The Value of a College Education: A Longitudinal Study of Science Literacy
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Background

Science literacy refers to knowledge of fundamental scientific facts, understanding of the process of science, scientific reasoning, understanding of the process of science, and appreciation of its impact on society (Miller, 1989). Science literacy is increasingly important for making informed decisions related to personal health, community and educational initiatives, political debates, and international concerns such as global warming and disease prevention. However, only a minority of Americans is considered scientifically literate (Miller, 1987).

Results

Exposure to college-level science coursework leads to growth in science literacy. Some students' science literacy scores have been tested with a longitudinal design that can lead to growth in science literacy (see Table 1). This research is supported by the UWEC Foundation and by multiple college-level science courses.

Table 1: Religious attitudes and attitudes toward science predict science literacy

<table>
<thead>
<tr>
<th></th>
<th>Time 1 Mean</th>
<th>Time 2 Mean</th>
<th>T1 vs T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief in God</td>
<td>.10</td>
<td>.09</td>
<td>-.11</td>
</tr>
<tr>
<td>Young Earth</td>
<td>.35</td>
<td>.34</td>
<td>-.01</td>
</tr>
<tr>
<td>Distaste of Science/Technology</td>
<td>.05</td>
<td>.06</td>
<td>.12</td>
</tr>
<tr>
<td>Intelligent Design Fallacies</td>
<td>.03</td>
<td>.02</td>
<td>-.13</td>
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<tr>
<td>Intelliglence Fallacies</td>
<td>.05</td>
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<td>-.11</td>
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<tr>
<td>Moral Objections to Evolution</td>
<td>.03</td>
<td>.02</td>
<td>-.12</td>
</tr>
<tr>
<td>Science Literacy</td>
<td>.20</td>
<td>.21</td>
<td>.09</td>
</tr>
</tbody>
</table>

From Time 1 to Time 2, students showed a decrease in Belief in God and, related to that, a decrease in Young Earth Creationist and Intelligent Design Fallacies (however, these decreases were not statistically significant). At both time points, participants reported minimal Moral Objections to Evolution (despite poor performance on the Evolution Knowledge subscale). At each time point, students had high religious beliefs, having moral objections to evolution, and distorting science and technology were not negatively associated with science literacy.

Discussion

In this study, we surveyed 200 students at the beginning of their college careers and again three years later. Our results revealed that students showed weak and inconsistent growth in overall science literacy (which was driven by growth in biology literacy, science reasoning, and basic science knowledge in religious beliefs, moral objections to evolution, and distrust of science and technology; and strong consistency in students' responses from Time 1 to Time 2). Students with high science literacy scores at Time 1 tended to have high scores at Time 2, students with high science literacy in biology (2004 - .34, p < .01) and chemistry (2004 - .30, p < .01) was also examined when controlling for science literacy at Time 1 (partial correlation). These science literacy scores appear to be a cause of exposure to science coursework rather than a result of it.

Acknowledgments

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