Does Science Olympiad Kit raise 3rd grade students’ interest in Science?

By Cornelia Ko, MPH
Introduction

**Background:** Delaware Science Olympiad holds three statewide tournaments for High, Middle, and Elementary schools every year.

**Problem:** Low participation rate for elementary schools in Southern Delaware.

**Purpose:** The aim of this study is to examine if the introduction of Science Olympiad Kit can increase the interest of the students in science.
Elementary Science Olympiad In-A-Box

- Aerodynamics
- Bottle Music
- Don’t Bug Me
- Gummi Bear Long Jump
- Metric Mastery
- Monster Match
- Operation Egg Drop
- Rock Hound
- Straw Tower
- Write It Do It
Hypothesis

• **H0**: Science Olympiad Kit does not increase the interest of 3rd grade students in science

• **H1**: Science Olympiad Kit increases the interest of 3rd grade students in science
Methods

- Epworth, North Star, and Forest Oak Elementary Schools took part in this research
- 134 3rd graders participated in this study with their parents’ consents
- Teachers administered a Pretest survey to the students before the introduction of the SO Kit
  - Demographics (Race, Gender)
  - Parents work status
  - *5 questions to gauge their interest in science and hands-on activities*
Methods

• The teachers used the SO Kit in the classrooms every week for 5 months
• Frequency chosen by the teacher
  • Epworth – 1 time per week, sometimes 2 times a week
  • North Star – 1 time a week
  • Forest Oak – 2 times a week
• At the end of 5th month, all participating students filled out the Posttest forms
  • Questions in Pretest forms
  • Feedbacks on the SO Kit
• Surveys analyzed by SPSS statistically
• Incomplete forms were excluded in analysis
### Sample Size

<table>
<thead>
<tr>
<th>School</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epworth</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Forest Oak</td>
<td>50</td>
<td>43</td>
</tr>
<tr>
<td>North Star</td>
<td>75</td>
<td>73</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>124</td>
</tr>
</tbody>
</table>
Gender

Pre-test

n=134

Boy 46.3%

Girl 53.7%

Post-test

n=124

Boy 43.6%

Girl 56.4%
Caucasian and Hispanic (similar to DE State birth data); African American (underrepresented); Asian (overrepresented)
Does your mother work?

Pre-test
- Yes: 80.6%
- No: 19.4%
- n=134

Post-test
- Yes: 82.3%
- No: 17.7%
- n=124
Does your father work?

Pre-test

Yes: 94.0%
No: 6.0%

n=134

Post-test

Yes: 92.0%
No: 8.0%

n=124
Number of parents who work in the household

Pre-test

- Both: 75.4%
- One: 23.9%
- None: 0.8%

n=134

Post-test

- Both: 75.8%
- One: 22.6%
- None: 1.6%

n=124

Three-quarter of the students have both parents working.
Do you like hands-on science activities?

“Most likely” and “Yes” increased by 7.8%. Statistically not significant.
Do you think the hands-on activities will help you understand science better?

Pre-test

<table>
<thead>
<tr>
<th></th>
<th>Most likely</th>
<th>Not sure</th>
<th>Less likely</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>19.4%</td>
<td>25.4%</td>
<td>69.4%</td>
<td>69.4%</td>
</tr>
</tbody>
</table>

Post-test

<table>
<thead>
<tr>
<th></th>
<th>Most likely</th>
<th>Not sure</th>
<th>Less likely</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>31.5%</td>
<td>12.9%</td>
<td>83.9%</td>
<td>83.9%</td>
</tr>
</tbody>
</table>

Students answered “Most likely” increased by 12.1%, while “Not sure” decreased by 12.5%. Statistically significant.

Chi-square tests.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>9.60</td>
<td>4</td>
<td>.048</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>9.77</td>
<td>4</td>
<td>.045</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>2.63</td>
<td>1</td>
<td>.105</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>258</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When you grow up, what do you want to do? (A real job)

Students answers were similar before and after. No statistical difference.
Would you like your school to spend more time on teaching science through hands-on activities?

Pre-test

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most likely</td>
<td>8.2%</td>
</tr>
<tr>
<td>Not sure</td>
<td>20.2%</td>
</tr>
<tr>
<td>Less likely</td>
<td>16.9%</td>
</tr>
<tr>
<td>No</td>
<td>64.9%</td>
</tr>
</tbody>
</table>

Post-test

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most likely</td>
<td>16.9%</td>
</tr>
<tr>
<td>Not sure</td>
<td>8.1%</td>
</tr>
<tr>
<td>Less likely</td>
<td>20.2%</td>
</tr>
<tr>
<td>No</td>
<td>68.6%</td>
</tr>
</tbody>
</table>

Chi-square tests.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>11.20</td>
<td>4</td>
<td>.024</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>11.54</td>
<td>4</td>
<td>.021</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.32</td>
<td>1</td>
<td>.250</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>258</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students answered “Most likely” increased by 8.7%, while “Not sure” decreased by 16.1%. Difference is statistically significant.
How many science-related books do you read a week?

Students read more science-related books after SO Kit. “0” category decreased 16%; “1 to 2” and “3 to 4” categories increased 18.4%. Statistically significant.
Does Science Olympiad Kit get you interested in knowing more about science-related subjects?

Majority of students answered “Most likely” and “Yes” (85.5%).
How many activities in the Science Olympiad Kit do you like?

Majority likes more than 4 activities (73.4%). 25% students like all.
Which activity in the Science Olympiad Kit is your MOST favorite?

Egg Drop is the most popular, followed by Straw Tower.
Which activity in the Science Olympiad Kit is your LEAST favorite?

Monster Match is the least popular. 20.2% of students do not dislike any of the activities.
Conclusion

• The introduction of SO Kit has the following positive effects on the 3rd grade students:
  • They think that the hands-on activities will help them understand science better (p=0.048)
  • They would like their schools to spend more time on teaching science through hands-on activities (p=0.024)
  • They read more science-related books a week (p=0.025)
• Accept the alternative hypothesis:
  \[ H1: \text{Science Olympiad Kit increases the interest of 3}^{rd}\text{ grade students in science} \]
Strengths

• Provided demographic information and interest levels in science to the educators and DSO Board members

• Investigated if the activities in the Science Olympiad Kit would get the third graders more interested in science

• Reflected the thoughts of the third graders towards the Science Olympiad Kit
Limitations

• Three schools started introducing the activities in the Science Olympiad Kit at different times (Sept, Nov, Dec).

• Three different teachers administered the introduction of Science Olympiad Kit in their own ways and the frequencies are not the same. The current study does not investigate these factors.

• The number of schools and the number of students are relatively small. This research may not generalize to all the third graders in Delaware. It can be viewed as a reference.
Acknowledgement

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THANK YOU.