INTERVIEW ROOM VERSUS CLASSROOM: HOW DO THE DATA COMPARE?

Jacquelyn J. Chini, Adrian Carmichael, & N. Sanjay Rebello- Kansas State University
Sadhana Puntambekar- University of Wisconsin, Madison

This work is funded in part by U.S. Department of Education, Institute of Education Sciences Award R305A080507.
**Motivation**

- Use teaching/learning interview\(^1\) to investigate student learning
  - Based on teaching experiment\(^2\)
  - Models natural learning environment
  - Allows more direct access to students’ thinking
  - Is inherently different than classroom environment

- Use interview results to inform decisions about curricula
  - Previously reported interview data is richer in detail than classroom data\(^3\)
  - Are there other differences?

STUDY DETAILS

- **Research Question:**
  How do the data from students completing a curriculum in an introductory physics lab compare with data from students completing the same curriculum in an interview setting?

- **Curriculum**
  - CoMPASS⁴ pulley unit
  - Physical pulleys & pulley simulation

- **Mixed Methods**
  - Quantitative: Pre- & post-test results
  - Qualitative: Worksheet responses

4. Puntambekar & Stylianou, 2005
COMPARISON OF INTERVIEW & CLASSROOM SETTINGS: SIMILARITIES

- Introductory physics students
- CoMPASS pulley curriculum
- Two hour intervention
- Worksheets collected
COMPARISON OF INTERVIEW & CLASSROOM SETTINGS: DIFFERENCES

<table>
<thead>
<tr>
<th>Interview Room</th>
<th>Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview Room</td>
<td>Laboratory</td>
</tr>
<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>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&amp; video recorded</td>
<td>No audio/video recording</td>
</tr>
</tbody>
</table>

* This study diverged from our typical teaching/learning interview to control for some differences from the classroom setting.
OVERALL TEST PERFORMANCE

- No statistically significant difference between the pre-test scores for the Teaching Interview (M=38) and the Class Study (M=31), $U=9546.5$, $p=.15$, $r=.119$.

- Teaching Interview scored significantly higher on the mid-test (M=62) than the Class Study (M=50), $U=9222.5$, $p<.001$, $r=.289$.

- Teaching Interview also scored significantly higher on the post-test (M=85) than Class Study (M=69), $U=9380.0$, $p=.013$, $r=.206$. 
POST-TEST PERFORMANCE: BY QUESTION

![Bar chart showing percent correct responses for Q01 to Q14. The chart compares teaching interview and class study results.]
**Individual Questions- ‘Work Change’**

**Quantitative Analysis (Post-test Q9)**

What can you tell about the *work needed* to lift the load by each of setup, if friction is not a factor?

A- Setup A requires most work
B- Setup B requires most work
C- Setup C requires most work
D- All require the same work

![Diagram of setups A, B, and C with 10 lbs loads](image)

![Bar chart showing responses](image)
Q: How did the work required to lift the load change when the pulley setup was changed?

<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 setup</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Higher percentage of Class Study students in “did not change” category
You use a movable pulley to lift a watermelon to your tree house. How does the work you do lifting the watermelon compare to its potential energy once lifted?

A- Work > PE
B- Work < PE
C- Work = PE
D- Not enough info.
**INDIVIDUAL QUESTIONS- ‘WORK- PE’ QUALITATIVE ANALYSIS (WORKSHEET)**

Q: How does the work required to lift an object compare to its potential energy once lifted?

<table>
<thead>
<tr>
<th>Categories</th>
<th>Teach. Int.</th>
<th>Class Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work=PE</td>
<td>53%</td>
<td>53%</td>
</tr>
<tr>
<td>Work almost PE</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Work&gt;PE</td>
<td>21%</td>
<td>7%</td>
</tr>
<tr>
<td>Work&lt;PE</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Work, PE different</td>
<td>9%</td>
<td>4%</td>
</tr>
<tr>
<td>Depends on system</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>One constant</td>
<td>3%</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Same percentage of Class Study and Teaching Interview students in “Work = PE” category
**Summary & Future Work**

- Quantitative and qualitative results do not neatly overlap
- Why did Class Study students perform as well as or better on worksheets while Teaching Interview students performed better on post-test?

- Repeat experiment with cameras in classroom setting
- Validity and reliability studies of the test currently underway
Thank You!

Contact Information: haynicz@phys.ksu.edu

For more information, see our poster at AAPT tonight or at PERC!