5.1 Introduction:

The rapid rate of growth entailed by modernisation brings into wake material wealth and human resource of a nation. The latter, in turn, is determined by the quality of educational inputs. Primarily, it is the education system that is responsible for the phenomenal growth of the developed nations. It is a base of all ‘Human Resource Development’, a stepping-stone for the onward march of culture, the bedrock of all human progress. An ancient proverb lays down, if you are planning for one year, plant rice; if you are planning for five years, plant trees; if you are planning for the future educate your children.

In the context of rapidly changing technology that is the characteristic of modern world, instruction is imparted in educational institutions. This is done through printed text and are poured out into young minds through oral transmission, frequently interspersed with the use of blackboard as in the conventional method.

In order to combat the deficiencies found in the conventional method, the focus of the teaching-learning process should be shifted from teacher-centred to student-centred techniques. This should be done keeping in view the individual needs of students with respect to relatively new concepts; like emotional and spiritual intelligence and altruism, for optimisation of learning.

Environmental education in the last two and a half decades has become a worldwide movement. It has been defined in various ways. However, the common theme is ‘the educational process dealing with man’s relationship with his natural and man-made surroundings’. To be effective, environmental education should deal with the dynamics of the physical, biological, socio-economic, political and technological dimensions taking into consideration threat perceptions to all sorts of life due to environmental degradation.
The efforts at the national level and major interaction through international conferences at Stockholm (1972), Tbilisi (1977) and Rio (1992) has put environmental education on a firm footing. In fact, environmental education has become an ongoing pursuit with educators in formal and non-formal education. Environmental education, whether formal or non-formal, has mostly relied on resource materials developed for classroom teaching (Jerath and Saxena, 2001).

The role of teacher of environmental education is to bring about awareness of the problems of environment. This is not an easy task. The contents to be learnt and the maturity of the learners vary in degree while learning itself has varied aspects and can take place through many avenues. Appropriate teaching strategies are of immense importance in bringing about required modification in student behaviour and his/her learning styles.

Modular approach to instruction is of recent origin. A module is a self-learning unit, usually of standardised format and can be completed in a short time. Individualised instruction, small group instruction and even large group instruction are possible through modular instructional approach.

Thus, a self-learning module is a specific type of learning resource. Modules are essentially self-contained, self-instructional packages, with learning paced by each student according to his/her individual needs and ability (Meyer, 1984).

Altruism in the simplest sense is unselfishness. Altruism is a term formed by Auguste Comte in 1851, on the Italian adjective altru, and employed by him to denote the benevolent, as contrasted with the selfish propensities. It revolves around the principle of considering the welfare and happiness of others before one’s own. Altruism by definition, is the placing of higher value on all but oneself. Cultivation of altruistic behaviour affects not only the welfare of the individual but also of the entire society. Thus, altruism is an important value in today’s materialistic and highly competitive world.

Altruism is found to have an immediate connection/nexus with empathy. In fact, empathy is found to be the root of altruism. Further, ‘empathy’, is one of the aspects of a much broader term or concept known as
Emotional intelligence is an emerging concept that is being recognised as an important factor for ensuring personal effectiveness, since attributes such as empathy, self-control, zeal, persistence and the ability to motivate oneself are far more important than IQ (Goleman, 1995). Emotional intelligence is the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth.

Thus, the skills involved in emotional intelligence can be taught to the children as emotional intelligence is not inborn but can be learnt, giving them a better chance to use whatever the intellectual potential might be due to hereditary factors. This view has also been expressed by Goleman (1995) considered to be the authority on the subject.

5.2 Statement of the Problem:

The present research study was an attempt at experimental exploration of the 'Effect of Self-Learning Modules on Achievement in Environmental Education in relation to Altruism and Emotional Intelligence'

5.3 Objectives of the Study:

1. To develop self-learning modules in environmental education for first year college students.
2. To develop a standardised test on emotional intelligence.
3. To develop a standardised achievement test based on self-learning modules in environmental education.
4. To study the relative effectiveness of self-learning modules in environmental education as compared to the conventional method of instruction on achievement.
5. To know whether the students having differential altruism differ in achievement.
6. To study whether the students having differential emotional intelligence differ in achievement.
7. To find if there is any interaction between strategies of teaching and altruism of students.
8. To find if there is any interaction between strategies of teaching and emotional intelligence of students.
9. To study the interactional effects of strategies of teaching, altruism and emotional intelligence on achievement.

5.4 Hypotheses:

The present study was conducted to seek experimental verification for the following hypotheses in the context of achievement in environmental education.

1. There is no significant difference in the mean achievement scores in respect of groups taught through self-learning modules and conventional method of instruction in environmental education.
2. There is no significant differences between mean scores of students having different levels of altruism.
3. Emotional intelligence does not significantly account for differential achievement in environmental education.
4. There is no first order significant interaction between strategies of teaching and altruism.
5. There is no first order significant interaction between strategies of teaching and emotional intelligence.
6. Strategies of teaching, altruism and emotional intelligence will not account for total variance.

5.5 Sample:

The sample for the study was hundred and forty students of Shri Guru Gobind Singh College, Sec - 26, Chandigarh. Since random selection of a college within the district (U.T.) was not possible due to various constraints such as lack of proper physical facilities, technical and administrative reasons etc., the experiment was carried out in this particular college. There were two sections of B.Com first year, namely A and B. The total number of students in sections A and B were hundred forty. Using a random number table, hundred forty random numbers were drawn. The students were then randomly divided into two groups, and each group was again randomly assigned the treatment to which it would be exposed. As a result, Group - I received Self-Learning
5.6 Tools Used:

1. Emotional Intelligence scale namely ‘KAS Sevenfold Emotional Intelligence Scale’ as developed by the investigator in collaboration with Khera and Sarabjit was administered to classify students into high emotional intelligence and low emotional intelligence groups. The emotional intelligence scale was found to have split-half and test-retest reliability as .95 and .91 respectively, and also satisfactory content validity indices (higher than .20).

2. Self-Report Altruism Scale (SRA Scale) by Chris John, Cynthia, Fekken and Phillipe (1981) was used to classify the sample into high and low altruism groups.

3. An Achievement Test on environmental education was developed and standardised for local use by the investigator. It was used to determine the performance of the learners. The achievement test had test-retest reliability = .82 and validity (content validity) of the test items = .92.

5.7 Research Design, Procedure and Data Collection:

The purpose of the present study was to examine the effect of self-learning modules on achievement in environmental education in relation to altruism and emotional intelligence. For this purpose, the experimental method was used. Randomised groups, post-test only equivalent group – 2 x 2 x 2 factorial design was employed. The treatment variable, i.e. teaching strategies, was divided into self-learning modules and traditional teaching. The two classifying variables: altruism and emotional intelligence were studied at two levels each (high and low). The criterion was the scores on the achievement test.

The present study was conducted in four phases.

In phase I: Self-learning Modules were developed. An achievement test and emotional intelligence scale were also constructed and standardised.

In phase II: Tests on altruism and emotional intelligence were administered to the sample, strictly in accordance with the instructions given in
the relevant manuals by the concerned authors.

In phase III: Five topics on environmental education were taught for two weeks to the two groups (Group- I through self-learning modules and Group - II through conventional lecture method.

In phase IV: An achievement test was administered as a post-test. The post-test achievement scores of both the groups were recorded and analysed for testing the significance of the treatment (independent) variable and dependent variables.

5.8 Statistical Techniques Used:

1. Appropriate descriptive statistics like mean, median, mode, and standard deviation were used to classify the sample into various groups. Skewness and kurtosis were computed to study the nature of the data.

2. For standardising achievement test and emotional intelligence scale, reliability and validity were calculated by using appropriate methods.

3. The analysis of variance (2 x 2 x 2) measure was computed to test the hypothesis - i.e. to find out the main effects and interactional effects among different variables on achievement. t-test as also computed to find the mean difference in achievement between various groups.
5.9 Results:

The data were analysed by using the above mentioned statistical techniques in 5.8. The results are given in tables 5.1 to 5.4.

Table 5.1: Summary of 2 x 2 x 2 Analysis of Variance in Respect of Achievement

<table>
<thead>
<tr>
<th>No.</th>
<th>Source of Variation</th>
<th>df.</th>
<th>Sum of Squares</th>
<th>Mean sum of Squares</th>
<th>F-value</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strategies of Teaching (A)</td>
<td>1</td>
<td>5978.41</td>
<td>5978.41</td>
<td>161.50</td>
<td>** Significant</td>
</tr>
<tr>
<td>2</td>
<td>Altruism (B)</td>
<td>1</td>
<td>232.41</td>
<td>232.41</td>
<td>6.28</td>
<td>* Significant</td>
</tr>
<tr>
<td>3</td>
<td>Emotional Intelligence (C)</td>
<td>1</td>
<td>4.41</td>
<td>4.41</td>
<td>0.12</td>
<td>Nonsignificant</td>
</tr>
<tr>
<td>4</td>
<td>A x B</td>
<td>1</td>
<td>385.21</td>
<td>385.21</td>
<td>10.41</td>
<td>** Significant</td>
</tr>
<tr>
<td>5</td>
<td>A x C</td>
<td>1</td>
<td>130.21</td>
<td>130.21</td>
<td>3.52</td>
<td>Nonsignificant</td>
</tr>
<tr>
<td>6</td>
<td>A x B x C</td>
<td>1</td>
<td>114.06</td>
<td>114.06</td>
<td>3.08</td>
<td>Nonsignificant</td>
</tr>
<tr>
<td>7</td>
<td>Error in Groups or</td>
<td>112</td>
<td>4145.87</td>
<td>4145.87</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total/SST</td>
<td>119</td>
<td>11333.99</td>
<td>95.24</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Significant at .05 level (table value for F= 3.93 for 1/112 degrees of freedom).
** Significant at .01 level (table value for F = 6.87 for 1/112 degrees of freedom).
Table 5.2: t-Ratio Between the Two Groups of Teaching Strategies on Post-test Achievement Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLM</td>
<td>60</td>
<td>34.30</td>
<td>7.96</td>
<td>11.48</td>
<td>** Significant</td>
</tr>
<tr>
<td>TT</td>
<td>60</td>
<td>20.18</td>
<td>5.23</td>
<td></td>
<td>** Significant</td>
</tr>
</tbody>
</table>

** Significant at .01 level (t_{18} = 2.63)

Table 5.3: t-Ratio Between the Two Groups of Altruism on Post-test Achievement Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High altruism</td>
<td>60</td>
<td>28.63</td>
<td>8.18</td>
<td>2.02</td>
<td>* Significant</td>
</tr>
<tr>
<td>Low altruism</td>
<td>60</td>
<td>25.85</td>
<td>11.01</td>
<td></td>
<td>* Significant</td>
</tr>
</tbody>
</table>

* Significant at .05 level (t_{18} = 1.98)
Table 5.4: t-Ratios for Interaction Between Teaching Strategies and Altruism

<table>
<thead>
<tr>
<th>No.</th>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>T</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A₁ B₁</td>
<td>15</td>
<td>30.90</td>
<td>7.12</td>
<td>2.72</td>
<td>** Significant</td>
</tr>
<tr>
<td></td>
<td>A₁ B₂</td>
<td>15</td>
<td>34.70</td>
<td>8.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>A₁ B₁</td>
<td>15</td>
<td>30.90</td>
<td>7.12</td>
<td>6.50</td>
<td>** Significant</td>
</tr>
<tr>
<td></td>
<td>A₂ B₁</td>
<td>15</td>
<td>20.37</td>
<td>6.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>A₁ B₁</td>
<td>15</td>
<td>30.90</td>
<td>7.12</td>
<td>8.39</td>
<td>** Significant</td>
</tr>
<tr>
<td></td>
<td>A₂ B₂</td>
<td>15</td>
<td>17.00</td>
<td>3.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>A₁ B₁</td>
<td>15</td>
<td>34.70</td>
<td>7.12</td>
<td>8.82</td>
<td>** Significant</td>
</tr>
<tr>
<td></td>
<td>A₂ B₁</td>
<td>15</td>
<td>20.37</td>
<td>6.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>A₁ B₂</td>
<td>15</td>
<td>34.70</td>
<td>8.40</td>
<td>10.53</td>
<td>** Significant</td>
</tr>
<tr>
<td></td>
<td>A₂ B₂</td>
<td>15</td>
<td>17.00</td>
<td>3.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>A₂ B₁</td>
<td>15</td>
<td>20.37</td>
<td>6.54</td>
<td>1.94</td>
<td>Nonsignificant</td>
</tr>
<tr>
<td></td>
<td>A₂ B₂</td>
<td>15</td>
<td>17.00</td>
<td>3.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A₁: SLM  B₁: Low altruism  
A₂: TT   B₂: High altruism

* Significant at .05 level (t₁₅₈ = 2.00)  
** Significant at .01 level (t₁₅₈ = 2.66)
5.10 Conclusions:

(i) Students taught through SLM strategy gained more environmental education concepts than those taught through TT strategy. Thus, SLM strategy proved to be superior as compared to TT strategy in teaching environmental education concepts.

(ii) Altruism accounts significantly for differential achievement in environmental education. Students with high altruism performed significantly better on achievement in environmental education than those with low altruism.

(iii) Emotional intelligence acted as a redundant factor so far as learning of concepts in environmental education is concerned.

(iv) Interaction between teaching strategies and varying levels of altruism was found to be significant in producing differential achievement scores.
   a. Students with high altruism gained more concepts in environmental education than those with low altruism under SLM strategy.
   b. No significant difference was found between the high and low altruism students on achievement in environmental education under TT strategy.

(v) Emotional intelligence does not interact significantly with strategies of teaching.

(vi) Strategies of teaching, altruism and emotional intelligence do not interact significantly.

5.11 Implications of the Present Study:

The findings of the present study revealed that the students taught under SLM strategy attained more environmental education concepts than those who received instruction through TT strategy. The techniques of SLM in the teaching arena is a novel concept.

Environmental education teachers should teach their students with different self-instructional packages compatible with varying abilities of the students. The present study disclosed that students with varying levels of altruism differ on achievement with respect to two teaching strategies.
Students with high and low altruism achieved more on environmental education concepts in SLM group as compared to the TT group. The teachers of this subject should also pay special attention to students with lower levels of altruism and emotional intelligence. This will help them in formulating the teaching strategies in a broad-spectrum mode. This study will also help teachers to classify the students in various groups according to their abilities, leading to appreciable improvements in achievements in academics.

5.12 Suggestions for Future Studies:
1. The present study may be replicated by including more topics of environmental education at college level.
2. The study may be extended to cover other variables - viz. cognitive style, self-concept, learning style, scientific attitude, intelligence, creativity, personality, socio-economic status, spiritual intelligence and other teaching strategies/instructional packages.
3. The coverage of the study may be extended to other subjects/areas at secondary and senior secondary level.
4. The results of the present study are fairly reliable as these are based on the technique of simple random sampling.
5. It is suggested that the present study may be extended by using two equivalent but different achievement tests. One can be used as pre-test and other as post-test.
6. More studies may be conducted to assess the effect of altruism on academic achievement.
7. Studies of this type may be extended to cover the effects of emotional intelligence.