CHAPTER 5
5.1 Chapter Preview

This chapter explains the methodology of the study. In the present study, the effectiveness of the active EESD teaching learning approach is evaluated through a meticulous experimental design. The aim of the active EESD approach is to provide the necessary exposure to knowledge, attitudes, behaviour and skills, through examples of facts, processes, interactions and applications on environment and sustainable development. Thus, the active EESD approaches include a combination of theoretical and empirical methods.

5.2 Research Design

In the present study, pre and post test experimental method were used as suggested by several workers such as Kerlinder, (1973), Dugard & Toldman, (1995), Karasar (2005), in order to evaluate the differences between the students who were facilitated by active EESD instructional strategy in the experimental group by the researcher and the control group students, who receive conventional teaching strategy by their regular teachers, over the same period of time. The regular teachers were carefully chosen in such a way that they are highly motivated and committed in delivering the conventional EE modules to the school children. But similar tests were performed on these two groups—both pre and post EESD implementation of the prepared modules (Figure 5).

![Figure 5 A schematic diagram of pre/post test design for EESD modules](image-url)
Students were pre tested to evaluate the previous knowledge, skills, behaviour, and attitudes towards various environmental issues focused on air, water, biodiversity conservation and solid waste management before the implementation of the EESD module. The experimental groups were then exposed to EESD modules using active EESD teaching strategy; this includes interactive classroom sessions, field exposures, experiments, small hands-on projects and service learning opportunities. At the end of the program, both experimental and control groups underwent the post-test using similar variables that were used for the pre-test.

5.2.1 Rationale for site selection

Sustainable development in cities is one of the most important educational challenges of our times. This requires a focus on creating a quality learning and educational environment that promotes sustainability, Providing lifelong learning opportunities in cities; teaching tolerance and mutual understanding in urban societies; enabling children and youth to learn to live and participate in urban life; enhancing learning to create inclusive societies in inclusive cities; developing learning in all its diverse forms (UNESCO).

The school is a unique institution where connections are made between problems and local life. It has the potential of serving as an enabler of change and of facilitating the acquisition of the knowledge and skills necessary to function as an active and responsible citizen. Local authorities have a strategic role to play in making these centres of learning, training and personal development available to all citizens. At the same time, the capacity to live together is generated through a wide range of non-formal and informal modalities of learning. The challenge of sustainability requires learning how to change and nowhere is this more urgent or important than in urban settings (UNESCO).

Middle school Children have been selected for this EESD program as they are future citizens. Children can contribute in EESD program with their valuable ideas and their participation is a precondition for environmental issues. Besides, children’s participation has already been widely researched (Moore, 1978; Ward, 1978; Hart, 1992, 1995, 1997; Matthews, 2001; Chawla, 2002; Reid et al, 2008; Simovska and Jensen., 2009). Hart (1995) states that; We need now a more radical social science research with children in which children themselves learn to reflect upon their own conditions, so that they can gradually begin to take greater responsibility in creating communities different from the ones they inherited. When children deal with complicated and increasing environmental problems, they may feel concerned and bothered but also lack the courage to act (Jensen and Schnack., 2006). As has already been shown, there is no direct link between environmental knowledge and environmental behaviour (Kollmuss and Agyeman., 2002), or scientific knowledge and people’s activation (Finger, 1994). Thus Environmental education, according to the critical paradigm, should focus on children’s empowerment and action (Kollmuss and Agyeman., 2002).
5.2.2 Population and sample

Middle (6th to 8th standard-13 to 15 age group) and high schools (9th and 10th standard-16 to 17 age group) from urban/peri-urban areas of Puducherry and Cuddalore were selected based on the availability of green gardens to conduct biodiversity related activities, availability of sufficient open space for solid waste management/recycling and adequate lab facilities for air and water quality assessment. The dedication, interest and motivation levels of the concerned teachers, school principals and correspondent were also considered for selecting the schools. The study sample consisted of 240 students. The researcher has found that in the selected schools, though all students are exposed to EE modules, only a few motivated students are selected for active EESD. The students for the experimental (EESD) and control group (not exposed to EESD/exposed to conventional EE) were carefully chosen in such way that they were never exposed to any hands-on-activity beforehand. Only highly motivated and committed students from standards eighth and ninth were selected. These students have more time availability for extracurricular activities than the high and higher secondary schools. The senior school students (from 10th Stds onwards) are mostly engaged with public/competitive examinations and hence will have less interest /motivation and time to participate (Table.1).

<table>
<thead>
<tr>
<th>Schools</th>
<th>No. of selected Students</th>
<th>Management</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chewalier Sellane Government Higher Secondary School (CSS)</td>
<td>60</td>
<td>Department of school education</td>
<td>Puducherry</td>
</tr>
<tr>
<td>Makkal Thalaivar Vasudeva Subya Government High School (MTV)</td>
<td>60</td>
<td>Department of school education</td>
<td>Puducherry</td>
</tr>
<tr>
<td>Javahar Navodya Vidyalaya (JNV)</td>
<td>60</td>
<td>Ministry of Human Resource Development (MHRD),</td>
<td>Puducherry</td>
</tr>
<tr>
<td>Sri Valliammal Matric Higher Secondary School</td>
<td>60</td>
<td>Private owned</td>
<td>Cuddalore</td>
</tr>
</tbody>
</table>

The student’s age group of the selected students ranged between 13 and 15 years. Boys and girls represented 62% and 38% of the population respectively. Among the total numbers, 60 students randomly chosen from each school were divided into two groups in
which, 30 students were kept as experimental group; another 30 students from the same school were treated as control group.

5.2.3 Tools and techniques

For the present study, Questions were prepared with slight modifications of items from existing questionnaires (Kostova., 2008 and Hagenbuch et. al., 2009). The questions are grouped into four categories (Table 2 - refer Appendix 1 for details) to compare overall reported changes in knowledge, attitudes, behaviour and skills on air, water, biodiversity conservation and solid waste management.

Table 2 Number of questions on selected environmental variables to measure student’s attitude, behaviour, knowledge and skills

<table>
<thead>
<tr>
<th>Environmental Variable</th>
<th>Attitude</th>
<th>Behaviour</th>
<th>Skills</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>6</td>
<td>10</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Water</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Biodiversity conservation</td>
<td>5</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Solid waste management</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Questions used a standard five-point Likert scale (Hagenbuch et.al., 2009) ranging from 1 (strongly agree) to 5 (strongly disagree).

5.2.4 Curriculum design and implementation

An exploratory survey among the selected school students and the neighbourhoods indicated that air/water quality, biodiversity conservation and solid waste management were the priority issues of concern. Hence, they were used for preparing EESD modules. The major objectives of the EESD modules are to foster the acquisition and transfer of knowledge, behaviour, attitudes and skills and attributes concerning the environment and its problems (UNESCO-UNEP International environmental Educational Program, 1985) (Appendix 2) as well as to monitor their efficacy on the students and teachers. The EESD module for the successful study of air, water, biodiversity conservation and solid waste management is composed of three constructs - didactic, conceptual and technological (modified and adopted from International Workshop on Environmental Education, Belgrade 1975, Kostova 2003, UNESCO 2005, CEE and CSE).
The didactic construct ensures contemporary educational process in which all achievements of pedagogy and psychology are put into practice. The conceptual construct comprises the environmental issues /concepts and reveals them from different perspective- cognitive, value and action. These three constructs of the innovative model of EE proposed by Kostova (2003) was taken together to provide the possibilities for closer interaction of psychology and pedagogy with environmental issues on the basis of continuous research and improvement. Through the innovative model of EESD, a system of approaches was put into practice. To prepare this EESD module, basic EE objectives as prescribed by NCERT (2005) were also considered.

5.2.5 Instructional Strategies

A variety of instructional strategies and experiential approaches were used in active environmental education for facilitating sustainable development. These include classroom sessions, practical, active-learning and creative drama and small projects. Actual strategies employed were (as suggested by Stone, 2007):

- Outdoor adventures and experiences
- Educational camping
- Field trips
- Fieldwork
- Wilderness trails and nature walks
- Experiments.

Inquiry-based learning, activities and laboratories provide students with opportunities to collect, analyze, interpret and present data. Students can also identify and prioritize factors, make predictions and test hypotheses, and construct graphs and charts (Stone, 2007) In addition, a variety of instructional strategies were also adapted that included- documentary film shows, case studies, classroom debates, group presentations, simulation games, drama and small projects as suggested by Heyman (1982), Gifford (2002) Proulx, (2004). (Table 3)

Through the storytelling contest, students were asked to express their ideas about the environmental issues, as well as to formulate their vision for the future of the city and air and water quality status besides biodiversity as well as solid waste issues. Through this procedure, Students shared their opinions and shaped a common pool of ideas.

Students were encouraged to take photographs of nature and wildlife instead of collection of samples/live specimens so that they can inculcate a culture of conservation into their day today interactions with nature and wildlife (Plate. 1). This reduced the mortality of rare plants and animals, and thereby conserving campus biodiversity (Plants, butterflies, dragonflies, birds and insects). Afterwards, Students were encouraged to express in writing why they took these pictures and what they intended to show through the power point presentations in front of all other school students.
Table 3 Instructional strategies for implementing EESD program

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands-on activities</td>
<td>Involve learners working with and manipulating materials to explore a concept for solving problems.</td>
</tr>
<tr>
<td>Story telling</td>
<td>Transmit knowledge through an oral tradition and allows audience to experience the emotions and environment of characters in the story</td>
</tr>
<tr>
<td>Role-playing</td>
<td>Assign learners to specific roles in a scenario to act out the situation and gain new perspectives, and problem solving skills</td>
</tr>
<tr>
<td>Contests</td>
<td>Provide incentives for environmental action or involvement to raise public awareness of an environmental issue, resource, or organization.</td>
</tr>
<tr>
<td>Field trips</td>
<td>Provide first hand experiences for participants with a physical site and resources in a community</td>
</tr>
<tr>
<td>Games</td>
<td>Demonstrate and teach environmental concepts through fun but structured play, involving elements such as challenge, collaboration, movement, and quiet concentration.</td>
</tr>
<tr>
<td>Drama</td>
<td>Develop students’ understanding of basic environmental and ecological concepts.</td>
</tr>
</tbody>
</table>

Source: Susan K Jacobson et al., 2007

Plate 1 students using photographic technique

Games related to various environmental issues (Plate.2), such as human population problems, water pollution, air pollution, solid waste issues, biodiversity loss desertification, urbanization, have been evolved based on the suggestions of several earlier workers (Jacobson et. al., 2007).

The use of drama and role play, particularly with middle school students aged 13 to 15, were used as a strategy to develop students’ understanding of basic environmental and ecological concepts. Various types of creative writing essays and poetry were used to raise environmental awareness (Bailey & Watson, 1998; Gifford, 2002; Li, Whitty, 2003;
2006; Stone, 2007). After the end of each activity, students were asked to write down their ideas expressing their perceptions, feelings and experiences about their environment.

Plate 2 games conducted related to ecological concepts

5.3 Hand-on-Exercises

5.3.1 Water Monitoring Program

Water monitoring program was carried out by experimental group students under the closer supervision and guidance of the researcher. The first step was to involve students in water quality monitoring program conducted in school as well as residential places. Water samples were randomly collected from both schools (Tap water and bore well) as well as the neighborhoods (Tap water bore well and surface water) (plates 3, 4, and 5). The ground water/bore well water samples ranging from 20 to 25 m. depth as well as surface water from a tank or pond for drinking purposes were used as the sampling points. The water samples were meticulously collected in laboratory glassware were rinsed with distilled water and washed with the water to be tested. Water testing was done with portable water test kit JAL-TARA, developed by Development Alternatives (DA), New Delhi. Students have analyzed simple water quality parameters such as pH, Fluoride, Nitrate, Iron, Hardness, Chlorine, Ammonia and coliform. Students also interacted with local people to convey the findings. There were also discussions on the need to ensure good quality supply of water and the water associated health problems.

Plate 3 Hands-on-exercise on water quality assessment at J.N.V School
5.3.2 Air Monitoring Program

Air pollution is one of important local as well as global environmental problems that threaten the health/wellbeing of living organisms, leading to a loss of biodiversity or disrupting the function of the environment as a system. The presence in the atmosphere of solid, gaseous or liquid substances emitted by natural sources and of human activities such as increasing vehicular density, tremendous growth of industries and improper solid waste burnings that damages human health, animal life and vegetation, as well as the balance of the natural ecosystem have been well documented (WHO, 2003; EEA, 2006; 2006).
Air monitoring program was conducted with experimental group students. The sites monitored were the major traffic junctions and highways, adjacent to schools in Puducherry and Cuddalore towns (Plate 6). Sulphur dioxide, Oxides of Nitrogen and Suspended Particulate matter were monitored with height of 3 m (as suggested by CPCB) using portable air quality testing kit PAVAN-TARA which is a low volume air sampler developed by Development Alternatives, New Delhi. The kit was kept running for five hours duration which is the minimum time required for air monitoring (as suggested by CPCB).

![Figure 6 Map showing the selected sites for air monitoring program in Puducherry](image)

![Figure 7 Map showing the selected sites for air monitoring program in Cuddalore](image)

5.3.3 Solid Waste Management Program

Solid waste management program was conducted with experimental group students (Plate 7). The waste auditing such as characterization, quantification, as well as recycling and reusing techniques were used. The various organic wastes such as vegetable, leaf litter, papers and food waste generated in school were converted as organic manure in schools, for school vegetable gardens maintained by students.
5.3.4 Field Trips

Fieldwork constitutes an important part of the proposed learning activities in this study (Plate 9). An extensive list of research studies has provided evidence of the importance of science field trips for cognitive and affective gains (Dillon et al, 2006). It is argued that fieldtrips may serve as a tool for improving thinking skills, interest and success in science learning (Hamilton and Ekeke, 2007). An environmental science fieldtrip can clearly influence basic knowledge of science-related subjects (Uitto et al, 2006). Whether a project involves an exploration of a park’s natural history or investigating the effect of a pollutant in a local ecosystem, the participant will come away with more knowledge about ecology and environmental issues (Magntorn and Hellden, 2007).
Visit to places of environmental concerns (Plate 10) provided best opportunities to the learners as a means of observing and experiencing the real environment. It has enough scope for building environmental awareness, stimulating participation and developing investigative skills in learners. As firsthand experience in the field contribute to cognitive and affective attributes, the students would develop their interest in conservation and protection of nature/wildlife. Hence this strategy was adapted.

![Students assessing plant diversity during field visits](Plate 10)

**Figure 10 Students assessing plant diversity during field visits**

### 5.3.5 Botanical Garden

The experimental group students from Puducherry and Cuddalore were taken to Botanical gardens (Plate 11). Live plants were demonstrated and the economic importance, rarity, endangered or endemic and direct and indirect benefits of trees and plant animal interactions were explained. This technique was used because a purposeful visit demands explanation. Instructions were provided for active observation and recording. Crammer and Dennis (1972) opine that during the early days in the field it probably will be necessary to point out many pertinent factors to initiate the students into the concept of close observation. As experience in the field is gained, the student’s will probably become better observers. Hence, this strategy was adapted.

![Students assessing plant diversity at botanical garden](Plate 11)

**Plate 11 students assessing plant diversity at botanical garden**
Students showed much interest and they were given enough time to acquaint themselves with these plants. Students learned at their own pace and noted the different types and shapes of leaves, flowers, mode of reproduction. They were asked to record in their notebook anything observed which might be important in their studies. The technique being used must have the potential to enhance and enrich learning experience. Students explore experiment and create in their own search for knowledge and skill. The field visit enabled the students to see and understand the diversity of species. Students understand the concept of conservation and sustainable utilization through the observation and learning of the concepts like reproduction, pollination, fertilization and vegetative reproduction. Students appreciated the potential resource for food, medicine, industrial material and habitat for other organisms. This activity will help to develop positive attitudes and conservation behaviour towards our natural environment. Bukinshiwiw (1997) observes that within the peaceful and beautiful surroundings of the campus gardens, the students will be highly receptive to conservation education. Hence, wherever and whenever possible, students were taken to nearby botanical gardens/parks.

5.3.6 Visit to Ousudu Lake bird sanctuary

The experimental group students visited Ousudu lake bird sanctuary, located 10 kms away from Puducherry. In order to create biodiversity assessments, it was important for the students in our field-based biodiversity course not only to learn about the plants and animals associated with Ousudu lake fresh water wetland, but also to understand how this biodiversity can be assessed in the field. With basic field equipments such as forceps, nets, buckets, shovels, sieves, binocular, microscope and collection jars, the students surveyed the diversity of riparian vegetations and hydrophytic plants and animals living in the water and land. Different sampling strategies, such as transects and plots, were utilized to more systematically cover the area sampled, and for this, students used a tape measure and poles to map out the sampling plot for plant and animal studies.

5.3.7 Visit to Vermi-compost yard

The experimental group students were taken to the local vermin-compost yard (Plate 12) located in Uppalam, Puducherry funded by Asia URBS project maintained by women self help group where they learned various processes of waste collection, segregation, initial microbial composting and vermin-composting and its utilization. Students were also provided with knowledge on various activities of earthworms in healthy soil formation and their role on sustainable farming.
5.3.8 Visit to handmade paper factory

The experimental group students were exposed to handmade paper factory where students learned how the paper manufacturing from various environmental friendly raw materials such as used second grade papers, cloths and plant fibrous after this field visit students made various goods from paper waste

Visits to natural areas were organized for experimental students to discover nature through their senses. During such visits, various games were also conducted that involve touching, smelling, hearing and observing nature. The students took samples (when appropriate) and recorded their experiences by means of drawings, sound recordings and writings. Negative attributes (e.g. littering, injuring fauna, plugging flora) had been discussed before the natural visits in the class room as well as in the field. These activities help students to value natural areas, such as the ones visited and develop positive attitudes regarding their protection.

5.3.9 Analysis of the Data

In this study, standard statistical techniques such as mean (X), standard deviation (Std. DEV), t-test, and ANOVA were used in the analysis of the data. P value was held as 0.05. Significance level was decided by taking p values into consideration. The statistical analyses have been made by means of SPSS 16.0 statistical package programme for windows. Paired-sample two-tailed t-tests were used to compare pre- test and post- test means for each question on the content to test the students knowledge, skills, attitudes, behaviour on air, water, biodiversity conservation and solid waste management. Mean pre- and post- test scores were evaluated for the student’s assessment category such as knowledge, attitude, behaviour and skill. Mean score was calculated from Likert-style (Brian E Hagenbuch, 2009) scale responses by adding scale responses into an index for environmental knowledge, attitude, behaviour and skills and then calculating the mean.
5.3.10 Reliability and Validity of Instruments

The environmental knowledge test was administrated on a total number of 240 students in a middle school level. In the first place, the item and test statistics of the achievement test were computed for reliability and validity. The reliability of the knowledge test was done the method followed by (Tekin, 1996; Yılmaz, 1998) the reliability value of the test was found as $r = 0.84$. The attitude scale test was applied to measure the attitudes of the students towards the environment in the study. The attitude scale test is a five-point likert type scale (which was used to differentiate orientations from 1 as low and 5 as high) reliability and validity of which have been made by t-test, including 26 items that measure students’ attitudes towards the environment. The reliability value of the attitude scale test was found as $r = 0.86$ and the Cronbach’s Alpha value was found as $\alpha = 0.86$.

5.4 Teacher’s perception on Environmental Education
5.4.1 Selection of the sample

The study was restricted to science and social science teachers in middle and high schools both in Puducherry and Cuddalore region. Out of 82 questionnaires distributed to the target teachers, only 55 were returned and they were used for statistical analysis. The questionnaires were also classified based on –gender and school location/type of management. The response rate on an individual teacher basis was 65%, which was modest though acceptable, given response rates for educational questionnaire surveys in recent years that were often below (Stimpson, 1996). The internal consistency reliability (Cronbach’s alpha) of different scales was satisfactory for attitudes 0.6025, teaching skills 0.9446, 0.5925, barriers logistical 0.8149 and personal 0.7238 (Ham and Sewing ,1987; Sia, 1992; Lane et al.,1994; Littledyke, 1997).

Figure 8 illustrates the male biased sex ratio of the interviewed teachers which actually reflect the lower percentage of female teachers employed in the selected schools (only about 25% of the teachers in the selected schools were females and hence the sampled population reflect the actual situation).

![Figure 8 Male - female ratio of Teacher’s survey](image_url)
Figure 9 explains the location of schools were selected for teachers survey of which 23 teachers were surveyed from urban schools followed by 18 from rural schools and 11 teachers from semi-urban schools both in Puducherry and Cuddalore region.

Figure 9 Location of surveyed schools

Figure 10 illustrates the type of school management considered as an assessment variables. 28 teachers were selected from Government schools and 23 teachers were surveyed from private schools both from Puducherry and Tamil Nadu.

Figure 10 Type of school management
5.4.2 Tools used in the study

The research was carried out using a direct administration of an environmental literacy questionnaire. The items in the questionnaire were close-ended which have made the instrument easy to use, score, and code for statistical analyses. However, close-ended question can limit the breadth of subjects’ responses (Fraenkel and Allen, 1996). The survey questionnaire addressed teachers’ environmental literacy (Kaplowitz and Levine, 2005) with distinct sets of questions for each component-knowledge, attitudes, skills, and teaching methods (Table 1).

Table 1 Structure of the Questionnaire used for teachers assessments

<table>
<thead>
<tr>
<th>Section name</th>
<th>Contents</th>
<th>No. of items</th>
<th>Question type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>Attitude towards environmental education</td>
<td>5</td>
<td>5-point Likert-scale</td>
</tr>
<tr>
<td>Skills</td>
<td>Teaching skills on environmental education</td>
<td>8</td>
<td>5-point Likert-scale</td>
</tr>
<tr>
<td>Teaching practice</td>
<td>Current and intended emphasis on teaching environmental knowledge, attitudes and skills current and intended approach teaching styles</td>
<td>24</td>
<td>5-point Likert-scale</td>
</tr>
<tr>
<td>Barriers</td>
<td>Logistical barriers (LB)</td>
<td>8</td>
<td>5-point Likert-scale</td>
</tr>
</tbody>
</table>

The knowledge component of the questionnaire consisted of multiple choice items aimed at assessing respondents’ knowledge of current environmental issues (Coyle, 2005). The environmental attitude items targeted respondents’ feelings and values related to the environment while the environmental use items measured respondents ‘motivation and commitment to take part in pro-environmental behaviour (Shuman and Ham, 1997). The concerned items collected include data on participants’ sensitivity toward environmental problems and issues (Ham and Sewing, 1987).

The purpose of the study was to investigate the perceptions of and practices in EE among the High school teachers, (teaching Science and social studies Puducherry and Cuddalore region) .The implemented questionnaire drew questions from validated instruments from previous studies (Sia, 1992; Lane et al., 1994; Littledyke, 1997) that was modified to suit them to the local context.
5.4.3 STATISTICAL ANALYSIS

The data obtained from the teacher’s survey was statistically analyzed using frequency distributions and one-way analysis of variance (ANOVA). This analysis was conducted using independent variables such as gender, school location (rural/urban) and nature of school management (private/government origin) and dependent variables based on the five environmental literacy components of the questionnaire (knowledge, attitude, teaching skills, teaching approaches and barriers) (Appendix 3).

For analysing the data, mean average, standard deviation, percentage, ANOVAs, t-test, correlations were computed for drawing the conclusions. For performing inferential statistics confidence level was set at 95%.

5.5 Content analysis

5.5.1 Theoretical Framework

The environmental literacy components investigated in the present study is from the middle school level, science and social science text books. The focus of the analysis is the definition of environmental literacy, its attributes, the variables that environmental education aspires to develop, and the relationship between those factors, assessment of the magnitude of environmental literacy presented in middle school level and environmental components that are effective to improve student’s knowledge, skills, attitude and behaviour on environment.

The main focus was on the coverage of environmental literacy and the depth of their incorporation in to the school text books. The continuity of the environmental themes and sub content were assessed. This was ascertained by examining the concepts included in textbooks in science and social science subjects for their potential in providing knowledge, attitude, behaviour and skills necessary for dealing with environmental issues. It was noticed that the concepts most commonly dealt with were associated with basic environmental components like water, air, soil, solid waste management, space and energy. It included eco-system, conservation of natural resources, bio-diversity, biotic community, wildlife, deforestation, pollution, soil degradation, acid rain, greenhouse effect, ozone layer depletion, bio-energy, population, food, health, and disaster management.

A total of ten text books at the middle school level from 6th to 10th standards curricula were selected for this analysis. Of these, five curricula were from science books: the content analysis was done mainly from Chemistry, Physics, and Biology subjects. Another five curricula were from Social sciences: Sociology, Geography, and Environmental studies from Tamil Nadu text books.
The selected curricula were subjected to content analysis. First, the objectives, which are fulfilling the National mission for environmental education (Appendix 4) as mentioned in National Curricula Framework 2005, were retrieved. A table including six components of EL and forty sub-components of EL was constructed for analysis. Appendix 4 included one column for each grade (6th grade to 10th grade). The objectives of the NCF 2005 and state curricula were analyzed against the forty subcomponents of EL, selected in this study.