Evidence of environmental education effectiveness

**ABSTRACT**

There is continuous pressure on the South African education system to deliver graduates who can pursue careers in science and engineering. It is important to nurture a love for the environment and an understanding of the intricate processes that occur in nature, among young learners. This would increase the possibility that these young learners would grow up to become environmentally responsible adults, whether as parents, farmers, environmentally responsible conservationists or even in their careers. A 2007 study in randomly-selected schools in the Buffalo (group B), Hartenbos and Klein Boikot (group H) catchments determined how effectively State-of-Rivers (Soft) materials had been used in the education system of grades 1 to 3. Questionnaires and participatory evaluation techniques were used to determine the level of understanding of human impacts on rivers, both before learners had seen the materials and after exposure to materials. The results indicate that, with the exception of few schools, the supplied materials were mostly used to keep the learners busy. The learners in group H displayed a slight increase in understanding of the benefits that healthy rivers provide, a slight decrease in understanding of the benefits that unhealthy rivers provide, and an increase in understanding of an overall increase in understanding in the target area. Ensuring optimum intervention in learners’ understanding requires communication materials that are aligned more closely with the school curriculum, supported by closer work with the Department of Education to ensure the introduction of fundamental ecosystem learning. Better understanding of ecosystems empowers facilitators to add maximum value in the classroom.

**METHOD**

**Study area:** Buffalo, Hartenbos and Klein Boikot catchments. Grades 1 - 3 learners from each primary school randomly selected from each catchment.

**Evaluations:** Questionnaires and qualitative conversations (open and closed questions). Questionnaire (n=1178) and participatory evaluations (n=261), before and after exposure to materials. Language: English, Xhosa, Afrikaans.

**Questionnaire measured learners:**
- Knowledge of ecosystems
- Understanding of the benefits that healthy rivers provide
- Understanding of human impacts on rivers
- Attitude towards conservation

**Participatory evaluations measured learners:**
- Understanding of good and bad practices (indicated on a poster).

**RESULTS AND DISCUSSION**

Understanding human impacts on rivers

Quantitative study

- Group B showed a slight increase in understanding over time, indicating a slight increase in understanding, while the other 50% gained significant understanding, resulting in an overall increase in understanding.
- All schools in group H, with the exception of one, showed a slight increase in understanding of human impacts on rivers over time. Results from group B were more variable.

Qualitative study

- All subgroups, with the exception of one, showed an upward trend over time, indicating a slight increase in understanding due to Soft reporting materials.
- One school in subgroup B Urban showed an upward trend in understanding.
- Results from the other school resulted in a slight decrease in understanding for the B Urban subgroup (Urban 2).
- Cronbach alpha = 0.79 and 0.81 for time 1 and time 2, respectively.

**ResUltS And discUssion**

Conserving our rivers

Qualitative study

Question: Why should rivers be conserved/taken care of? Relative frequency of answers over time.

**Proposed actions that could make sad rivers happy/ healthy rivers again:**
- Ecosystem-related items: almost no change
- Irrelevant or no answer: decreased

**CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH**

The understanding of the learners from rural areas within group B improved the most during the course of the study. This is likely due to the large number of households in this group that use rivers as their main source of domestic water. The degree to which the lack of piped water and sanitation and socio-economic circumstances in general influenced both the initial scores and the improvement in understanding, needs to be further investigated.

In conclusion, the lack of change in understanding of the most important variable that was not foreseen and planned for in this study. Future studies should take into account and plan for this variable.

Environmental learning in schools, and the creativity with which it is done, also needs greater attention. The impact of environmental education on learners’ environmental awareness, and the possibility of creating an environmentally responsible society, needs to be further investigated.

In South Africa, the foundation phase schools’ curriculum currently focuses on water uses and water as a benefit to humans. The importance of functioning ecosystems and how humans can contribute to restoring valuable natural resources, and looking after the environment in general, should be more integrated into the curriculum. Further studies should focus on the understanding of ecosystems and the importance of functioning ecosystems should be expanded.

Currently, the Soft materials target the foundation phase learners. Soft materials should be expanded beyond the foundation phase to encourage the forming of attitudes and behaviors that support sustainable development and a better future for all South Africans.

**Table 1:** Frequency listed as actions to be implemented to change unhealthy rivers to healthy rivers, in descending order of greatest change between time 1 and 2.

<table>
<thead>
<tr>
<th>Action</th>
<th>Frequency</th>
<th>Time 1</th>
<th>Time 2</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement new construction</td>
<td>67</td>
<td>27</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Traffic into water bodies</td>
<td>44</td>
<td>20</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Irrigation water</td>
<td>37</td>
<td>15</td>
<td>58%</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2:** Proposed actions that could change unhealthy rivers to healthy rivers in descending order of greatest change between time 1 and 2.

<table>
<thead>
<tr>
<th>Action</th>
<th>Frequency</th>
<th>Time 1</th>
<th>Time 2</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement new construction</td>
<td>67</td>
<td>27</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Traffic into water bodies</td>
<td>44</td>
<td>20</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Irrigation water</td>
<td>37</td>
<td>15</td>
<td>58%</td>
<td></td>
</tr>
</tbody>
</table>