Session 2 slides

http://mazur.harvard.edu
Outline

• Your questions
• Developing PI/JiTT questions
• Strategies for assessment
1. Go to learningcatalytics.com/demo
2. Enter info, click “Start”
3. Join session 123456789
“Do the exact sciences lend themselves better for ConcepTest questions than social sciences?”
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)
Question categories:

- Creating/finding ConcepTests (part 2)
- Moving information transfer out of classroom
- Administering ConcepTests
- Student resistance
- Assessment (part 3)
“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
“The difficulty that I face with my students that they do not prepare for the lecture even if I ask them to do that.”
Moving information out of classroom

My approach:

- Reading quizzes (1991)
- Reading summaries (1994)
- Just-in-Time Teaching (1999)
Question categories:

- Creating/finding ConcepTests (part 2)
- Moving information transfer out of classroom
- Administering ConcepTests
- Student resistance
- Assessment (part 3)
“Can I use peer instruction in only one chapter of the course?”
“Which is better for PI, a small, medium or large class?”

“Is PI effective in big classes?”
“If clickers are not available, are there any other options?”
Administering ConcepTests

Yes! (And the learning gains are the same)

- show hands (on chest)
- flash cards
“Is there a minimum number of questions to use?”
Administering ConcepTests

“Should the CTs always include answer options (MCQs)? Or can they be open ended?"

“What if decided to use open-ended questions to begin experimenting IP, then I can use students answer to develop multiple-choice questions.”
Your questions

Question categories:

• Creating/finding ConcepTests (part 2)
• Moving information transfer out of classroom
• Administering ConcepTests
• Student resistance
• Assessment (part 3)
“How can I engage my students in reacting positively to Concept Tests?”
Student resistance

After changing, things might get worse before they get better!
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 to 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.
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!
Hello Prof. Mayer,

I wanted to thank you for your role and the inspiration of your teaching. Your classes have helped me throughout the semester. You are truly inspiring and have changed how I look at "learning." I also wanted to thank you for your understanding and support during my circumstances. You really made a difference in my life. So Thank you!

THANKS

10/4/16 Best

You made a difference.
“I wanted to hand you this card as a token of my deep appreciation of how you have helped me throughout the semester.
“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”.

THANKS in my life. So Thankyou!
“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!
“What are the guidelines for writing ConcepTests that promote critical thinking in my students?”
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, 2, 1, 6, 4, 5

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, 2, 1, 6, 4, 5

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

5, 3, 4, 1, 6, 2
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) \( y = mx + b \)
Your ranking of the CTs on the assignment (best to worst):

3, 2, 1, 6, 4, 5

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

5, 3, 4, 1, 6, 2
Ana plays goalie for a soccer team competing in the FIFA world cup. Her coach asks her to warm up by running from one corner of the field to the exact middle of the field. About how far does she need to run?
Developing PI/JiTT questions

Which type of viral Hepatitis has the highest mortality rate during pregnancy?

a. Hepatitis A  
b. Hepatitis B  
c. Hepatitis C  
d. Hepatitis D  
e. Hepatitis E
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

Kevin Chan, HKPoly
“How do I select which concepts to evaluate?”
Developing PI/JiTT questions

“How do I know I’m doing the right thing?”
Developing PI/JiTT questions

brief presentation

ConcepTest

clicker poll 1

< 30% correct
revisit concept

30–70% correct
peer discussion

> 70% correct
explanation

clicker poll 2
repeat from start
Developing PI/JiTT questions

ConcepTest data

![Graph showing percentage of correct answers before and after discussion. The graph has a diagonal line indicating no improvement.](image-url)
Developing PI/JiTT questions

ConcepTest data

% correct answers

before discussion

after discussion

0 20 40 60 80 100

no improvement

0 20 40 60 80 100

100 80 60 40 20

0
Developing PI/JiTT questions

ConcepTest data

% correct answers

after discussion

before discussion

0 20 40 60 80 100

no improvement

61% before

100

80

60

40

20

0
Developing PI/JiTT questions

ConcepTest data

% correct answers

after discussion

before discussion

95% after

61% before

no improvement
Developing PI/JiTT questions

ConcepTest data

- % correct answers:
  - 100
  - 80
  - 60
  - 40
  - 20

- Before discussion:
  - 0

- After discussion:
  - 34% gain

- Graph showing percentage of correct answers before and after discussion.
Developing PI/JiTT questions

ConcepTest data

% correct answers

after discussion

before discussion

0
20
40
60
80
100

0
20
40
60
80
100

no improvement

no improvement
Developing PI/JiTT questions

ConcepTest data

% correct answers

after discussion vs. before discussion

before discussion
Developing PI/JiTT questions

ConcepTest data

The graph shows the percentage of correct answers before and after discussion. The data indicates a significant improvement in correct answers after discussion.
“Please tell me how to find ConcepTests in Medicine and Medical Biochemistry.”
• Your questions
• Developing PI/JiTT questions
• 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
“How do you assess a diverse student body? Essay questions are hard for the students and difficult to grade.”
“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
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:

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