Does the Teaching/Learning Interview Provide an Accurate Snapshot of Classroom Learning?

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1. Introduction
Research Question: How does data from students completing a pulley curriculum in an interview setting compare with data from students completing the same curriculum in a laboratory setting?
Context of Study: CoMPASS pulley curriculum

2. Methodology
Some students completed the pulley curriculum in a teaching interview room, others in a conceptual physics lab classroom.

<table>
<thead>
<tr>
<th>Teaching Interview</th>
<th>Classroom Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=12</td>
<td>N=132</td>
</tr>
<tr>
<td>Paid $25 for participation</td>
<td>Part of normal laboratory</td>
</tr>
<tr>
<td>Two hour intervention</td>
<td>Two hour intervention</td>
</tr>
<tr>
<td>Interview Room</td>
<td>Laboratory</td>
</tr>
<tr>
<td>Alone or with partner</td>
<td>Groups of 3 or 4 students</td>
</tr>
<tr>
<td>Researcher facilitates</td>
<td>Researcher &amp; TA facilitate</td>
</tr>
<tr>
<td>Audio/video recorded</td>
<td>No audio/video recording</td>
</tr>
<tr>
<td>Worksheets collected</td>
<td>Worksheets collected</td>
</tr>
</tbody>
</table>

3. Quantitative Analysis: Overall Score
- Mann-Whitney test used to compare scores
- No statistically significant difference between pre-test scores for the Teaching Interview (TI) & Class Study (CS) (p = .15)
- TI scored significantly higher on mid-test than CS (p <.001, r =.289)
- TI score significantly higher on post-test than CS (p = .013, r =.206)

4. Quantitative Analysis: Specific Questions
Largest performance spread in three questions below
Q9: Identify which of three pulley setups would require the most work to lift the same load to the same height.
A. Single fixed
B. Single compound
C. Double compound
D. All need equal work

Q13: Compare the work (W) needed to lift an object with its potential energy (PE) once lifted.
A. W > PE
B. W < PE
C. W = PE
D. Not enough info

5. Qualitative Analysis
- Used phenomenographic approach [3] to analyze students’ responses to open-ended worksheet questions
- Focused on questions related to post-test

<table>
<thead>
<tr>
<th>Categories</th>
<th>Teach. Int.</th>
<th>Class Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not change</td>
<td>43%</td>
<td>61%</td>
</tr>
<tr>
<td>Changed slightly</td>
<td>16%</td>
<td>5%</td>
</tr>
<tr>
<td>Changed</td>
<td>35%</td>
<td>29%</td>
</tr>
<tr>
<td>Changed for some</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Related to Q9:
How does the work required to lift an object change when the pulley setup is changed?

Related to Q13:
How does the work (W) done to lift an object compare to its potential energy (PE) once lifted?
Greater variability in CS responses.

6. Summary
- Qualitative study results do not neatly overlap with quantitative study results. While TI students did better on post-test, CS students did as well or better on worksheet questions.
- Main implication: instructional materials tested in a small scale environment may not work the same in a larger classroom.

7. Future Work
- Identify additional factors that may have affected the results: Different incentives? Different student-researcher ratio? Different group size?
- Videotape students using curriculum in classroom setting
- Validity and reliability studies of the tests are in progress


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