores were computed, the 't' values obtained (Knowledge 5.11, Understanding 5.29, Application 3.81, Skill 5.78) are greater than the table value (2.63) at 0.01 level. This indicates that there is significant difference between the performance of experimental and control groups in their achievement at the various objectives.

Thus it can be inferred that the learning modules are effective in enhancing achievement in the various categories of objectives Knowledge, Understanding, Application and Skill.

5.2.9 Retention Test

There is significant difference between the experimental and control groups in their achievement in the retention test (t=10.002, P<0.01). It can be inferred from the interpretation of the findings that the experimental group who learnt with the help of the learning modules could retain the environmental science areas more than that of the control group who learnt the same in the conventional method.

5.3 Tenability of the Hypotheses

5.3.1 The first hypothesis is that the facilities available and activities conducted in the schools for enhancing environmental awareness of higher secondary school students are very limited.
The major findings (No. 5.2.2, 5.2.4) show that the facilities available and activities conducted in the schools for enhancing environmental awareness of higher secondary school students are very limited. Hence the above hypothesis is accepted.

5.3.2 The second hypothesis is that the higher secondary school students have low awareness regarding environmental issues and aspects.

The major findings (No. 5.2.6, 5.2.6.1, 5.2.6.2) show that a major proportion of the higher secondary school students have low awareness regarding environmental issues and aspects. Thus the above mentioned hypothesis is substantiated.

5.3.3 The third hypothesis is that the learning modules prepared in the environmental science areas would be effective in enhancing environmental awareness among higher secondary school students.

The major findings (No. 5.2.7, 5.2.7.1, 5.2.7.2, 5.2.7.3, 5.2.7.4) show that the prepared learning modules are more effective in enhancing environmental awareness among higher secondary school students. Hence the above hypothesis is substantiated.

5.3.4 The fourth hypothesis is that the learning modules prepared would be more effective in enhancing achievement of higher secondary school students in the environmental science areas.

The major findings (No. 5.2.8, 5.2.8.1, 5.2.8.2) show that the learning modules are more effective in enhancing achievement of
higher secondary school students in the environmental sciences areas. Hence the hypothesis is accepted.

Thus all the hypotheses formulated in the study are substantiated.

5.4 Conclusions of the Study

The major conclusions that emerged from the study are given below.

5.4.1 The higher secondary school syllabus contains the environmental topics natural resources and conservation organism and environment, population, biotic community, ecosystem, forest conservation, pollution, waste management, green house effect, ozone depletion, global environmental change, species interaction and biodiversity. But the above topics are not presented in such a way as to enhance the environmental awareness substantially in the environmental issues.

5.4.2 The facilities available and activities conducted for enhancing environmental awareness among higher secondary school students are very limited. The schools should be provided with books and journals covering environmental areas and issues. Opportunities should be given to teachers and students to take part in environmental education
programmes such as field study, nature camps, seminars, discussions and workshops. Sufficient audio-visual aids are not present in higher secondary schools to teach the science topics. The method of teaching is lecture method. Sufficient audio-visual aids should be provided in the schools and the teachers should use the audio-visual aids to teach the environmental science areas.

5.4.3 The environmental awareness of students at higher secondary level is low and that in each of the environmental issue such as natural resources and conservation, forest conservation and management, different types of pollution, waste management, global environmental change, ozone depletion and biodiversity is not satisfactory.

5.4.4 The learning modules prepared on the environmental science areas are very effective in enhancing environmental awareness among higher secondary school students.

5.4.5 The learning modules prepared in the environmental science areas are very effective in enhancing achievement in the environmental science area among higher secondary school students.
5.4.6 The retention capacity of the students who learnt with the help of learning modules is higher than those who learnt in the conventional text book oriented method.

5.5 Implications of the Present Study

The present study has several implications in different areas pertaining to teaching and learning. They are as follows:

5.5.1 Implications of the study in general

Environmental awareness is the need of the hour. Inculcating an awareness of environment among children is the responsibility of the teachers and to carry out this noble task, education is the perfect instrument. If right attitudes are induced in children, these attitudes will be transmitted to later generations also by them. Therefore every curriculum should emphasize the importance of environmental protection and management. The study revealed the fact that the students even at the higher secondary level do not have adequate awareness regarding environmental issues and aspects. The activities for enhancing environmental awareness are very limited in our educational institutions. Therefore it is very essential that necessary changes should be made in the curriculum on all levels so that environmental awareness can be enhanced.
5.5.2 Educational implications

The learning modules are found to be very effective in learning the concepts easily and meaningfully. Students can achieve well when they learn with the help of learning modules. Subjects who learned with the help of learning modules can retain what they have learnt for a longer time than those who learnt through the conventional way. Learning modules are self learning materials, where the students are asked to learn by themselves according to their pace, ability and interest. The motivation they get through self-learning will give them encouragement to study further and thus the learning will become concrete and long standing.

The learning modules motivate students to actively participate in outdoor activities like nature study, field study, environmental programme etc. The students are also motivated to read books and journals.

5.5.3 Implication on students

Students can achieve well when they learn with the help of learning modules. Learning modules will help the students to make the learning more concrete and meaningful. The environmental awareness of the students are enhanced when they learned with the help of learning modules. The present study has implication upon the students in another way also. The learning modules motivate the
students to actively participate in outdoor activities like nature study, field study, environmental programme etc. The students are also motivated to read books and journals. So the environmental topics should be presented to the students through environment oriented methods like activity, field trip, nature study etc.

5.5.4 Implications on teachers

The prepared learning modules are found to be very effective in learning the concepts easily and meaningfully. The present study enables the teachers to understand the environmental issues and aspects that are prevalent at present. The study throws light on the fact that the teachers should get opportunities to attend workshops, refresher courses etc. to equip them to prepare learning modules and present to the students systematically and also attend seminars on environmental issues and aspects. The study reminds the teachers that after the completion of the topics under the environmental aspects most of the students have only low awareness. Hence there is a high need for including all the major environmental areas in the higher secondary curriculum and also the need for the use of innovative instructional strategies for curriculum transaction.

The present study will inspire all teachers to make the students aware of all the environmental issues and aspects.
5.5.5 Implication upon the heads of institution

The present study helps the principals of the higher secondary schools to understand the overall environmental awareness of higher secondary school students. The study insists the heads of institution to arrange activities like field study, nature camps, cleaning programmes, etc. in the schools. The principals should arrange seminars, discussion etc. in the school. More Books, Journals etc. should be made available in the school. Teachers should be encouraged to participate in seminars, workshops and refresher course. Sufficient financial aid should be allotted to the organise activities of nature club, field study etc. and sufficient AV aids should be made available in the schools.

5.5.6 Implication on government

The natural environment and the natural resources should be protected and conserved. The government should enforce it through laws and insist the Education Department to instruct the school students to protect and conserve our natural environment. The higher secondary schools should organize Haritha club, Nature club etc. and all students should be members of this club. Necessary training should be given to teachers and students regarding the functioning of these clubs. Government should take initiative to allot grace marks to the students who are members of these clubs. This
will be an incentive for the students to become members of these clubs. The government should also take initiative to allot funds to the schools for organizing nature camps, workshops, seminars etc.

5.6 Suggestions of the Study

The findings of the study revealed that the students of the higher secondary schools have only low awareness regarding environmental issues and aspects. The findings also revealed that the facilities available and activities conducted for enhancing environmental awareness among higher secondary school students are very limited. The prepared learning modules are effective in enhancing environmental awareness. On the basis of the above findings the following suggestions are made.

5.6.1 Effective steps should be taken for revising the present higher secondary curriculum with more environmental issues and aspects included in it. It should be taught by using modern instructional strategies.

5.6.2 Non-availability of reference books for teachers and students of higher secondary schools may be assessed as a major hurdle in imparting environmental education. So there must be adequate supply of reference books and reading materials in advance. More reading books, journals
etc. on environmental science area should be made available to teachers and students at higher secondary level.

5.6.3 Opportunities should be given to teachers at higher secondary level to develop skills in identifying and evaluating local resources for use in environmental education.

5.6.4 Orientation to the new instructional strategies should be given to teachers. The new instructional strategies like field study, project method, activity method should be introduced to teachers at higher secondary level.

5.6.5 The study reveals that the conventional method of teaching is inadequate for the realisation of higher environmental awareness. New teaching strategies and self learning materials regarding environmental issues and aspects need to be provided and it will help to enhance environmental awareness.

5.6.6 A more systematic effort should be made to supply various audio-visual aids in all schools, and employ them effectively to educate the students about various environmental issues and aspects.

5.6.7 The reasons behind natural calamities like flood, drought, earthquake, ozone layer depletion, loss of biodiversity and
extinct and endangered species should be taught to students. This would help the students to change their attitude towards environment, instil into them the need for protecting environment, and develop an environmental sensitivity.

5.6.8 Facilities have to be provided in the schools to organize discussions, seminars, demonstrations, workshops, film shows etc. to develop environmental awareness among higher secondary school students.

5.6.9 Inservice and refresher courses should be organised for teachers to make them familiar with the ways of teaching subjects using environmental resources, and also to prepare self learning strategies in environmental issues and aspects.

5.6.10 The teachers should be given proper orientation to the different types of learning modules which would equip them to adopt better teaching learning strategy. The teachers should be motivated to use available learning modules in environmental science areas and issues like the one developed in this study.

5.6.11 The teachers shall be provided with prepared learning modules in their concerned subjects. Teachers shall be
encouraged by giving certificates and awards to those who are doing innovative practices in new strategies of teaching.

Learning modules are very effective in enhancing environmental awareness and achievement. Therefore it is suggested that the teachers should take initiative to prepare learning modules in different topics and teach accordingly. Students should be instructed for self learning using these learning modules. In this way, the awareness and achievement can be enhanced to a substantial amount.

5.7 Suggestions for Further Research

It is hoped that the present study would open avenues for further research in the area.

5.7.1 Similar studies on a wider sample including more areas in environmental aspects and issues would be helpful for valid generalisations. Different types of learning modules, and programmed instructions in more environmental areas may be prepared for primary, secondary and higher secondary school students for developing environmental awareness.

5.7.2 A survey of the attitude of teachers and students towards environment based instruction may be conducted and a set of instructional materials and instructional packages may be prepared and tested.
5.7.3 A survey of the attitude of teachers and students towards environmental literacy, environmental sensitivity etc. may be conducted. A study can also be conducted for preparation of modern instructional strategies to develop environmental awareness among various levels of students. Further investigation should be undertaken to find out new instructional strategies for environmental education.

5.7.4 Media based public programmes with respect to environmental awareness can be studied and media based instructional strategy can be devised to create environmental awareness among primary, secondary, higher secondary and college students.

5.7.5 Attitude of educational practitioners, administrators, curriculum framers, teachers and environmentalists towards the inclusion of more environmental issues and aspects in school and college curriculum may also be studied.

5.7.6 A study can be conducted to analyse various environmental issues and problems such as acid-rain, radioactivity, pollution, metal pollution, mercury pollution, unwise management of solid waste and pollutants etc.
5.7.7 A survey can be conducted to identify the role of various environmental organisations in developing and fostering environmental awareness and in giving environmental education at formal, informal and non-formal levels of education.

5.7.8 The module was tested for teaching of a single unit in environmental science prescribed for plus two classes. This may be done for more topics in different subjects both science and arts subjects.

5.7.9 The adequacy of theoretical support of teacher assisted modular approach is to be tested by comparing it with other modern models.