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?

1. Engelhardt *et* al., 2003; 2. Steffe & Thompson, 2000; 3. McBride, 2009

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
  - CoMPASS[4] 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

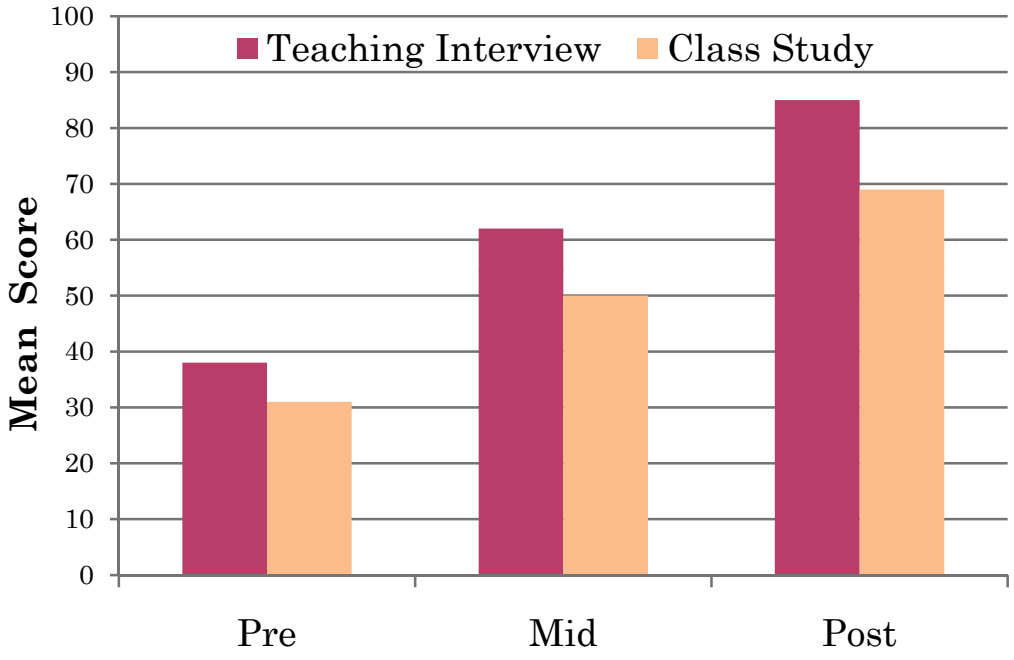
- Introductory physics students
- CoMPASS pulley curriculum
- Two hour intervention
- Worksheets collected

Comparison of Interview & Classroom Settings: Differences

Interview Room	Classroom
Interview Room	Laboratory
N= 12	N=132
Paid $25 for participation	Part of normal laboratory
Alone or with partner	Groups of 3 or 4 students
Researcher facilitates	Researcher & TA facilitate
Audio& video recorded	No audio/video recording

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

Overall Test Performance

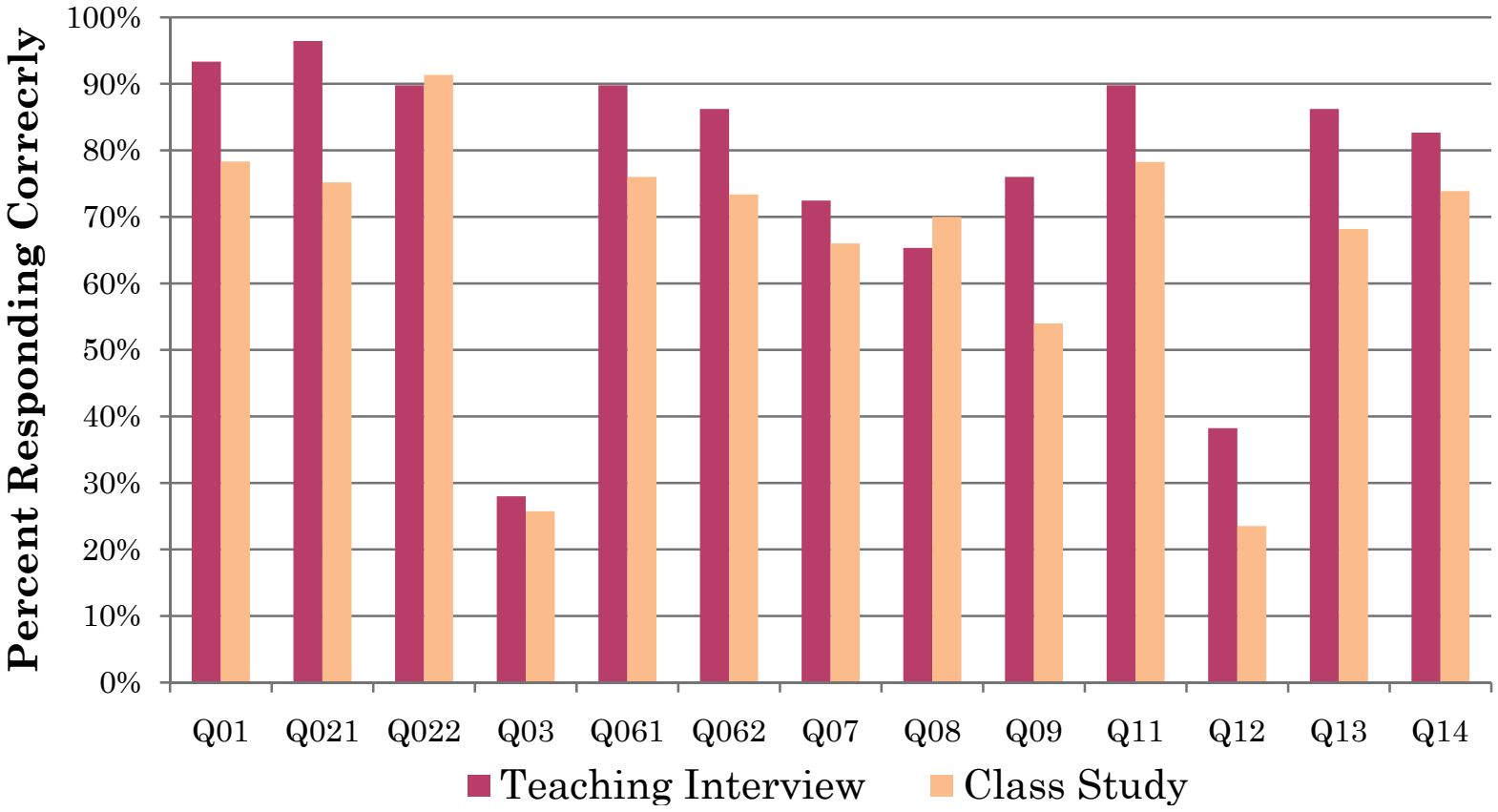


•No statistically significant difference between the pre-test scores for the Teaching Interview (M=38) and the Class Study (M=31), U=9546.5, p=.15, r=.119

•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



Individual Questions- 'Work Change' Quantitative Analysis (Post-test Q9)

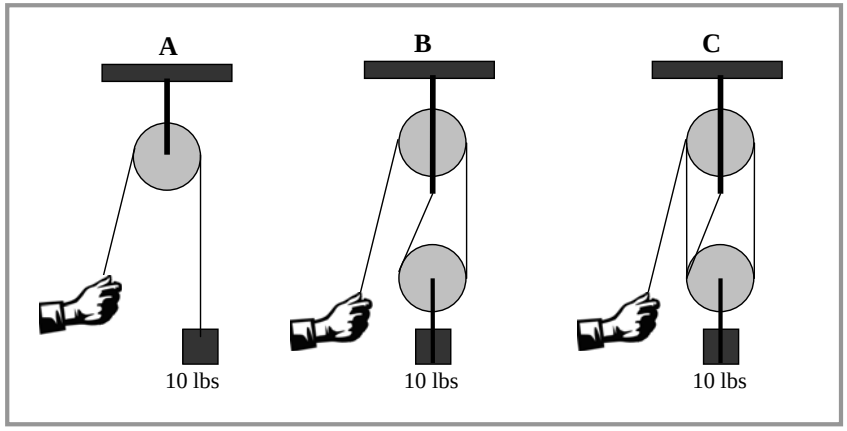
What can you tell about the *work needed* to lift the load by each of setup, if friction is not a factor?

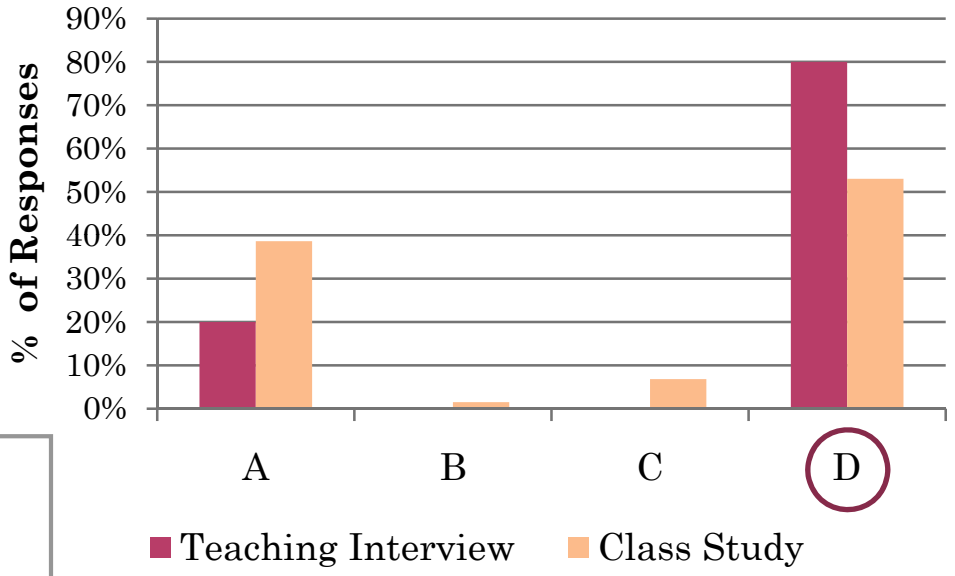
A- Setup A requires most work

B- Setup B requires most work

C- Setup C requires most work

D- All require the same work





Individual Questions- 'Work Change' Qualitative Analysis (Worksheet)

Q: How did the work required to lift the load change when the pulley setup was changed?

Categories	Teach. Int.	Class Study
Did not change	43%	61%
Changed slightly	16%	5%
Changed	35%	29%
Changed for some setup	0%	3%
Other	6%	2%

Higher percentage of Class Study students in "did not change" category

Individual Questions- 'Work- PE' Quantitative Analysis (Post-test Q13)

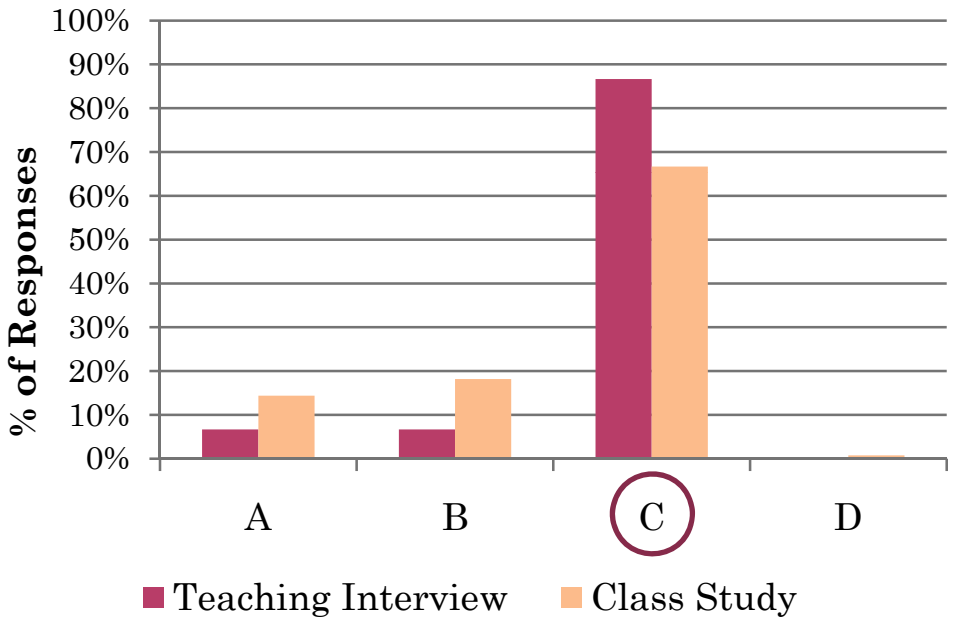
You use a movable pulley to lift a watermelon to your tree house. How does the work you do lifting the watermelon compare to its potential energy once lifted?

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?

Categories	Teach. Int.	Class Study
Work=PE	53%	53%
Work almost PE	6%	9%
Work>PE	21%	7%
Work<PE	6%	3%
Work, PE different	9%	4%
Depends on system	0%	3%
One constant	3%	15%
Other	0%	4%

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!