Technology is not a pedagogy: Peer Instruction with and without clickers



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Have you used Peer Instruction?

Yes, with clickers
 Yes, without clickers
 No

On average, how many questions/class hour?

1. one
 2. two
 3. three
 4. four or more
 5. don't use PI

How do you implement PI?

question, poll
 question, poll, discuss, repoll
 question, discuss, poll
 other
 don't use PI

do learning gains depend on setting and technology?

Outline

Peer Instruction

School setting

Technology



lectures focus on delivery of information

lectures focus on delivery of information

but education is more than information transfer

ee

STRUCTION

ERIC MALUR

move information transfer out of classroom

assign reading teach by questioning

brief lecture





















Professors A and B teach the same mechanics class at the same college during different semesters. Professor A uses the traditional approach to teaching and lectures. Professor B uses Peer Instruction and students respond to the questions in using clickers. Each class is evaluated using the traditional end-ofsemester questionnaire and using the FCI to measure students' comprehension of mechanics. Both professors are middle-aged and male. The results are as follows.

A: student evaluation: 1.5/5.0; <g> = 0.42 B: student evaluation: 3.7/5.0; <g> = 0.57

Professor	Α	В
pedagogy	traditional	PI with clickers
student evaluation	1.5/5.0	3.7/5.0
FCI <g></g>	0.42	0.57

What might account for the large difference in evaluation?

- I. professor personality II. technology III. pedagogy
- I only
 II only
 III only
 III only
 III and III
 I, II, and III
 other combination



a couple of points worth noting:



a couple of points worth noting:

1. you got engaged



a couple of points worth noting:

you got engaged
 no "correct" answer

a couple of points worth noting:

you got engaged
 no "correct" answer
 you got engaged



School setting

• Technology

traditional instruction



traditional instruction



traditional instruction



first year of implementing PI



first year of implementing PI



first year of implementing PI





what about problem solving?





better understanding leads to better problem solving



- 55%

18











exam performance



exam performance



student retention



student retention



student retention





similar learning gains in both environments



School setting

Technology

Professor C teaches mechanics at a private institution with very selective admissions. She uses Peer Instruction and requires her students to purchase clickers. Professor D teaches a similar course at a community college with many under-prepared students. Neither Professor D's college, nor his students have the means to purchase clickers, so Professor D prints out flashcards for his students. Each class' performance is compared to a similar (control) class taught using the traditional lecture approach at the same institution using both FCI pre and post testing and free-response questions on the final examination.

C: <g> = 0.49 (control 0.25); exam 11% improvement D: <g> = 0.46 (control 0.32); exam 8% improvement

Professor	С	D
college	selective	community college
technology	clickers	flashcards
FCI <g></g>	0.49 (0.25)	0.46 (0.32)
exam improvement	11%	8%

Identify conclusions you would draw from this comparison:

- I. interactive teaching works across all levels II. clickers are a useless gimmick III. you really can't draw any conclusions
- I only
 II only
 I and II
 II and III
 II and III
 I, II, and III

FCI scores at John Abbott College



FCI scores at John Abbott College



normalized gain: 0.47



FCI scores at John Abbott College



FCI scores at John Abbott College



normalized gain: 0.44





similar gains for flashcards (0.47) and clickers (0.44)



Remember the Professor C/D question?



Remember the Professor C/D question?

The technology didn't *really* fail..., we tricked you, but...



Remember the Professor C/D question?

The technology didn't *really* fail..., we tricked you, but...

notice you still got engaged!

(it's not the clickers, but your brain that matters)



















but clickers do offer advantages



but clickers do offer advantages

- permit fast and accurate tally
- provide data archive
- help promote change



clickers great teaching aid

learning gains determined by pedagogy

can start now and get clickers later

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