

Engaging Students One-on-One, All At Once

Session 2



Peer Instruction Online Course
Hong Kong Polytechnic University
26 September 2014

Session 2 slides

<http://mazur.harvard.edu>

Outline



Outline

- **Your questions**
- **Developing PI/JiTT questions**
- **Strategies for assessment**

Online Polling

1. Go to learningcatalytics.com/demo
2. Enter info, click "Start"
3. Join session 123456789

Your questions

“I have difficulties in searching the Peer Instruction resources as most of them are mixed with ConcepTests.”

Your questions

“As I am experimenting PI in different classes, I notice that students’ active participation and cooperation is key to success — they must trust the instructor (that he or she is not being lazy, that he or she is teaching something more than they can read from the textbooks), and they must also be willing to help each other. Do you have any not-so-successful experience in terms of getting students to involve?”

Your questions

Question categories:

- **Creating/finding ConcepTests**
- **Moving information transfer out of classroom**
- **Administering ConcepTests**
- **Student resistance**
- **Assessment**

Your questions

Question categories:

- **Creating/finding ConcepTests (part 2)**
- **Moving information transfer out of classroom**
- **Administering ConcepTests**
- **Student resistance**
- **Assessment (part 3)**

Your questions

Question categories:

- Creating/finding ConcepTests (part 2)
- **Moving information transfer out of classroom**
- Administering ConcepTests
- Student resistance
- Assessment (part 3)

Moving information out of classroom

“Must students always complete a pre-class reading?”

Moving information out of classroom

*“How to make students read before class
if they are not used to it?”*

Moving information out of classroom

My approach:

- **do not deliver information in class**
- **offer a reward**
- **use reading feedback as opportunity to help**

Moving information out of classroom

“Sometimes it’s a bit difficult to use PI as students in Hong Kong get used to the spoon-fed education system. How can we deal with students who are not willing to read the materials before class (for JiTT) and refuse to participate in class? (I want to use JiTT and PI at the same time)”

Moving information out of classroom

My approach:

- **Reading quizzes (1991)**
- **Reading summaries (1994)**
- **Just-in-Time Teaching (1999)**

Your questions

Question categories:

- Creating/finding ConcepTests (part 2)
- Moving information transfer out of classroom
- **Administering ConcepTests**
- Student resistance
- Assessment (part 3)

Administering ConcepTests

“Any suggested duration of each question?”

Administering ConcepTests

“Is implementation of PI possible without clickers?”

Administering ConcepTests

Yes! (And the learning gains are the same)

- **show hands (on chest)**
- **flash cards**

Administering ConcepTests

*“What is an optimal balance between
ConcepTests and lecture format?”*

Administering ConcepTests

“Can we use non-multiple choice questions in ConcepTests?”

If yes, we cannot use clickers for non-MCQ. How can students share their answers with the others and how can the teachers know if most of the students answer the question correctly? (especially for large class size)”

Administering ConceptTests

*“Would would be a feasible plan for PI
to be implemented for a large-sized class?”*

Your questions

Question categories:

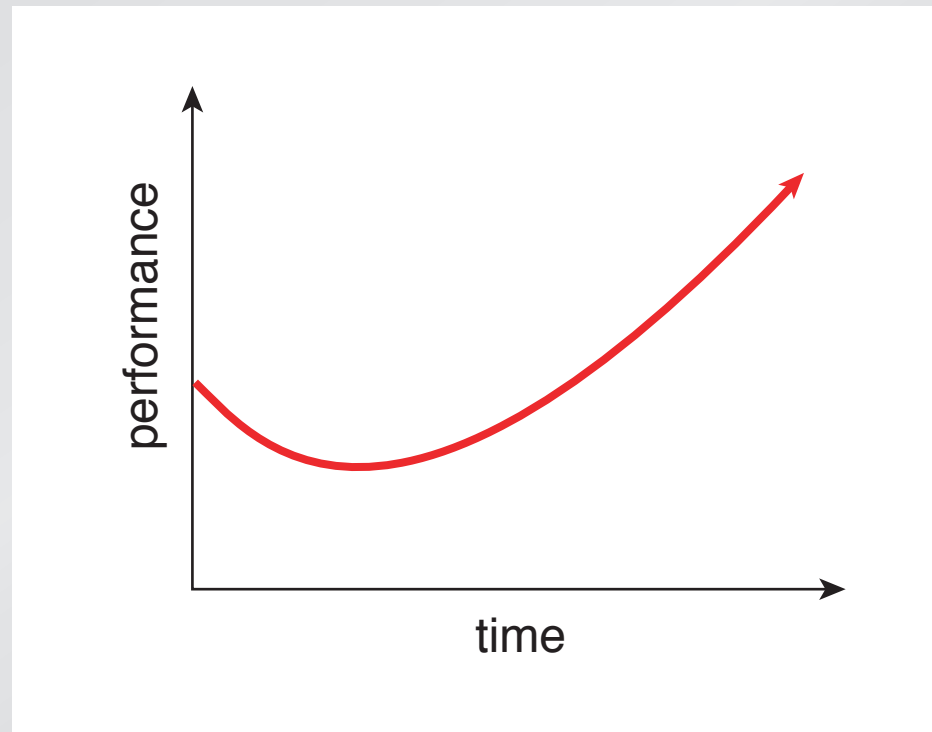
- Creating/finding ConcepTests (part 2)
- Moving information transfer out of classroom
- Administering ConcepTests
- **Student resistance**
- Assessment (part 3)

Student resistance

“I am experimenting with PI in different classes and noticed that students’ active participation and cooperation is key to success — they must trust the instructor and be willing to help each other. Do you have any not-so-successful experiences in terms of getting students involved?”

Student resistance

After changing, things might get *worse* before they get better!



Student resistance

Written on Wednesday Feb 16, two weeks into the course:

Subject: concerns

Professor Mazur,

Here are a few concerns. I speak for many of my classmates.

1) You are giving us WAY too much work. After spending multiple hours on the problem set, and not being able to figure out many of the questions, I now see that we have an additional 6 or 7 pages or homework in the workbook. I just spent 4 hours on the lab, and I am not confident on almost half of the questions. This is more work than I have had all semester in all of my other classes combined.

2) If you are going to give us this much work, I would suggest re-structuring the lectures. I find the readings very difficult to understand. I am not a bad student (I got a solid A in physics 1a), but it is very difficult to internalize the readings. You should spend most of the lecture going over, point by point, the readings in their entirety. While the PRS clickers are fun, they do not help me understand the complex material.

I am extremely flustered by the incredibly large amount of work, and my inability to understand it, and I am strongly considering dropping the course.

Student resistance

Written on Monday May 23, just after the final exam:

Subject: Thanks!

Professor Mazur,


First of all I want to thank you for a great semester. You are an excellent professor, and it is clear that you truly care about each and every student.

The exam went well today. I'm not sure to what extent you will curve the final grades (if at all), but it looks like I may be right around the cutoff point between an A and an A-. I studied as hard as I could and I'm keeping my fingers crossed about the A, but no matter what happens with my grade you should know that you are one of the best professors that I have ever had at Harvard.

Thanks again!

Student resistance

Hello Prof. Mayer,
I wanted to hand you this card as
a token of my deep appreciation of
how you have helped me throughout
the semester. You are truly
an inspiring and have
changed how I look at
"learning". I also wanted
to thank you for
how understanding
you were of all
my circumstances.
You really made a difference
in my life. So THANKS
Thank you!
Best.

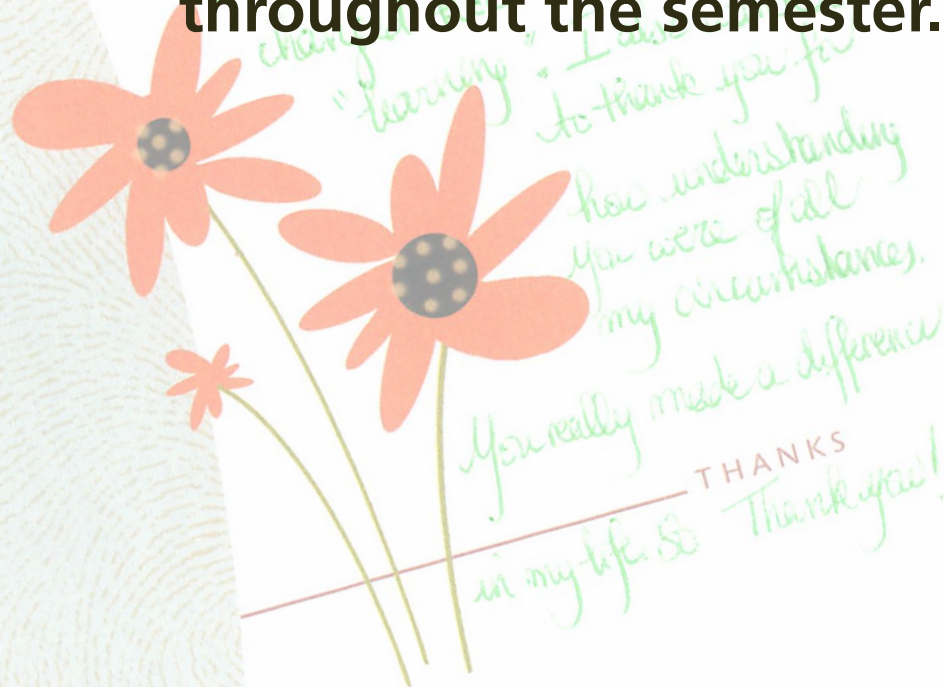


You made a difference.

Student resistance

"I wanted to hand you this card as a token of my deep appreciation of how you have helped me throughout the semester."

You made a difference.



Student resistance

"I wanted to hand you this card as a token of my deep appreciation of how you have helped me throughout the semester. You are truly awe inspiring and have changed how I look at "learning".

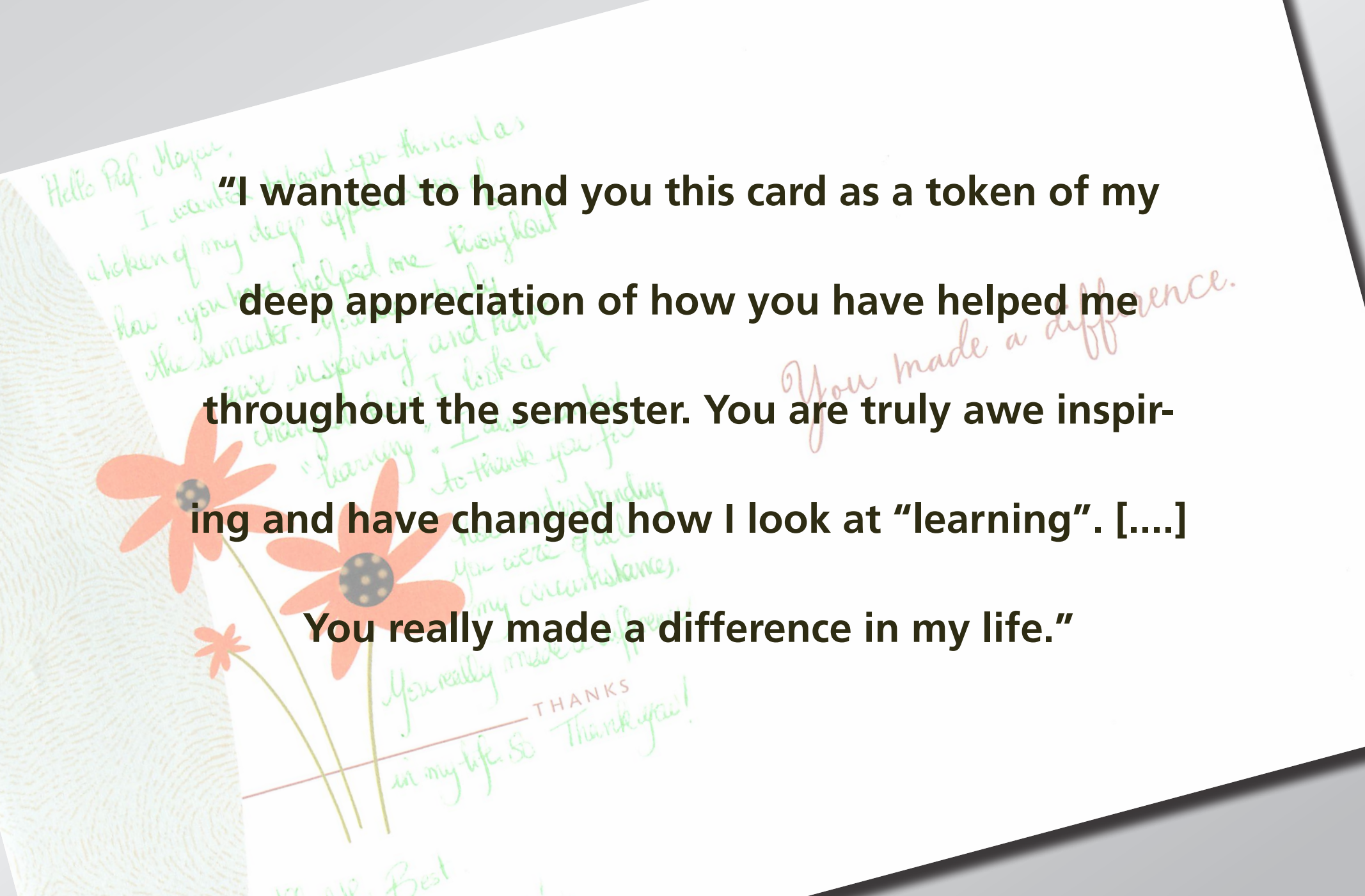
You made a difference.

*THANKS
in my life. So Thank you!*

Best

Student resistance

"I wanted to hand you this card as a token of my deep appreciation of how you have helped me throughout the semester. You are truly awe inspiring and have changed how I look at "learning". [....] You really made a difference in my life."



Student resistance

and don't forget...

Student resistance

and don't forget...

PI leads to better learning and retention!

Student resistance

"I want to encourage students to think out of the box, to come up with more than one answer to the same questions, etc. I tried that once by asking a 'stupid' question, hoping that the students would point out the problems of that question. I wonder if you have sample questions of that kind."

Student resistance

*“Student may feel the questions not interesting,
so may not bother to answer it seriously.”*

Outline

- Your questions
- **Developing PI/JiTT questions**
- Strategies for assessment

Developing PI/JiTT questions

Your ranking of the CTs on the assignment (best to worst):

3, 1, 4, 5, 6, 2

Our ranking of the CTs on the assignment (best to worst):

5, 3, 4, 1, 6, 2

Developing PI/JiTT questions

Your ranking of the CTs on the assignment (best to worst):

3, 1, 4, 6, 5, 2

Our ranking of the CTs on the assignment (best to worst):

5, 3, 4, 1, 6, 2

Developing PI/JiTT questions

Which of the following is the Pythagorean theorem?

a) $a + b = c$

b) $a^2 + b^2 = c^2$

c) $a^2 + b^2/c^2$

d) $y = mx + b$

Developing PI/JiTT questions

Your ranking of the CTs on the assignment (best to worst):

3, 1, 4, 6, 5, 2

Our ranking of the CTs on the assignment (best to worst):

5, 3, 4, 1, 6, 2

Developing PI/JiTT questions

To get from his high school to his home, Yahya travels 5.0 meters east and then 4.0 meters north. When Jasmine goes to her home from that same high school, she travels 8.0 meters east and 2.0 meters south. What is the approximate measure of the shortest distance, between Yahya's home and Jasmine's home?

Developing PI/JiTT questions

<http://bit.ly/conceptesthandout>

Developing PI/JiTT questions

My Peer Instruction Question

- Your first time camping in the woods, you are bitten over 45 times by mosquitoes, resulting in lots of swollen, itchy bumps on your arms, legs, and back. You never want to go camping again. What kind of consequence did you confront on your first camping experience?

- A. Positive Reinforcement
- B. Negative Reinforcement
- C. Positive Punishment
- D. Negative Punishment



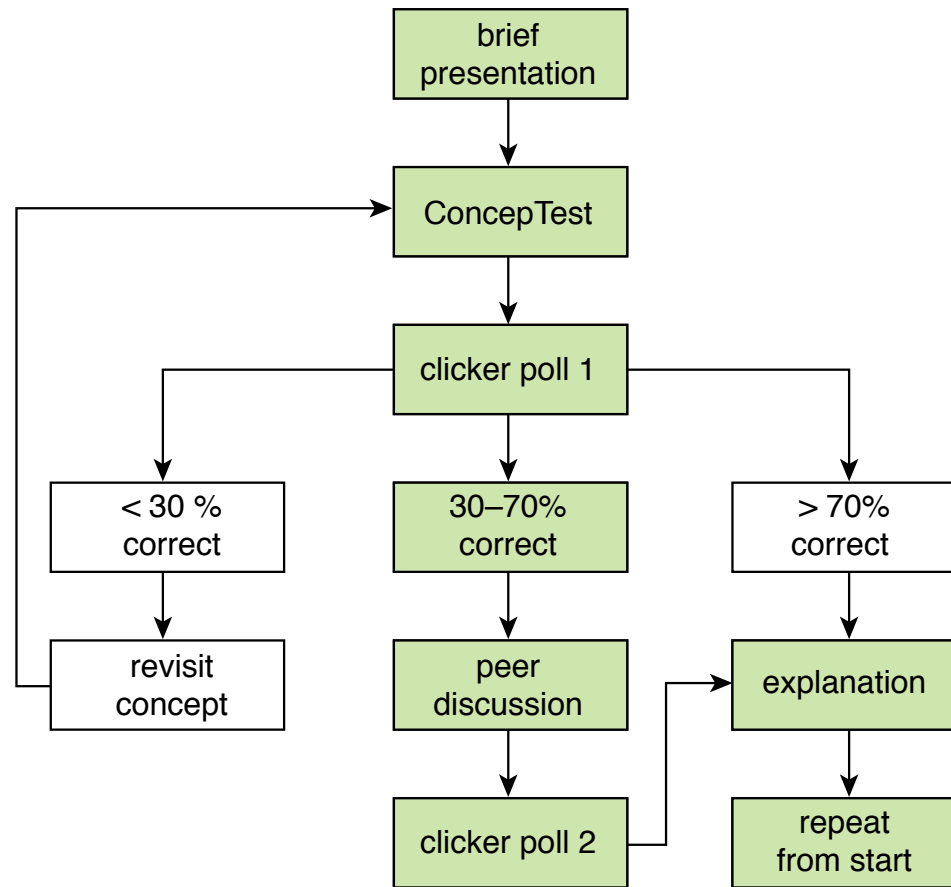
Developing PI/JiTT questions

“How do I select which concepts to evaluate?”

Developing PI/JiTT questions

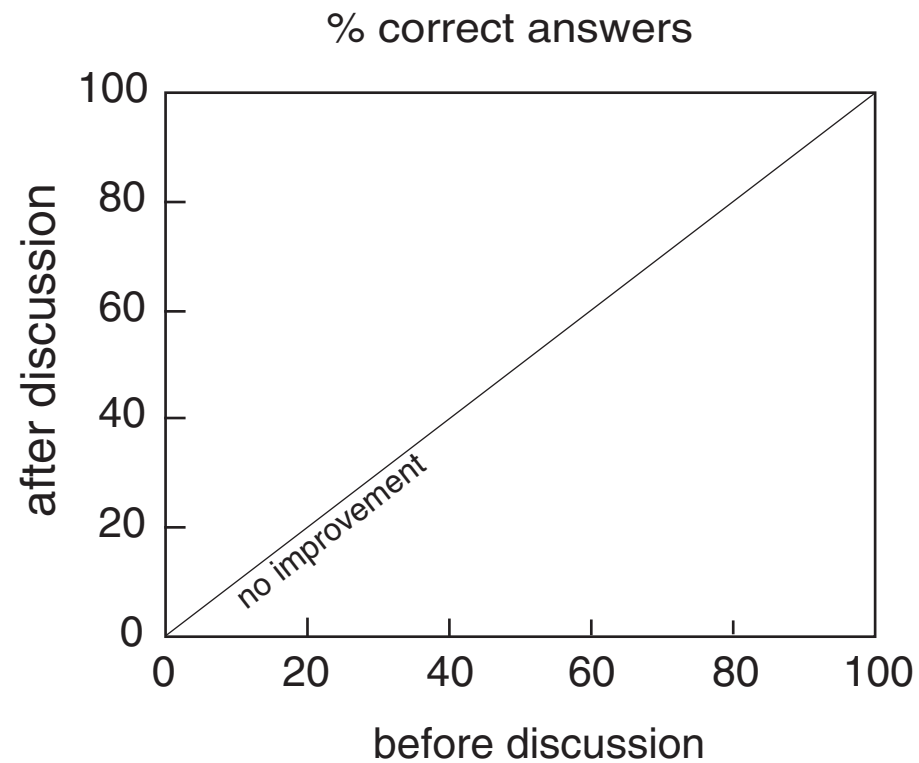
“How can I know what question is a good ConcepTest before I try it out in class with the 30%–70% principle”

Developing PI/JiTT questions



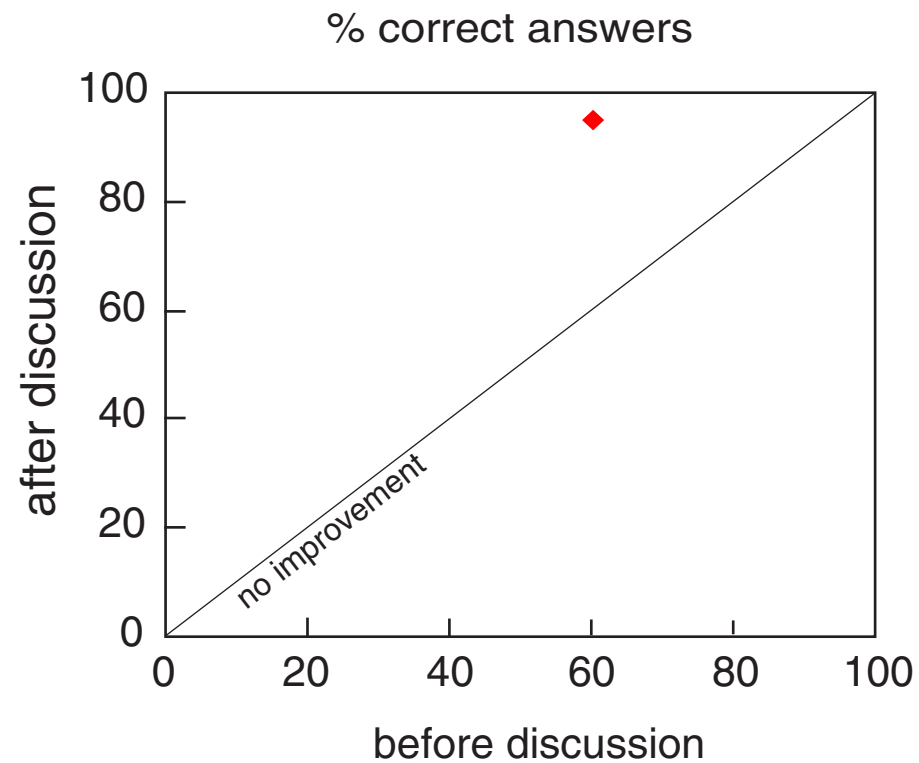
Developing PI/JiTT questions

ConceptTest data



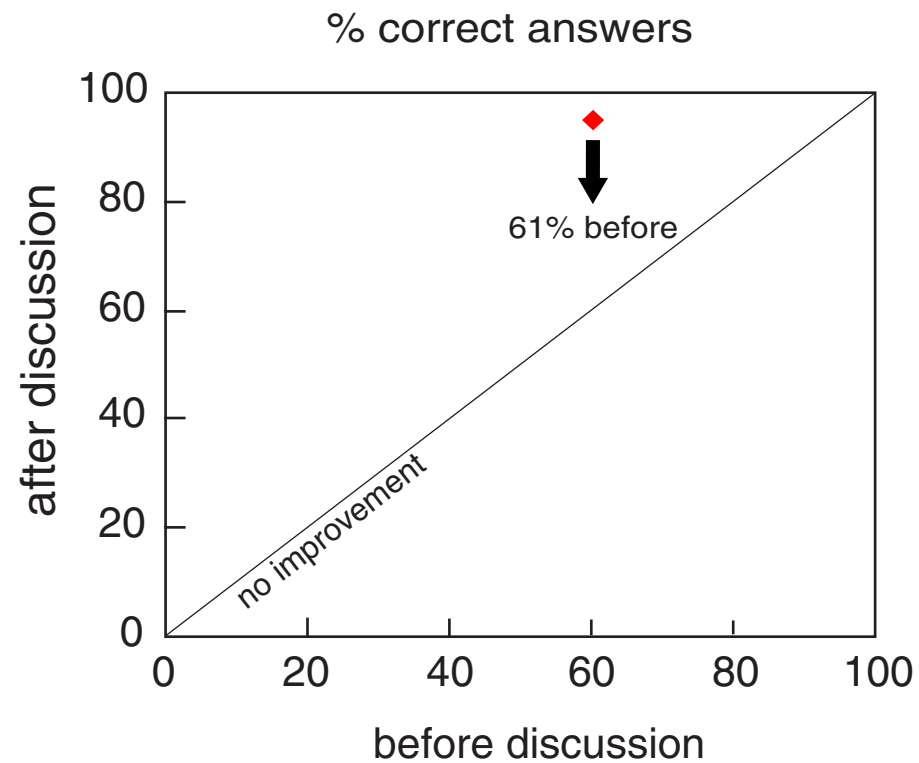
Developing PI/JiTT questions

ConceptTest data



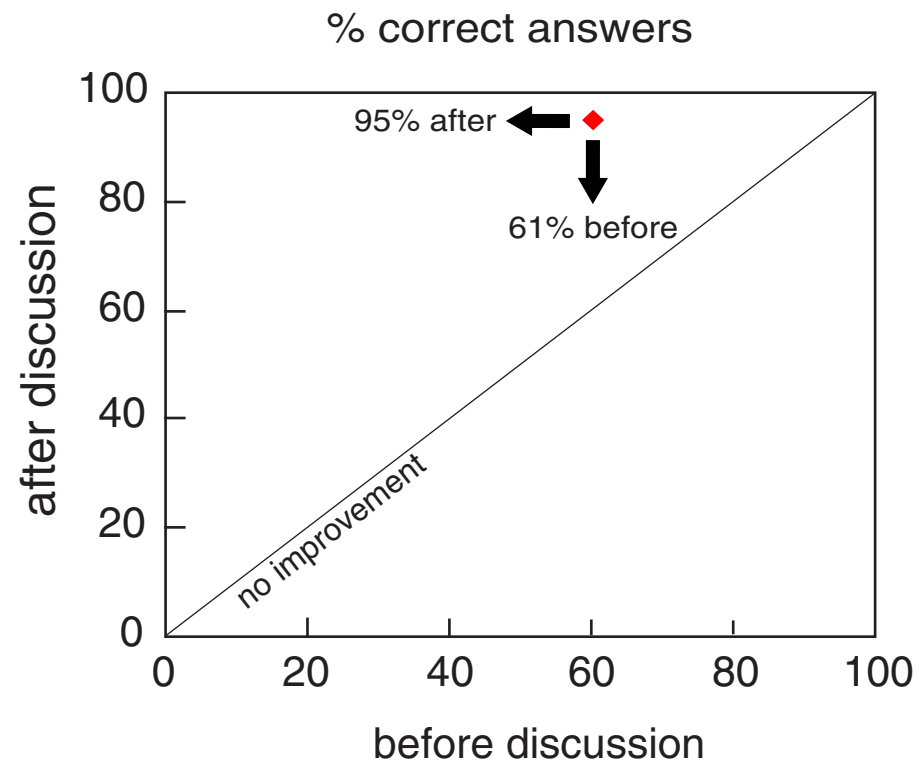
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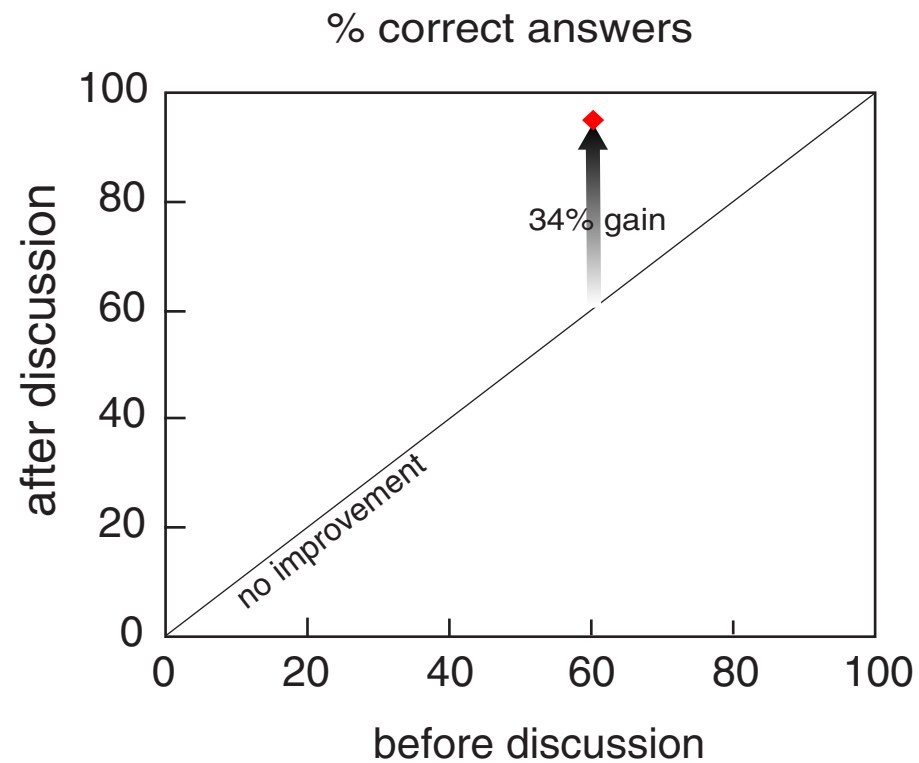
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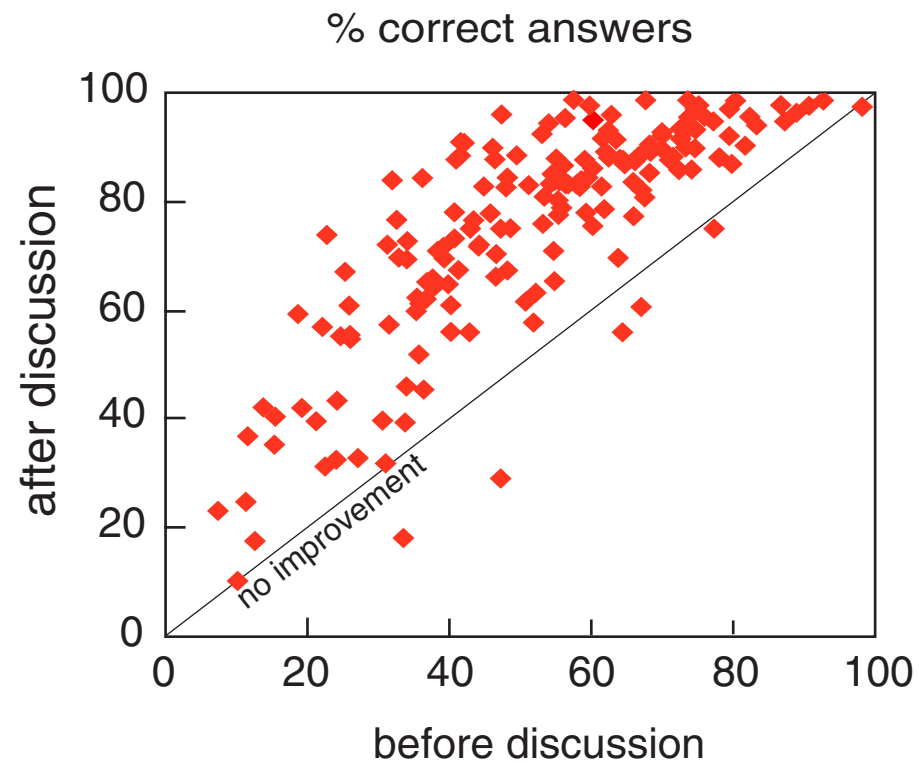
Developing PI/JiTT questions

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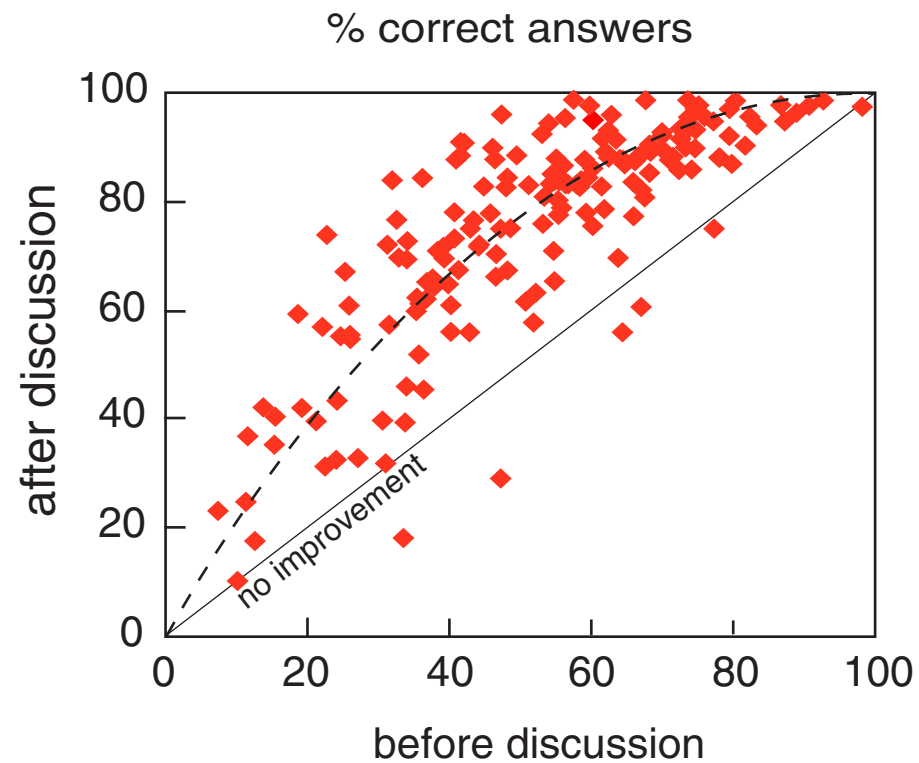
Developing PI/JiTT questions

ConcepTest data



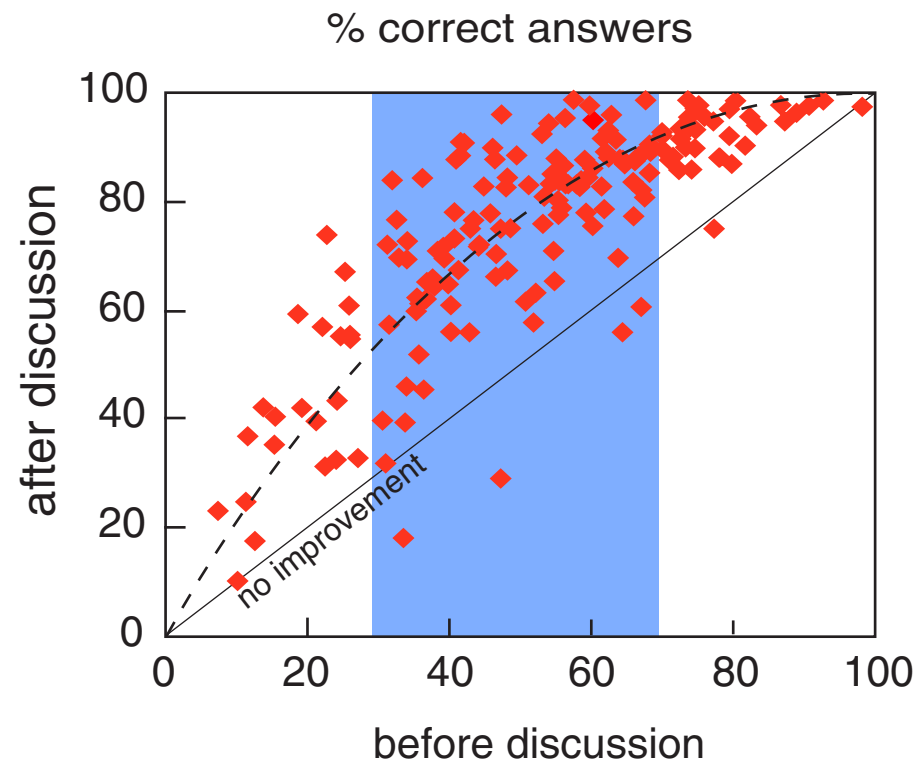
Developing PI/JiTT questions

ConceptTest data



Developing PI/JiTT questions

ConcepTest data



Developing PI/JiTT questions

*“Do you encourage students to come up
with their own ConcepTests?”*

Developing PI/JiTT questions

“Please tell me how to use PI in Finance.”

Outline

- **Your questions**
- **Developing PI/JiTT questions**
- **Strategies for assessment**

Strategies for assessment

“As we try to engage students in active and thoughtful learning, it is hard to evaluate accordingly.”

Strategies for assessment

Some ideas:

- **Open book/computer**
- **Collaborative exam**
- **Multidimensional**

Strategies for assessment

“How do you assess a diverse student body? Essay questions are hard for the students and difficult to grade.”

Strategies for assessment

“How do you assess a diverse student body? Essay questions are hard for the students and difficult to grade.”

Calibrated Peer Review: <http://cpr.molsci.ucla.edu>

Strategies for assessment

YouTube:

“Assessment: The Silent Killer of Learning”

Last, but not least...

Are you going to be implementing PI/JiTT?

Last, but not least...

Are you going to be implementing PI/JiTT?

Share your plans!

Research Funding:

Pew Charitable Trust, Pearson/Prentice Hall, Davis Foundation, Engineering Information Foundation, Derek Bok Center for Teaching and Learning, National Science Foundation

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