Chapter V
SUMMARY, FINDINGS, EDUCATIONAL IMPLICATIONS AND PERSPECTIVES FOR FURTHER STUDY

In the preceding chapter analysis of data and interpretation of results were presented. The present chapter provides the Summary of the research work, findings Educational Implications and Perspective for further study.

5.1 Summary:

5.1.1 Introduction:

The present day’s global environmental problems and challenges make environmental education (EE) as one of the major issues at different levels of education. Environmental education is a practical process for equipping man with the knowledge, skills and commitment to improve his environment. Environmental education, therefore, must receive adequate importance in India right from the primary level to higher education. Recognising the potentials of education in creating an environmentally conscious society, the National Policy on Education-1986, Government of India states that “There is a paramount need to create a consciousness of environment. It must permeate all ages and sections of the society, beginning with the child. Environment consciousness should inform teaching in schools and colleges. This aspect will be integrated in the entire education process.

Consequent to this, several concerted efforts have been made in the country, both at the national level and individual state levels to
recognise the content and methodologies of teaching at the school level to integrate and infuse environmental perspective. These efforts have been intensified with the Supreme Court’s Directive (1991) to make Environmental Education (EE) compulsory at the school level.

Surveys conducted by UNESCO-UNEP (1982), Ravindranath and Razak (1988), Meera and Ashish (1992) in ascertaining EE requirements in the country have clearly indicated that the most pressing requirements are in the areas of:

1. developing and distributing quality teaching-learning materials;
2. equipping teachers and resource persons with the knowledge, understanding and skills in imparting EE;
3. conducting action research and experimentation for promoting EE;
4. networking with various institutions for information, resources and expertise.

While these challenges are being attended to through various institutions in the country (Government and non-Government), the role of DIETs in effectively implementing EE in schools becomes crucial.

The training of teacher-educators is vital for effective implementation of EE programme at the elementary school since the teacher-educator is responsible not only for the training of teachers but also preparation of curricula and its integration in other subjects both in the curricula of formal as well as non-formal education. Additionally, the teacher-educators will also be required to plan,
implement and evaluate EE programs for teacher trainees—both pre-service and in-service. The goals and objectives of the training of teachers may be as follows:

**Goals of Teacher Training Programmes:**

- To develop among the teacher trainees an awareness of economic, social, political and interdependence as a global reality and the need to develop the habits of living in harmony with nature;
- To help them acquire a basic understanding of environment in its totality—natural and man-made, technological and social and its associate problems;
- To develop in them a set of values and feelings of concern for environment, and motivation for actively participating in programmes for environmental improvement and protection; and
- To orient them in the techniques of planning, implementation, monitoring and evaluation of programmes and projects in environmental education.

**Specific Objectives of Training Programmes:**

- Build motivation of the teachers/individuals;
- Inculcate positive attitudes towards the environment;
- Strengthen commitment to the cause of the environment;
- Promote initiative, innovation and resourcefulness;
- Develop the urge to learn more about the environment and its related problems that directly affect human life;
- Create the ability for unbiased analysis of environmental issues from scientific angle;
- Clarify personal values;
- Reinforce the ability to screen environment-related scientific information;
- Ability to make sound decisions after proper understanding of the implications to alternative solutions;
- Ability to relate to members of the community which the school serves and assist them to solve these problems;
- Ability to identify resources for EE; and
- Ability to manage EE and lead ‘ACTION’.

**Components of Training Programmes:**

Teacher educators are entrusted with the dual responsibility of developing the curriculum as well as organising training of teachers—both pre-service and in-service. Three major components of training of teachers are:

1. Academic Component
2. Curricular Component
3. Organisational Component

**Academic Component**: This will include awareness of and understanding of environmental issues at the global level; ability to identify environmental problems in the specific local setting and generate discussion regarding alternative solutions to the environmental problems; and, screen environmental related information.

**Curricular Component**: A major component of the training will be the planning of curriculum. This will include the (i) setting of goals of environmental education for the specific level; (ii) selection of contents to be included; (iii) deciding on the approach to the
curriculum; (iv) methodology of transaction; finally, (v) evaluation of curriculum in achieving the set goals.

**Organisational Component**: This includes organisation of pre-service and in-service training programs for teachers of both, formal and non-formal system. In this context the identification of training needs; determining the contents and duration of programme; planning the logistics of the programme i.e. identification of financial resources and experts; and, ability to monitor and evaluate the impact will form important components.

Environmental education as an important educational thrust has its own content and methodological characteristics. Given the importance of EE and the spirit with which it has to be imparted, teachers, in addition to transmitting knowledge and information, have to be prepared to assume much greater roles of enthusing and enabling children in the protection and conservation of environment. This brings into focus the need for organising effective teacher training programmes.

DIETs vested with the responsibility of planning and organising programmes for training and re-training teachers could emphasise the following in their training programmes:

1. Enabling teacher and teacher trainees in integrating EE thrust into the school curriculum and developing need specific curriculum;

2. Providing teachers with an understanding of the local environmental issues and problems as well the essential concepts in EE.
3. Training teachers in the content and methodologies of EE with specific reference to the use of techniques such as conducting environmental surveys, observations, field trips, nature education camps etc.;

4. Helping teachers in developing locale specific EE materials in local languages;

5. Training teachers in the use of computers available at DIETs for preparing EE lesson plans;

6. Training teachers in the processes of evaluating EE; and

7. Training teachers in adapting locally available EE materials.

The fact that there is a need for teacher training in EE and it has been emphasized many times (Unesco, 1981; Saxena, 1983a; Saxena, 1983b). This is due to the fact that EE is basically interdisciplinary and applied in nature. Dealing with inter-disciplinary problems is something new and it requires different kinds of skills. Perhaps it will require a different kind of teacher training programmes for the new teachers and an orientation programme for those already in service. In this type of programme, first of all a kind of sensitivity towards environment is to be aroused. Secondly, the teachers are to be exposed to the kinds of environmental problems they are likely to face in the class-room. These coupled with emphasis on the use of software and hardware, are necessary elements of such a programme. The other implications are related to change of curriculum, methods of teaching and evaluation tools.

The above observations made the investigator interested in assessing the needs for environmental education in pre-service and in-
service education programmes of DIETs in Himachal Pradesh in the research problem stated as under:

5.1.2 Statement of the Problem:

"NEED ASSESSMENT FOR ENVIRONMENTAL EDUCATION IN PRE-SERVICE AND IN-SERVICE EDUCATION PROGRAMMES OF DIETs IN HIMACHAL PRADESH"

5.1.3 Objectives of the Study:

The present study will be conducted to attain the following objectives:

1. To develop and standardize the Environmental Awareness Questionnaire.

2. To develop and standardise the Questionnaire for Needs Assessment of Environmental Education for Pre-service training programmes.

3. To develop and standardise the Questionnaire for Needs Assessment of Environmental Education for In-service training programmes.

4. To study the environmental awareness of teacher educators, pre-service teacher trainees and in-service teachers in respect of the following components:

   e) Environmental Education.
   f) Forest and Environment.
   g) Pollution:
      - Soil Pollution
      - Air Pollution
      - Water Pollution
      - Noise Pollution
- Radioactive Pollution
h) Pollution Control

5. To compare the overall environmental awareness of teacher educators, pre-service teacher trainees and in-service teachers.

6. To compare environmental awareness of teacher educators, pre-service teacher trainees and in-service teachers in respect of the components of environment as listed in objective No. (4)

7. To assess the needs of environmental education in Pre-service training programmes of DIETs pertaining to academic component.

8. To assess the needs of environmental education in Pre-service training programmes of DIETs pertaining to curricular planning component.

9. To assess the needs of environmental education in Pre-service training programmes of DIETs pertaining to organisational component.

10. To assess the needs of environmental education in In-service training programmes of DIETs pertaining to academic component.

11. To assess the needs of environmental education in In-service training programmes of DIETs pertaining to curricular planning component.

12. To assess the needs of environmental education in In-service training programmes of DIETs pertaining to organisational component.
5.1.4 Hypotheses of the Study:

The following hypotheses have been formulated for the present study on the Academic component of the both Training programmes i.e. pre-service and in-service:

1. There are significant differences in the mean overall environmental awareness scores of Teacher Educators and Pre-service Teacher Trainees.

2. There are significant differences in the mean overall environmental awareness scores of Teacher Educators and In-service Teachers.

3. There are significant differences in the mean overall environmental awareness scores of Pre-service Teacher Trainees and In-service Teachers.

4. The Teacher Educators and Pre-service Teacher Trainees differ significantly in environmental awareness scores with regard to different components of environmental awareness (as listed in Objective No. 4).

5. There are significant differences in the mean environmental awareness scores of Teacher Educators and In-service Teachers in respect to different components of environmental awareness (as listed in Objective No. 4).

6. The Pre-service Teacher Trainees and In-service Teachers differ significantly in environmental awareness
scores with regard to different components of environmental awareness (as listed in Objective No. 4).

5.1.5 Delimitation of the Study:

The study will be delimited with respect to the following:

- The study was confined to the pre-service teacher trainees in elementary education i.e. J.B.T. students enrolled in two years course in various DIETs of Himachal Pradesh during 1998-2000 session, In-service primary teachers working in the primary schools of the state of Himachal Pradesh and Teacher Educators working in the various DIETS of Himachal Pradesh. Hence the results obtained and inferences drawn are relevant to the pre-service teacher training and in-service teacher training programmes at DIET level in Himachal Pradesh.

- The Study involved the analysis of need assessment of pre-service and in-service teacher training programmes at DIET level in Himachal Pradesh on three components i.e. Academic, Curricular planning and Organisational components only.

- The environmental awareness of teacher educators, pre-service teacher trainees and in-service teachers was measured with the help of Environmental Awareness Questionnaire developed by the Investigator herself.

- The needs assessment of pre-service training in EE at DIET level have been analysed by using Needs Assessment
Questionnaire of EE for the Teacher Educators at DIET level developed by the investigator herself.

- The needs assessment of in-service teacher training in EE at DIET level have been made by using Need Assessment Questionnaire of EE for the in-service teachers working in primary schools of Himachal Pradesh developed by the investigator herself.

- The data were collected from six DIETs of Himachal Pradesh i.e. Shimla, Solan, Nahan, Kinnaur, Dharamshala and Chamba only and the in-service primary teachers working in feeding primary schools within the jurisdiction of each DIET in the district.

Thus the present investigation was delimited in terms of objectives, sample, tools and statistical techniques etc. Therefore, the inferences drawn in the present study are applicable only in parallel situations.

5.1.6 Sample:

The target population in the present study covered all the DIETs in the State of Himachal Pradesh. Six DIETs were selected randomly out of twelve DIETs in the State of Himachal Pradesh. From these six DIETs 123 Teacher Educators were selected by following random cluster techniques. Further 184 pre-service teacher trainees were selected randomly from Six DIETs. Besides teacher educators and pre-service teacher-trainees, incidental-sampling technique was employed for the purpose of selecting 180 in-service
teachers from the feeding primary schools of the Six DIETs under study.

Thus total sample comprised of Six DIETs, 123 Teacher Educators, 184 Pre-service Teacher Trainees and 180 In-service Primary School Teachers for the present study.

5.1.7 Instrumentation:

To collect the information of assessing the needs of environmental education in pre-service and in-service teacher training programmes of DIETs in Himachal Pradesh, the following tools were constructed and standardised by the investigator herself for conducting the present study:

(i) Environmental Education Awareness Questionnaire.

(ii) Needs Assessment Questionnaire of EE for the Pre-service Training Programme at DIET level for Teacher Educators.

(iii) Needs Assessment Questionnaire of EE for the In-service Teachers Training Programmes at DIET level for In-Service Primary Teachers.

5.1.8 Analysis and Interpretation of Data:

The data were collected through Environmental Awareness Questionnaire, Needs Assessment Questionnaire of EE for Pre-service teacher training programme and Needs Assessment Questionnaire of EE for In-service teacher training programmes at DIET level. The information gathered through these questionnaires
were scored and tabulated. The data were analysed and interpreted using statistical techniques such as: percentages, 't'-test and $\chi^2$-test.

5.2 Findings of the Study:

The following conclusions were drawn on the basis of analysis and interpretation of data:

A. Environmental Awareness of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT)

1. Comparison of Overall Environmental Awareness of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):

- There is a significant difference in the overall environmental awareness of Teacher Educator and Pre-service Teacher Trainees. Pre-service Teacher Trainees possess more environmental awareness than the Teacher Educators.

- There is a significant difference between the overall environmental awareness mean scores of Teacher Educators and In-service Teachers. Teacher Educators have higher environmental awareness than In-service Teachers.

- There is a significant Difference between the overall environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers.
2. Comparison of Environmental Awareness on the Component of Environment and Environmental Education of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):

- There is a significant difference in the environmental awareness of Teacher Educator and Pre-service Teacher Trainees on the component of environment and environmental education. Teacher Educators possess more environmental awareness on this component than the Pre-service Teacher Trainees.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of environment and environmental education. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of environment and environmental education. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers.

3. Comparison of Environmental Awareness on the Component of Forest and Environment of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):
There is a significant difference in the environmental awareness of Teacher Educator and Pre-service Teacher Trainees on the component of Forest and Environment. Pre-service Teacher Trainees possess more environmental awareness on this component than the Teacher Educators.

There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Forest and Environment. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

There is a significant difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Forest and Environment. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers.

4. Comparison of Environmental Awareness on the Component of Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):

There is a significant difference in the environmental awareness of Teacher Educator and Pre-service Teacher Trainees on the component of Pollution. Pre-service Teacher Trainees possess more environmental awareness on this component than the Teacher Educators.

There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service
Teachers on the component of Pollution. In-service Teachers have higher environmental awareness on this component than Teachers Educators.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Pollution. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

5. **Comparison of Environmental Awareness on the Component of Soil Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):**

- There is no significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Soil Pollution. Hence both Teacher Educators and Pre-service Teacher Trainees possess same level of environmental awareness on this component.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Soil Pollution. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Soil Pollution.
Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

6. Comparison of Environmental Awareness on the Component of Air Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):

- There is no significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Air Pollution. Hence both Teacher Educators and Pre-service Teacher Trainees possess same level of environmental awareness on this component.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Air Pollution. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Air Pollution. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

7. Comparison of Environmental Awareness on the Component of Water Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):
- There is a significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Water Pollution. Pre-service Teacher trainees possess more environmental awareness than Teacher Educators on this component.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Water Pollution. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Water Pollution. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

8. **Comparison of Environmental Awareness on the Component of Noise Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):**

- There is no significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Noise Pollution. Hence both Teacher Educators and Pre-service Teacher Trainees possess same level of environmental awareness on this component.
- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Noise Pollution. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Noise Pollution. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

9. **Comparison of Environmental Awareness on the Component of Radioactive Pollution of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):**

- There is no significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Radioactive Pollution. Teacher Educators possess more environmental awareness than Pre-service Teacher Trainees on this component.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Radioactive Pollution. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant difference between the environmental awareness mean scores of Pre-service Teacher Trainees and
In-service Teachers on the component of Radioactive Pollution. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.

10. **Comparison of Environmental Awareness on the Component of Pollution Control of Teacher Educators (TE), Pre-service Teacher Trainees (PSTT) and In-service Teachers (IT):**

- There is no significant difference in the environmental awareness of Teacher Educators and Pre-service Teacher Trainees on the component of Pollution Control. Hence both Teacher Educators and Pre-service Teacher Trainees possess same level of environmental awareness on this component.

- There is a significant difference between the environmental awareness mean scores of Teacher Educators and In-service Teachers on the component of Pollution Control. Teacher Educators have higher environmental awareness on this component than In-service Teachers.

- There is a significant Difference between the environmental awareness mean scores of Pre-service Teacher Trainees and In-service Teachers on the component of Pollution Control. Pre-service Teacher Trainees have more environmental awareness than In-service Teachers on this component.
(B) Assessment of Needs for Environmental Education in Pre-Service Teacher Training Programmes at DIET Level:

On the basis of analysis and interpretation of the information collected through the Needs Assessment Questionnaire for Pre-service Teacher Training in Environmental Education, the following needs are assessed in pre-service teacher training programme of DIETs in environmental education under three training components under study:

1. Academic Component:

- There is no institutional policy for pre-service teacher training programme at DIET level in Himachal Pradesh. Thus there should be an institutional policy for pre-service teacher training programme in environmental education.

- Environmental awareness programmes be organized at DIET level to make the pre-service teacher trainees to understand various environmental issues at the global and National level.

- The National Development programme for environmental education at pre-service training level for elementary stage in DIETs in Himachal Pradesh should be implemented.

- There is a need of coordination between various training faculties in DIETs.

- Annual plan for environmental education for pre-service teacher training course should be prepared by each DIET.
- There is a need to have community participation for making environmental education programme effective and successful.

- The following environmental problems are identified by the Teacher Educators:
  - Soil Pollution.
  - Water Pollution.
  - Air Pollution.
  - Noise Pollution.
  - Population Problem.
  - Litter and Solid Waste Problem.
  - Social Pollution.

These problems at local level are needed to be discussed during pre-service training and pupil-teachers should be trained in solving these environmental problems.

2. Curricular Component:

The major component of pre-service training in EE is the planning and transaction of curriculum. The following areas of curriculum planning are needed in pre-service training programme in EE:

a) Setting of goals and objectives:

- To acquire an awareness of sensitivity to the total environment.

- To acquire the social values.

- To develop skills for solving environmental problems.
- To encourage the trainees to develop attitude of care and concern for the environment.

- To identify local environmental problems and make their systematic study.

- To develop skills in designing and evaluation EE curricular materials.

- To make use of computers for preparing lesson plans in EE.

- To translate general objectives into specific objectives by stating them in behavioural terms.

- To equip the teachers with necessary skills, teaching techniques and methodologies.

b) **Selection of contents to be included**

   In JBT, I year and II year teaching of Environmental Studies (EVS) paper VI is prescribed. In Teaching of Social science Paper VI and Teaching of Health and Physical Science Paper VII, some topics related to environmental education are also included. The contents of syllabus relating to environmental education have been given in Para 4.3 (D)-I of this chapter. The existing curriculum needs to be revised to realize the objectives of pre-service teacher training courses effectively.

   - Various types of Pollution such as Radioactive and Social pollution.
   - Deforestation.
   - Ecological Disruption.
- Energy crisis.
- Land use and soil erosion.
- Project work.
- Planning and organisation of EE programmes including lesson planning in EE.
- Identifying the local environmental issues.
- The tackling of environmental problems.

(c) Curricular Approach:

Majority of the Teacher Educators expressed their opinion of infusing EE in the existing subjects. So, infusing EE in the existing subjects may be incorporated in pre-service training courses rather than extra curricular programmes. The following tools of EE should be included in the syllabus of EE.

- Strong General Education.
- Understanding of Natural Resources.
- Ecological awareness.
- Economic awareness.
- Problem solving.
- Understanding that man is a part of human eco-system.

The following aspects of EE should be taken care of while planning pre-service training programme in EE.

- Major practical skills should be covered effectively.

- Relevant theoretical areas of EE are included in the curriculum.

- Learning materials in EE should be provided.

- There should be coordination between theory and practical aspects of EE.

- Teachers' guide book should be provided for effective implementation of the EE-programmes.
(d) Development of Skills:

The emphasis should be laid on development of skills during pre-service training. The following skills may be developed as suggested by majority of the Teacher Educators:

- Speaking.
- Observing.
- Writing.
- Modeling.
- Describing.
- Making Diagrams.

(e) Methodologies of Curriculum Transaction:

The following methods of curriculum transaction should be included in the existing syllabus of teaching of environmental studies:

- Small group projects.
- Outdoor activities.
- Simulation and games.
- Case studies.
- Use of exhibits.
- Team teaching.

(f) Organisation of Environmental Activities:

The following environmental activities be organised for enhancing awareness among pupil teachers in addition to theoretical part of EE:

- Plantation.
- Making trees as a friend.
- Eco-club.
- Visit to slum areas.
- Active participation in EE-programmes.
- Celebrating environmental day.
- Meeting with community.
(g) Use of Audio-Visual Aids:

Following Audio-Visual aids are being studied and used in existing curriculum of JBT pre-service teacher training course:

- Picture, Map.
- News Paper and Magazines.
- Models.
- Flash Cards.
- Hobbies.
- Innovative Teaching Aids.

In addition to these, the following Audio-Visual Aids should be added in the curriculum.

- Posters.
- Slogan writings on environment.
- Overhead Projector.
- Computer, VCR, TV, Radio etc. (Modern Technological Media)

(h) Teaching Techniques:

Following Teaching Techniques are being studied and included in the existing curriculum of JBT pre-service teacher training course.

- Lecture.
- Questions Answer Approach.
- Story Telling.
- Demonstration.
- Observation.
- Programmed Instruction.
- Learning by doing.
- Field trips and excursions.

In addition to these, the following teaching Techniques may be included in the curriculum:
- Experimentation.
- Assignment.
- Use of modern media.
- Activity-oriented approach.
- Out of classroom experiences.

(i) **Evaluation Techniques**:

The syllabus of teaching of environmental studies if JBT I year and II year included the following topics on evaluation:

- Role of evaluation-testing process interest aptitudes.
- Modes of evaluation such as continuous and comprehensive evaluation end of unit/section evaluation.
- Construction of test items preparation of short-answer type questions multiple response type testing reasoning ability.
- Analysis of educational data.
- Feedback of students and teacher.
- Formative Assessment.

In addition to the above topics of evaluation, formative and summative evaluation be practiced to assess the effectiveness of training programme and the following tools of evaluation should be used as suggested by teachers educators:

- Teachers' Observation.
- Questionnaire and interview schedule.
- Internal Assessment.
- Pupils Record.
- Teachers made Tests.
- Rating Scale.
- Analysis of Students' Product.
- Participants' Observation.
- Check-list Survey.
- Socio-metric Techniques.
- Maintenance of Anecdotes.
- Attitudinal Questions.
3 Organisation Component:

The following needs are assessed with respect to organisation and management of EE programme at pre-service training level i.e. JBT two years course.

a) The institutional environmental education objectives should be clearly defined.

b) The institutional plan should be prepared covering:
   - Environmental Education Course Development.
   - Arranging Activities in EE.
   - Environmental Education Physical Resources.
   - Environmental Education Capital and Recurrent Costs.

c) Environmental education plans should be reviewed regularly.

d) Monitoring system for EE should be developed.

e) There should be a provision of assessing the cost-effective and cost-efficiency of training programmes such as materials, activities and methods employed.

f) Periodical evaluation should be carried out to assess the effectiveness of training programme in EE.

g) There is no satisfactory staff development programmes in DIETs. Hence the Teachers working in DIETs need special training on Environmental Education in the form of organising orientation programmes, refresher course etc.
h) For effective implementation of EE training programme, there should be provision of finances. The following sources of funds be tapped as revealed by Teacher Educators:

- Internal Funds.
- Separate Govt. Budget Allocation exclusively for EE.
- Fees.
- Community Contribution.

(C) **Assessment of Needs for Environmental Education in In-service Teacher Training Programmes at DIET Level:**

On the basis of analysis and interpretation of data collected through the Needs Assessment Questionnaire, the following needs are assessed in In-service Education Training Programmes of DIETs in Environmental Education under three training components:

1. **Academic Component**:

- There is no provision of in-service teachers training programme in environmental education. Thus, in-service training programmes in EE are organized at DIET level to equip the teachers with necessary skills and competencies in order to make their teaching of EVS effective.

- Environment awareness programmes are organized to make the in-service teachers to understand various environment issues at the global and national level.

- The following environmental problems are identified by the in-service teachers.

* **Pollution Problems** such as: water pollution, Air pollution, Garbaze pollution, Noise pollution, Soil Pollution, Social Pollution etc.
* Population Problems.

* Polythene Bags Problems.

These problems at local level are needed to be discussed during in-service training programmes and in-service teachers should be helped in solving these environmental problems.

2. Curricular Component :

The major component of in-service training in EE is the planning and transaction of curriculum which is needed in in-service training programme.

a) Setting of Goals & Objectives :

The Goals and objectives of the in-service training of primary teachers in EE may be as follows :

- To develop among the teachers an awareness of the environment and need to develop the habit of living in harmony with nature.

- To help them acquire a basic understanding of environment in its totality-natural and man-made, technological and social and its associate problems.

- To develop in them a set of values and feelings of concern for environment.

- To orient them in the techniques of planning, implementation, monitoring and evaluation of programmes and projects in EE.
- To equip the teachers with necessary skills, teaching techniques and methodologies in EE.

- To develop an ability to manage EE and lead ‘action’.

b) Selection of Content:

In primary classes from II to V environmental studies (EVS) textbook is prescribed. The class wise content of syllabus has been given in Para –A 9 (iv). The existing curriculum needs to be revised and the following topics be added in the existing syllabus to realize the objectives of EE effectively:

- Various types of pollution.
- Population explosion.
- Conservation and Deforestation.
- Soil erosion etc.

In-service training to teachers should include the following content areas so that the teachers may teach EVS systematically and develop concern for environment among students:

- Pollution such as water, air, soil, noise and radioactive.
- Population explosion.
- Health and Hygiene.
- Deforestation.
- Use of resources and conservation.
- Food and Nutrition.
- Energy crisis.
- Monitoring and Evaluation.
- Ecology.
- Planning and Organisation of EE programme including lesson planning.
- Land use.
c) Curriculum Approaches:

Subject based approach is being followed at primary stage. There is a need to incorporate EE as a separate subject in Primary curriculum. Infusing EE in the existing subject may be introduced at primary stage. The in-service training in EE may include the following two approaches in planning curriculum:

3. Subject based approach.
4. Infusing EE in the existing subject.

d) Methodologies of Curriculum Transaction:

Following teaching techniques/methodologies be undertaken during in-service training in EE:

- Small group projects.
- Simulation and games.
- Role play.
- Activity oriented approach.
- Field trips.
- Use of exhibits.
- Outdoor activities.
- Case studies.
- Action research.

e) Evaluation of curriculum:

The following evaluation techniques may be used for evaluating curriculum:

- Formative and Summative
- Continuous and Comprehensive.

In-service teachers suggested the tools of evaluation such as:

- Checklist survey.
- Teacher made tests with regard to knowledge, awareness and understanding of environmental problems.
- Rating scale.
- Questionnaire and interview schedule.
- Teachers’ observation of students.
- Pupils’ records.
- Participants’ observation.
- Achievement tests.
- Maintenance of anecdotes.
- Attitudinal questions.
- Analysis of student’s products.
- Sociometric techniques
- Internal assessment.

3. Organisational Component:

As depicted by in-service teachers, the following in-service training programmes in EE are organized by DIETs along with their number of participants, duration and frequency in a year.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Level of Training</th>
<th>No. of Participants</th>
<th>Duration</th>
<th>Frequency in a year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oriented Programme</td>
<td>15</td>
<td>2 days</td>
<td>Once</td>
</tr>
<tr>
<td>2</td>
<td>Workshop</td>
<td>15</td>
<td>7 days</td>
<td>Once</td>
</tr>
<tr>
<td>3</td>
<td>Seminar</td>
<td>15</td>
<td>1 day</td>
<td>Once</td>
</tr>
<tr>
<td>4</td>
<td>Conferences</td>
<td>25</td>
<td>3 days</td>
<td>Once</td>
</tr>
<tr>
<td>5</td>
<td>Refresher course</td>
<td>20</td>
<td>21 days</td>
<td>Once</td>
</tr>
<tr>
<td>6</td>
<td>Summar courses</td>
<td>25</td>
<td>30 days</td>
<td>Once</td>
</tr>
<tr>
<td>7</td>
<td>Contact Programme</td>
<td>15</td>
<td>7 days</td>
<td>Once</td>
</tr>
</tbody>
</table>

Other organizational aspects such as development of faculty, selection of experts, identification of financial resources, monitoring and evaluation of in-service training programme will be the same as for pre-service training and should be organized by DIETs.

(D) Environmental Education Module for Pre-service and In-service teacher training programmes at DIET level:

The following modules for Pre-service and In-service Teachers’ Training programmes in Environmental Education are suggested:
(i): Pre-service Teachers’ Training module:

a) Setting of Goals and Objectives:

- To acquire an awareness of sensitivity to the total environment.
- To acquire the social values.
- To develop skills for solving environmental problems.
- To encourage the trainees to develop attitude of care and concern for the environment.
- To identify local environmental problems and make their systematic study.
- To develop skills in designing and evaluation EE curricular materials.
- To make use of computers for preparing lesson plans in EE.
- To translate general objectives into specific objectives by stating them in behavioural terms.
- To equip the teachers with necessary skills, teaching techniques and methodologies.

b) Duration of the Training: Two Years.

c) Planning of EE-Programme:

The following activities should be carried out to plan the EE-programme for Pre-service Training.

i) The Institutional Policy for pre-service teacher training programme in EE should be prepared.
ii) The national development programme for EE at pre-service training level for elementary stage in each DIET should be implemented and planned accordingly.

iii) Annual plan for EE for pre-service teacher training course should be developed.

iv) A process of coordination between different faculties should be developed.

v) Making arrangement for community participation.

d) Selection of Content:

Teacher preparation in EE should focus on and reflect the many faceted and interdisciplinary nature of EE, while doing this pupil teachers should be provided with opportunities to acquire and apply the knowledge, skills and attitudes inherent in EE. At the very minimum, the selection of content should include:

- Basic training in Ecology.

- Field and laboratory experiences for teachers in the area of environmental science.

- Knowledge of Environmental issues and problems of resource management.

- Competencies in Environmental Problem identification, Problem and issues investigation. Issues evaluation, Evaluation and Citizenship action relevant components of many disciplines are drawn upon to create a distinct EE-unit.
The following content areas should be included in the syllabus of EE/EVS:

- Basic knowledge of ecology.
- Natural resources and its conservation.
- Identification of environmental problems and its ways of tackling the following environmental problems may be taken up:
  - Pollution and its types such as Soil, Water, Air, Noise, Radioactive and Social Pollution.
  - Control of pollution.
  - Afforestation and Deforestation.
  - Ecological Disruption.
  - Energy Crisis.
  - Land Use and Soil Erosion.
  - Garbage Problem.
- Identifying local environmental issues.
- Planning and organisation of EE-programmes including lesson planning in EE.
  - Project work.

Methodologies of Curriculum Transaction:

Following methods of curriculum transaction be studied and practiced during training:

- Small Group project:
- Outdoor activities.
- Simulation and Games.
  - Case studies.
- Use of exhibits.
  - Action research.

Organisation of Environmental Activities:

- Plantation.
- Making trees as a friend.
- Eco-club.
- Visit to slum areas.
- Active participation in EE programmes.
- Meetings with community.

**Use of Audio-Visual Aids:**

The following Teaching Aids should be studied and used during training:

- Picture, Map.
- Newspaper and magazines.
- Models.
- Flash cards.
- Hobbies.
- Innovative teaching aids.
- Posters.
- Slogan writing on environment.
- Overhead projector.
- Computer, TV, VCR, Radio etc.

**Teaching Techniques:**

Following Teaching Techniques should be studied and followed during practice of lesson in EVS:

- Lecture.
- Question-answer approach.
- Story telling.
- Demonstration.
- Observation.
- Programmed instruction.
- Learning by doing.
- Field trips and excursion.
- Experimentation.
- Assignments.
- Use of modern media.
- Activity-oriented approach.
- Out of classroom experiences.

**Evaluation Techniques:** The following topics of Evaluation should be studied and practised during training:
- Role of evaluation-testing process of interest and aptitudes.
- Modes of evaluation such as formative and summative, continuous and comprehensive.
- Test construction – objective type, essay type tests.
- Analysis of educational data.
- Internal assessment.

The following tools of evaluation be included in the syllabus:

- Teachers' observation.
- Questionnaire and interview schedule.
- Pupils' record.
- Teachers' made tests.
- Rating scale.
- Check-list survey.
- Socio-metric techniques.
- Participants' observation.

Practical Work:

Preparation of charts, models, collection, field work, scientific outings, excursion, observation of flora and fauna, organisation of environmental activities.

(e) Faculty Development Programme:

All the faculty members should be oriented to teach EE for this, orientation programme for Teacher Educators at least for seven days, duration should be organised in the beginning of session:

- EE related materials, articles, papers and other reading materials should be provided to the faculty.
- Core faculty for EE should be identified.
- External resource faculty should be recognized.

(f) Organisational Support:

- Administrative support for EE training should be mobilised.
- Supply of equipment and materials needed for EE-training programme be ensured.
- Funding of EE training programme should be ensured in time.

(g) Monitoring and Evaluation:
- Principal of the institution should keep in touch with faculty for information monitoring.
- Experiences should be shared with faculty members in staff meetings.
- Periodical evaluation should be carried out to assess the effectiveness of training programme in EE.
- Environmental education plans should be reviewed regularly.
- A provision should be made for assessing the cost-effective and cost-efficiency of training programmes.
- Information collected from monitoring should be used to improve EE training programme. For this aspect, checklist is suggested.

(ii) Environmental Education Module for In-service Teacher Training Programme:

In-service training may be organised in face-to-face programme by DIETs for In-service Teachers teaching environmental studies (EVS) in primary schools:

a) Duration and Type of the Training: Depending upon the type of programme the duration of training should be decided. The following in-service training programmes may be organised by DIETs
Sr. No. | Level of Training       | No. of Participants | Duration | Frequency in a year |
--------|-------------------------|---------------------|----------|---------------------|
1       | Oriented Programme      | 15                  | 2 days   | Once                |
2       | Workshop                | 15                  | 7 days   | Once                |
3       | Seminar                 | 15                  | 1 day    | Once                |
4       | Conferences             | 25                  | 3 days   | Once                |
5       | Refresher course        | 20                  | 21 days  | Once                |
6       | Summar courses          | 25                  | 30 days  | Once                |
7       | Contact Programme       | 15                  | 7 days   | Once                |

b) Setting of Goals and Objectives:

The Goals and objectives of the in-service training of primary teachers in EE may be as follows:

- To develop among the teachers an awareness of the environment and need to develop the habit of living in harmony with nature.
- To help them acquire a basic understanding of environment in its totality-natural and man-made, technological and social and its associate problems.
- To develop in them a set of values and feelings of concern for environment.
- To orient them in the techniques of planning, implementation, monitoring and evaluation of programmes and projects in EE.
- To equip the teachers with necessary skills, teaching techniques and methodologies in EE.
- To develop an ability to manage EE and lead 'action'.

c) Selection of Content (Design Course):

The following topics may be discussed during in-service training:
- Concept of EE and its need.
- Pollution and its types such as Water, Air, Soil, Noise, Radioactive and Social.
- Identification of local environmental problems and their solution.
- Population explosion and its impact.
- Health and Hygiene.
- Afforestation and Deforestation.
- Ecology.
- Use of Resources and Conservation.
- Energy crisis.
- Planning and Organisation of various environmental activities.
- Preparing lesson plans on EE.
- Land use and Soil erosion.
- Community participation in EE.
- Case studies in EE.
- Environmental Awareness Programmes.

d) **Curricular Approach:**

Infusing environmental education approach is followed during training.

e) **Identification of Faculty Needs:**

According to the experiences and competencies of the faculty, the needs may be identified and the teachers of DIET should be oriented in advance by organising orientation programme.
f) Resource Persons Identification:

Resource persons should be select from University, Colleges of Education, EE-Experts. A panel of Resource Persons should be prepared in advance.

g) Methods and materials for transaction:

Methods:

Some of the Potential Methods in curriculum transaction recommended are:

- Experimental learning-sensory experiences.
- Lectures-visiting experts, community members.
- Practical learning through case studies, field studies.
- Action research.
- Preparation of lesson plan on EE.
- Group Techniques.
- Tutorial Presentation.
- Debates, and
- Voluntary community work, visit to slum area.

Emphasis on skill, knowledge along with environmental ethics should be an important criterion in-service training.

Training Materials:

Since in-service training in EE included both school and out of school activities, the materials should not be merely book-based/theoretical. It should be based on field experiences and development of case studies of successful experiments. Participating trainees would need to be actively involved in generating films and other audio-visual materials including computers.
h) **Feedback from the Participants:**

Feedback with regard to effectiveness of training be collected from the participants using feedback questionnaire and should be used to improve in-service training programmes.

i) **Organisation Support:**

- Administrative support for organising in-service training programmes in EE should be mobilised.
- Supply of equipment and materials needed for in-service training programme is ensured.
- Funding of EE in-service training programme should be ensured well in time.
- Planning of in-service training programme is made well in advance.
- Provision of Boarding and lodging facilities is made for the participants.

j) **Monitoring and Evaluation:**

- Principal of the institution should keep in touch with faculty members for informal monitoring of the programme.
- Follow-up programmes to assess training transfer are carried out periodically.
- In-service training plans should be reviewed regularly.

(iii) **Suggestive Model for Pre-service and In-service Training Programmes in EE at Elementary level Organised by DIETs:**

Combined model for pre-service and in-service teachers training programmes in Environmental Education at Elementary
Level is suggested which can be used by DIETs for organising EE-programmes and is presented below in the form of flow diagram:

**Proposed Model for EE in DIETs**
5.3 Educational Implications:

The implications based on the findings of the study are given as below:

1. In the present study, significant differences in overall environmental awareness were found between Teacher Educators and Pre-service Teacher Trainees, Teacher Educators and In-service Teacher & Pre-service Teacher Trainees and In-service Teachers. Pre-service Teacher Trainees possess more environmental awareness than Teacher Educators and In-service Teachers. Further, Teacher Educators have possessed more environmental awareness than In-service Teachers. One of the reasons which may be accountable for this is that Pre-service Teacher Trainees are freshers and have more exposure for competitive examinations than Teacher Educators and In-service Teachers. It suggests that there is a need of organising orientation programme to Teacher Educators and In-service Training programmes for In-service Teachers in the area of Environmental Education for improving their environmental awareness.

'Learning by doing' is a better alternative in developing environmental awareness. This would be possible through field trips, nature trails and organising study camps for understanding the environment in its totality-biological, physical and social. There is a need to develop among the In-service Teachers certain abilities, skills and behaviour which help them in observing their environment more keenly and
transacting environmental education curriculum to primary school students effectively and efficiently.

2. The study attempted to assess the needs for environmental education in Pre-service and In-service Teacher Training programmes of DIETs in Himachal Pradesh at Elementary Education stage. Whilst the results on the status of environmental education and teachers, self perceived needs provide more insights to the development of environmental education as a practical issue, the study of teachers, receptivity may offer some theoretical insights. It suggested that:

- There should be institutional policy for Pre-service and In-service Teacher Training programmes in environmental education at Elementary Stage.

- There is a lack of In-service Teacher training programmes in environmental education form primary teachers. Hence, it is suggested that various types of In-service Teacher Training Programmes in environmental education should be organised at DIET level.

- The Govt. should make efforts to provide funds and other relevant materials for Pre-service and In-service Teacher Training programmes in elementary education at DIET level.

- The curriculum of environmental education for Pre-service and In-service Teacher Training programmes in environmental education should be designed as per the needs assessed in the present study.
- The concerned authorities must arrange orientation and refresher courses for training of the Teacher Educators in Environmental Education.

5.4 Perspectives for Further Study:

According to Goyal (1985), the research in teacher education both in India and Abroad has so far been nominal. Sukhia et al (1966) very rightly pointed out "a comparatively new but productively field of education, teacher education is open to many kind of research .........." (pp.49).

The above observation show that qualitative research in environmental education related to teacher preparation needs to be undertaken on a much larger scale than what it is now. Since the teacher is one of the most important components in educational process, research on the status of variables affecting the performance is of great importance. The following are some suggested problems based on the findings of the study, which need further investigation.

1. The present study can be replicated in DIETs located in other states of the country.

2. A study may be undertaken to evaluate the environmental education curriculum for Pre-service Teacher Training programmes at various levels.

3. A study may be conducted to evaluate the primary school curriculum in environmental education.
4. Teacher's receptivity to environmental education may be studied in relation to belief efficacy in teaching environmental education.

5. A study can be undertaken to investigate the environmental awareness of school students of various groups on various environmental issues.

6. A study can be undertaken to study the awareness of community on various environmental problems.

7. A comparative study may be planned between the awareness level of school and college students as well as between various groups of disadvantaged sections of the society on environmental issues.

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