Impact of Whole House Approach and Strategic Environment Education on Environment Responsible Behaviour, Concern for Environment and Environment Knowledge

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Abstract:
Growing environmental issues need the attention of human being irrespective of age and position. Childhood is considered as the best period to inculcate environmental habits to create a sustainable future. Education has an important role in providing information and skills to practice such habits. In this study pre-post quasi experimental design was adopted and effect of two different intervention strategies such as ‘strategic environment education’ and ‘whole house approach’ on students’ environment responsible behaviour, concern and knowledge was tested. Government high school students of Balasore district of Odisha participated in the study. Using SPSS, pre and post-test data were analyzed. It was found that ‘whole house approach’ has better impact on students’ environment responsible behavior, concern and knowledge than ‘strategic environment education’.

Key Words: environment responsible behavior, concern for environment, environment knowledge, parents involvement.

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Environment and human-being are two inseparable entities. Human actions have both positive and negative effect on environment. Whether knowingly or unknowingly, a destructive action by individual towards environment for fulfilling her/his needs and wants can become a threat to own survival. Further, an individual’s behaviour not only affect her/him but also other creatures on the earth. Hence, each individual has responsibility to protect, conserve and restore environment. According to Krajhaznl (2010), environment behaviour includes all human behaviour as people are constantly interacting with environment. Steg and Vlek (2009) defined environment behaviour as behaviour that benefits the environment.

Childhood experience with nature have positive impact on children’s behaviour towards environment (Palmberg & Kuru, 2000) and also influences their participation in nature activity in adulthood (Asah, 2012). Hence, children need nature experiences as well as must be responsible to protect environment. According to Strong (1998) children’s consumer power is growing and represent specific products and services in market. Their product choice has influence on present and future environment. Hence children need opportunity for informed decision making at personal level, home, school and community (Chawla & Cushing, 2007). If the children’s concern for environment will not be taken into consideration, then unintentionally various dimensions of environment related to needs of children (playground, healthy food, hygienic living space etc.) may be ignored (Chawla, 1988).

Skills and knowledge about environment issues and environmental actions are important factors which affect the environment behaviour (Hines, et. al, 1987; Kollmuss & Agyeman, 2002). Education is being considered as an important tool to promote environment sustainability and is expected to provide appropriate knowledge, information and sustainability skills for environment action (UNESCO, 2005). However environment education curriculum has concentrated on environmental problems rather than the action needed to tackle these issues (Siddiqui & Khan, 2015). Hence, environment education need to be developed strategically and it must include case studies (Gaterslebn, et.al, 2002), information on social proof (Linden, 2015), outdoor environment experience (Behera & Samal, 2013), goal setting (Sintov et. al, 2010) and opportunity for environment action (Saini, 2014).
Chawla (1988) suggested that to make children care about nature, it is necessary to combine communities which give them something to care about. Parents and educators need to advocate the rights of children to enable them to have enriching experience with living beings, so that they can learn to become caretakers of the earth (Davis, 1998). Children are more likely to participate in community activity when they get support from their parents or when they observe their parents engaged actively in such activities (Pancer& Pratt, 1999). Students whose parents are involved in their education are more likely to have positive learning outcome than whose parents are not involved (Center for Disease Control and Prevention, 2012). Children get formal education at schools but their learning continues at home and in community. Parents’ play a very important role in overall learning and education of children by facilitating diverse learning experiences outside school. Parents involvement has positive effect on social skills, behaviour, sense of personal competence and efficacy for learning (Emerson, et. al, 2012).

Based on the suggestions mentioned by earlier research, two intervention strategies such as ‘strategic environment education’ and ‘whole house approach’ were prepared and experimented on high school students to find out the impact of environment responsible behavior, concern and knowledge. Whole house approach had included the intervention with parents and students both.

Objectives:
- To assess the effect of whole house approach and strategic environment education on students’ environment responsible behaviour, concern for environment and environment knowledge
- To compare the impact of whole house approach and strategic environment education.

Hypotheses:
- Hypothesis 1: Whole house approach and strategic environment education will improve students’ environment responsible behaviour, concern for environment and environment knowledge.
- Hypothesis 2: Whole house approach will have better impact than strategic environment education on students’ environment responsible behaviour, concern for environment and environment knowledge.
Methodology:
This paper presents the part of a study done for doctoral study. This study has been conducted using quasi experimental design. Interventions were conducted in government high schools of Balasore district. Three randomly selected government high schools are the part of this paper. Only 9th standard students of these schools were included in the study.

Questionnaire containing environment responsible behavior, concern and knowledge items was used in the study. Pre testing of the tool was done and validity and reliability of the scales were examined using exploratory factor analysis and Cronbach alpha respectively. Environment responsible behavior scale items are about waste segregation, water use, energy use in personal, household and public space. Concern for environment scale contains environment attitude, perceived ability to perform environment action, and value items. Environment knowledge items are framed to know the understanding of children about the impact of different actions of human beings (water, energy and waste) on environment. There are total 19 items in environment responsible behavior scale, 14 items in concern for environment scale and 12 items in environment knowledge measure. There scales were found reliable as Cronbach alpha value for environment responsible behavior and concern for environment were 0.70 and 0.65 respectively.

Two different interventions i.e. strategic environment education and whole house approach were tested in this study. Strategic environment education included waste, water and energy management information and skills for students. In this, pictures and charts were used to disseminate information and demonstrated skills to manage environmental resources. Seven sessions were designed. Group discussion, reflection, story-telling, role play, commitment etc. techniques were used in the sessions. Whole house approach included both students and their parents. Students were provided knowledge and skills about environment management at school and motivational interviews were conducted for parents to motivate them about the environment responsible practices. Motivational interviewing is a method developed by Miller and Rollnick (2002) to motivate clients for desired behavior change by focusing on their positive aspects, understanding their concerns and values, listening them with empathy and empowering their self-efficacy.
Whole house approach was conducted for the students of school 1, only strategic environment education intervention was given to students of school 2 and students of school 3 were kept under control. Intervention period was for one and half months. After one week of pre-test, intervention sessions were conducted and post-test was done after one and half months of last intervention.

For data analysis, in this paper, 30 students from each school, who have attended all the sessions were chosen. Statistical tools like t-test and ANCOVA were used to interpret the data.

**Analysis:**

**Pre-post comparison of students intervened through whole house approach**

H\(_01\): There is no significant improvement in the mean score of environment responsible behaviour at posttest stage than the mean score of environment responsible behaviour at pretest stage of the students of school 1 intervened through whole house approach.

H\(_02\): There is no significant improvement in the mean score of concern for environment at posttest than the mean score of concern for environment at pretest of the students of school 1 intervened through whole house approach.

H\(_03\): There is no significant improvement in the mean score of environment knowledge at posttest than the mean score of environment knowledge at pretest of the students of school 1 intervened through whole house approach.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Testing</th>
<th>M</th>
<th>SD</th>
<th>N</th>
<th>R</th>
<th>Correlated t-Test</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>H(_01)</td>
<td>Pretest</td>
<td>58.20</td>
<td>9.90</td>
<td>30</td>
<td>0.73</td>
<td>7.958</td>
<td>p (0.000) (&lt;0.05)</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>70.57</td>
<td>11.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H(_02)</td>
<td>Pretest</td>
<td>48.30</td>
<td>6.13</td>
<td>30</td>
<td>0.62</td>
<td>4.77</td>
<td>p (0.000) (&lt;0.05)</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>53.60</td>
<td>6.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H(_03)</td>
<td>Pretest</td>
<td>13.83</td>
<td>3.13</td>
<td>30</td>
<td>0.50</td>
<td>4.89</td>
<td>p (0.000) (&lt;0.05)</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>17.90</td>
<td>5.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From table -1 it is evident that correlated t-test values 7.958 (vide H₀₁), 4.77 (vide H₀₂), and 4.89 (vide H₀₃) are significant at 0.05 level of significance and degree of freedom 29. It indicates pre and post mean scores of environment responsible behaviour, concern for environment and environment knowledge differ significantly. Further, mean scores of students for environment responsible behaviour, concern for environment and environment knowledge at post-test are 70.75, 53.60 and 17.90 respectively which are greater than the respective pretest scores. Hence, the null hypotheses are rejected. The alternative hypotheses are

H₁₁: There is significant improvement in the mean score of environment responsible behaviour at posttest stage than the mean score of environment responsible behaviour at pretest stage of the students of school 1 intervened through whole house approach.

H₁₂: There is significant improvement in the mean score of concern for environment at posttest than the mean score of concern for environment at pretest of the students of school 1 intervened through whole house approach.

H₁₃: There is significant improvement in the mean score of environment knowledge at posttest than the mean score of environment knowledge at pretest of the students of school 1 intervened through whole house approach.

Pre-post comparison of students intervened through strategic environment education

H₀₄: There is no significant improvement in the mean score of environment responsible behaviour at posttest stage than the mean score of environment responsible behaviour at pretest stage of the students of school 2 intervened through strategic environment education.

H₀₅: There is no significant improvement in the mean score of concern for environment at posttest than the mean score of concern for environment at pretest of the students of school 2 intervened through strategic environment education.

H₀₆: There is no significant improvement in the mean score of environment knowledge at posttest than the mean score of environment knowledge at pretest of the students of school 2 intervened through strategic environment education.
Table 2: Correlated t-test for students of School 2 intervened through strategic environment education

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Testing</th>
<th>M</th>
<th>SD</th>
<th>N</th>
<th>R</th>
<th>Correlated t-Test</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₀₄</td>
<td>Pretest</td>
<td>50.73</td>
<td>7.45</td>
<td>30</td>
<td>0.72</td>
<td>7.63</td>
<td>p (0.000) &lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>61.57</td>
<td>9.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀₅</td>
<td>Pretest</td>
<td>49.80</td>
<td>6.00</td>
<td>30</td>
<td>0.72</td>
<td>5.27</td>
<td>p (0.000) &lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>54.00</td>
<td>5.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀₆</td>
<td>Pretest</td>
<td>12.87</td>
<td>4.08</td>
<td>30</td>
<td>0.67</td>
<td>4.33</td>
<td>p (0.000) &lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>15.77</td>
<td>4.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From table 2 it can be seen that correlated t-test values 7.63 (vide H₀₄), 5.27 (vide H₀₅), and 4.33 (vide H₀₆) are significant at 0.05 level of significance and degree of freedom 29. It indicates pre and post mean scores of environment responsible behaviour, concern for environment and environment knowledge differ significantly. Again the post-test scores of students with regard to environment responsible behaviour (61.75), concern for environment (54.0) and environment knowledge (15.77) are more than the respective pre-test scores. Hence, the null hypotheses are rejected. The alternative hypotheses are

H₁₄: There is significant improvement in the mean score of environment responsible behaviour at posttest stage than the mean score of environment responsible behaviour at pretest stage of the students of school 2 intervened through strategic environment education.

H₁₅: There is significant improvement in the mean score of concern for environment at posttest than the mean score of concern for environment at pretest of the students of school 2 intervened through strategic environment education.

H₁₆: There is significant improvement in the mean score of environment knowledge at posttest than the mean score of environment knowledge at pretest of the students of school 2 intervened through strategic environment education.
Pre-post comparison of students intervened through strategic environment education

H₀₇: There is no significant improvement in the mean score of environment responsible behaviour at posttest stage than the mean score of environment responsible behaviour at pretest stage of the students of controlled school 3.

H₀₈: There is no significant improvement in the mean score of concern for environment at posttest than the mean score of concern for environment at pretest of the students of controlled school 3.

H₀₉: There is no significant improvement in the mean score of environment knowledge at posttest than the mean score of environment knowledge at pretest of the students of controlled school 3.

Table:3: Correlated t-test for students of School 3 under control

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Testing</th>
<th>M</th>
<th>SD</th>
<th>N</th>
<th>R</th>
<th>Correlated t-Test</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₀₇</td>
<td>Pretest</td>
<td>60.40</td>
<td>8.77</td>
<td>30</td>
<td>0.95</td>
<td>1.51</td>
<td>p (0.141) &gt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>59.67</td>
<td>8.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀₈</td>
<td>Pretest</td>
<td>46.20</td>
<td>7.14</td>
<td>30</td>
<td>0.75</td>
<td>0.907</td>
<td>p (0.372) &gt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>47.17</td>
<td>6.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀₉</td>
<td>Pretest</td>
<td>13.63</td>
<td>3.03</td>
<td>30</td>
<td>0.78</td>
<td>0.574</td>
<td>p (0.570) &gt;0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>13.37</td>
<td>3.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From table -3 it can be seen that correlated t-test values 1.51 (vide H₀₇), 0.907 (vide H₀₈), and 0.574 (vide H₀₉) are not significant at 0.05 level of significance and degree of freedom 29. It indicates pre and post mean scores of environment responsible behaviour, concern for environment and environment knowledge do not differ significantly. Hence, the null hypotheses are accepted.

Effect of whole house approach and strategic environment education on environment responsible behaviour, concern for environment and environment and environment knowledge
H\textsubscript{010}: There is no significant difference in the adjusted mean scores of environment responsible behaviour of students of school 1, 2 and 3 by considering pre-environment responsible behaviour as covariate.

H\textsubscript{011}: There is no significant difference in the adjusted mean scores of concern for environment of students of school 1, 2 and 3 by considering pre-concern for environment as covariate

H\textsubscript{012}: There is no significant difference in the adjusted mean scores of environment knowledge of students of school 1, 2 and 3 by considering environment knowledge as covariate.

Table:4: ANCOVA test to compare the effect of whole house approach and strategic environment education

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Sources</th>
<th>Df</th>
<th>Sum of Square</th>
<th>Mean of Sum of Square</th>
<th>F-Value</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>H\textsubscript{010}</td>
<td>Intervention</td>
<td>2</td>
<td>2558.56</td>
<td>1279.28</td>
<td>28.442</td>
<td>p(0.000)&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>86</td>
<td>3868.13</td>
<td>44.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>89</td>
<td>86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H\textsubscript{011}</td>
<td>Intervention</td>
<td>2</td>
<td>477.62</td>
<td>238.81</td>
<td>10.34</td>
<td>p(0.000)&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>86</td>
<td>1984.58</td>
<td>23.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>89</td>
<td>86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H\textsubscript{012}</td>
<td>Intervention</td>
<td>2</td>
<td>300.49</td>
<td>150.24</td>
<td>11.55</td>
<td>p(0.000)&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>86</td>
<td>1118.41</td>
<td>13.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>89</td>
<td>86</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the table number 4, it is evident that F values 28.44 (videH\textsubscript{010}), 10.34 (videH\textsubscript{011}), and 11.55 (videH\textsubscript{010}) are significant at 0.05 level of significance and degree of freedom 2/89. It shows that the adjusted means scores of environment responsible behaviour, concern for environment, environment knowledge of whole house approach intervention school (1), strategic environment education school (2) and control school(3) differ significantly when the respective pre scores of environment responsible behaviour, concern for environment, and environment knowledge are considered as covariate. Hence, different interventions whole house approach, strategic
environment education and control have different influence on the groups with regard to bring change in the above mentioned variables.

Chart: Estimated marginal mean of post environment responsible behaviour, concern for environment and environment knowledge

The above charts show that the adjusted mean scores (at the posttest stage) of environment responsible behaviour, concern from environment and environment knowledge of students of school 1 intervened through whole house approach are more than the students of school-2 intervened through whole house approach. Hence, whole house approach has a better effect on
improving environment responsible behaviour, concern from environment and environment knowledge among students than strategic environment education.

**Conclusion:**
From the analysis, it is found that both ‘strategic environment education’ and ‘whole house approach’ have positive impact on environment responsible behavior, concern and knowledge of students. However, effect of ‘whole house approach’ on environment responsible behavior, concern and knowledge is better than the effect of ‘strategic environment education’. Hence, parents’ involvement in environment management may have effect on environment responsible behavior of children. In the current study, one to one motivational interview was conducted with parents. It may not be possible for the teachers to visit homes to motivate parents but class wise parents and students’ group discussion may be conducted to motivate parents and students to carry out environment action. The current study involved only classroom session as the part of intervention with an intention to demonstrate schools having space issues to conduct environment sensitisation activities. Future studies may include out-door activity in strategic environment education to find out the effect on environment responsible behavior or may compare the effect of outdoor environment activity with current ‘strategic environment education’.

**References:**


