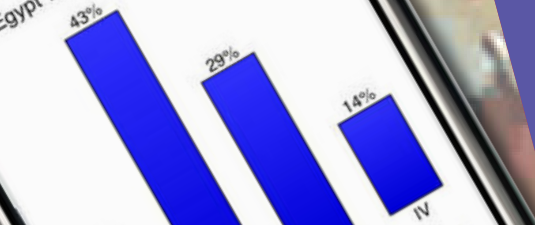


# Peer Instruction Workshop: Part II



Campus Kristiania  
Oslo, Norway, 7 March 2013



# Peer Instruction Workshop: Part II

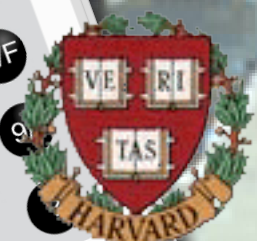
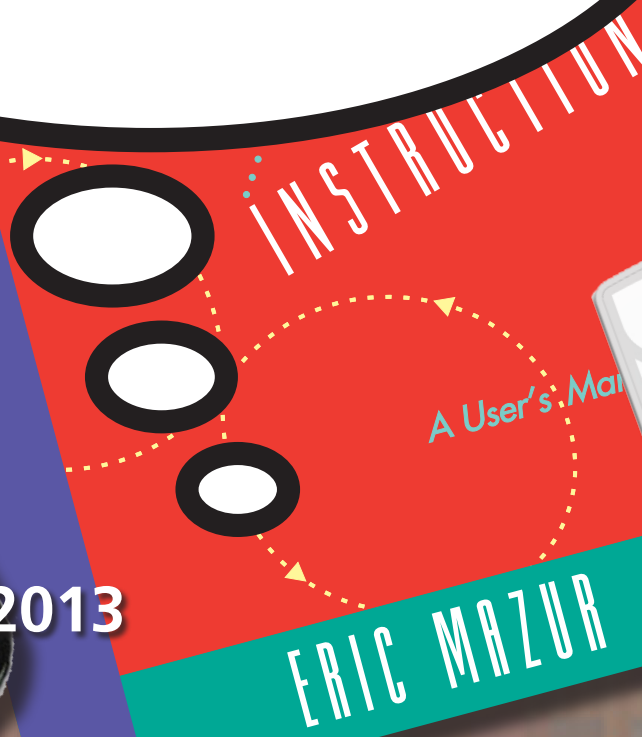


@eric\_mazur

Includes  
Class-Tested,  
Ready-to-Use  
Resources

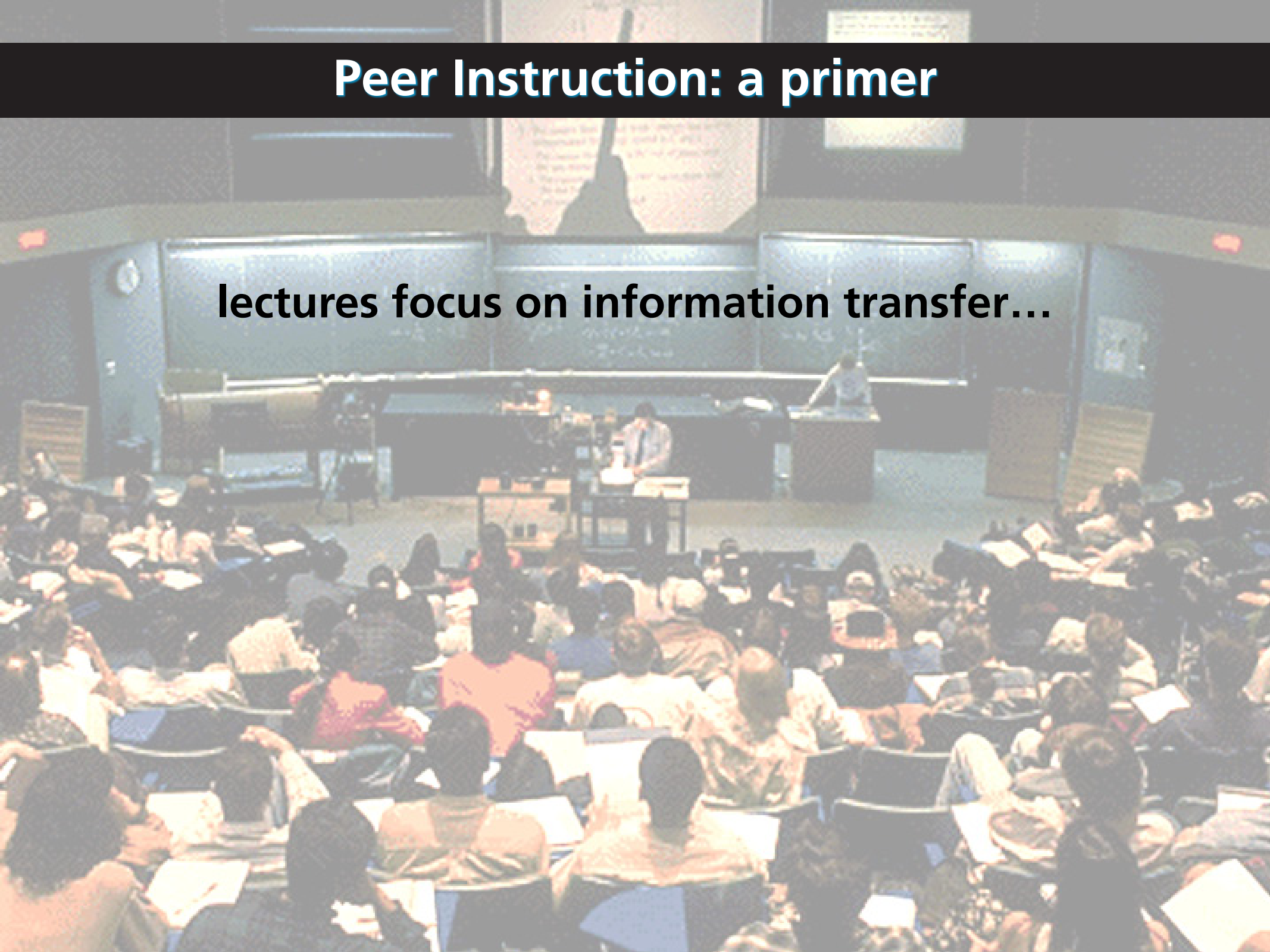


Campus Kristiania  
Oslo, Norway, 7 March 2013



# Peer Instruction: a primer

lectures focus on information transfer...

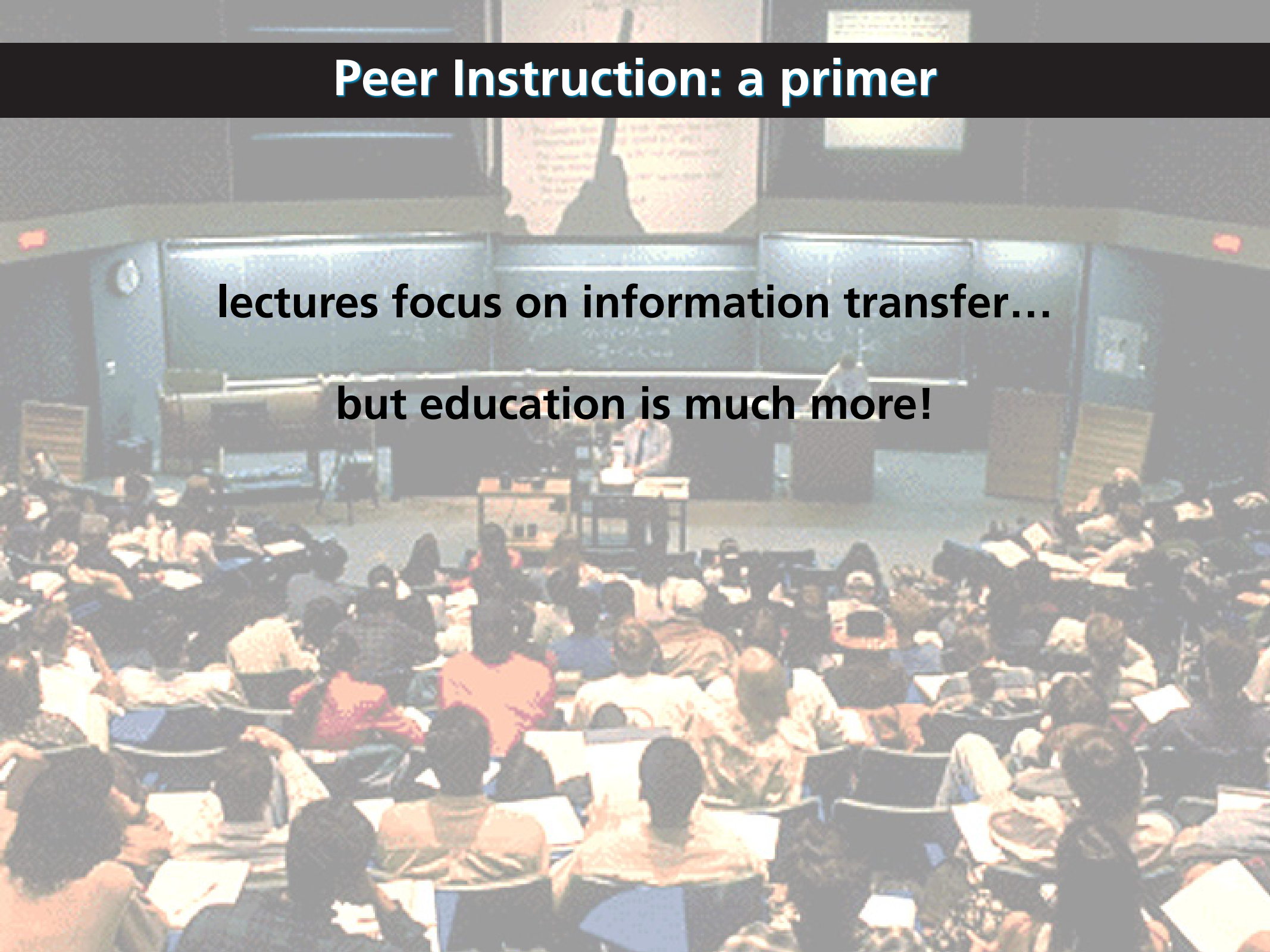




# Peer Instruction: a primer

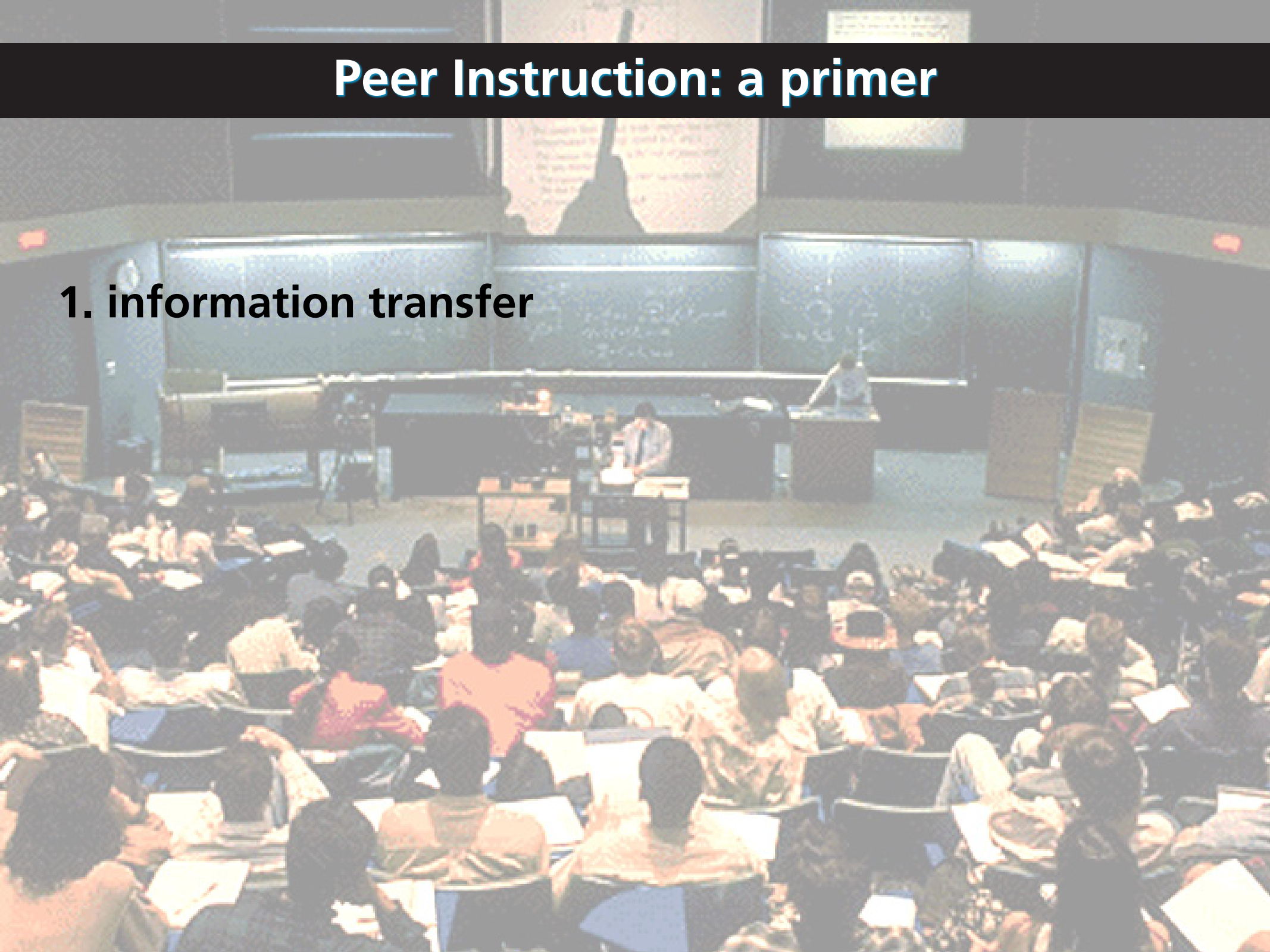
lectures focus on information transfer...

but education is much more!



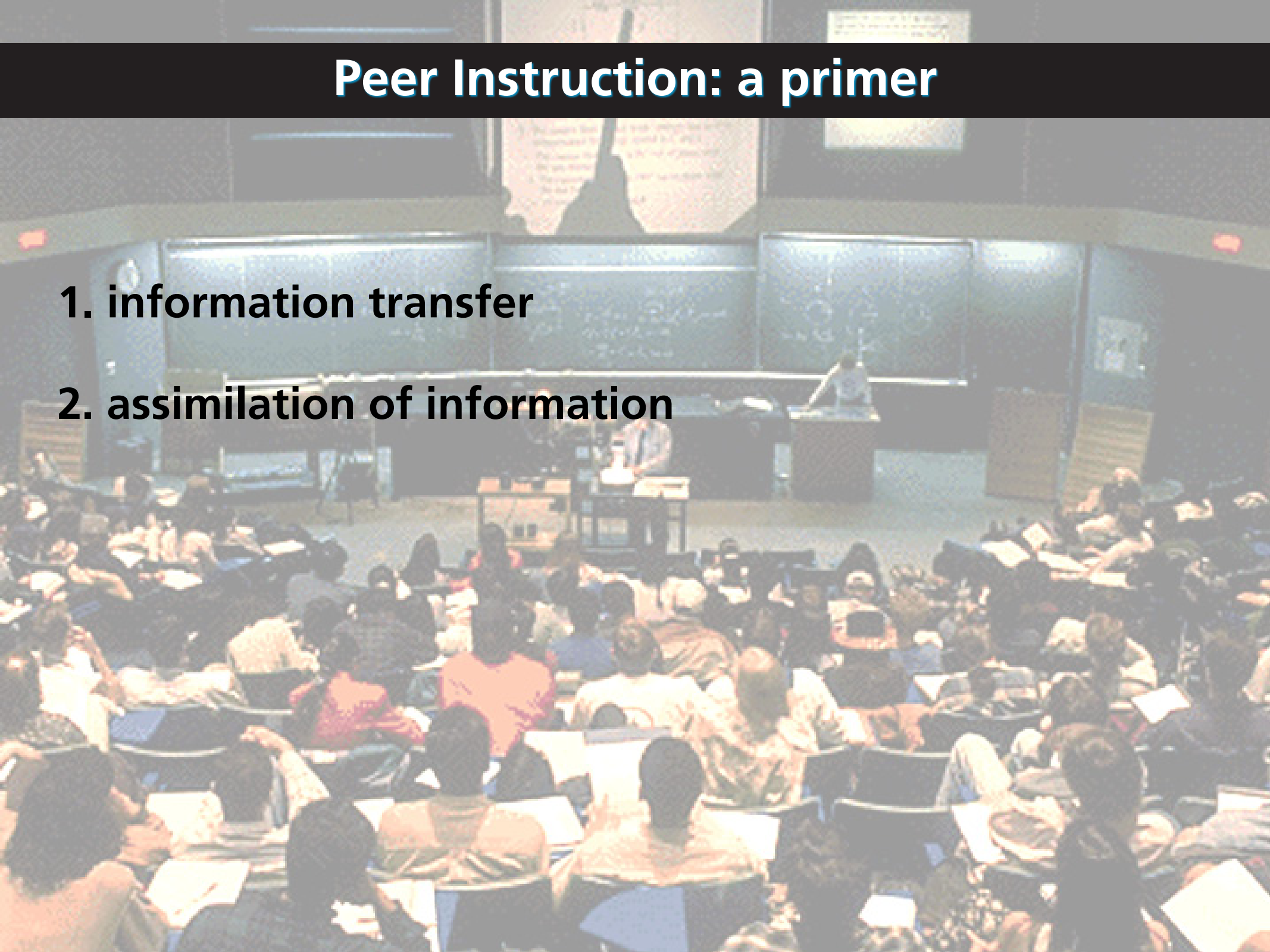
# Peer Instruction: a primer

## 1. information transfer



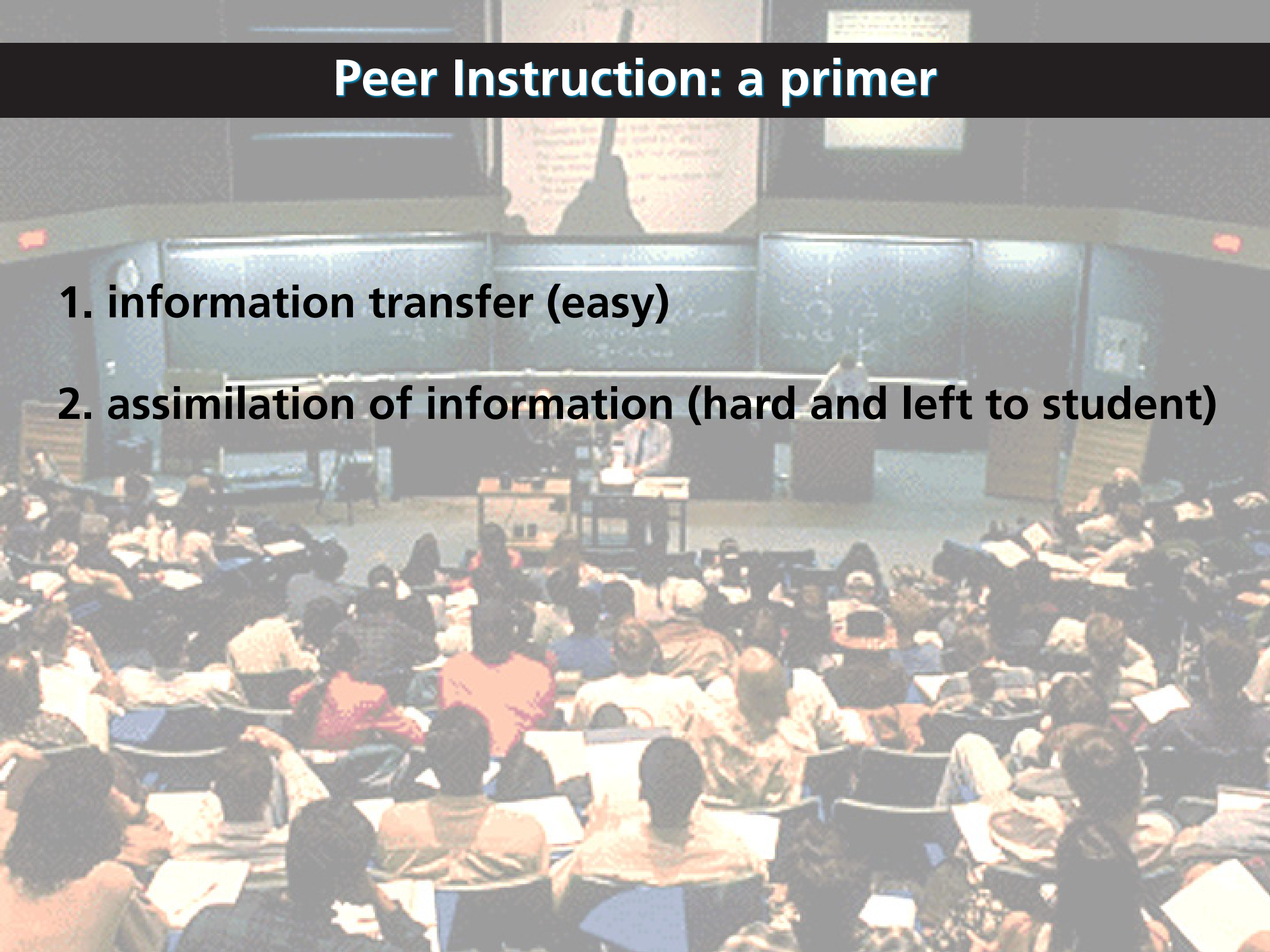
# Peer Instruction: a primer

1. information transfer
2. assimilation of information



# Peer Instruction: a primer

1. information transfer (easy)
2. assimilation of information (hard and left to student)



# Peer Instruction: a primer

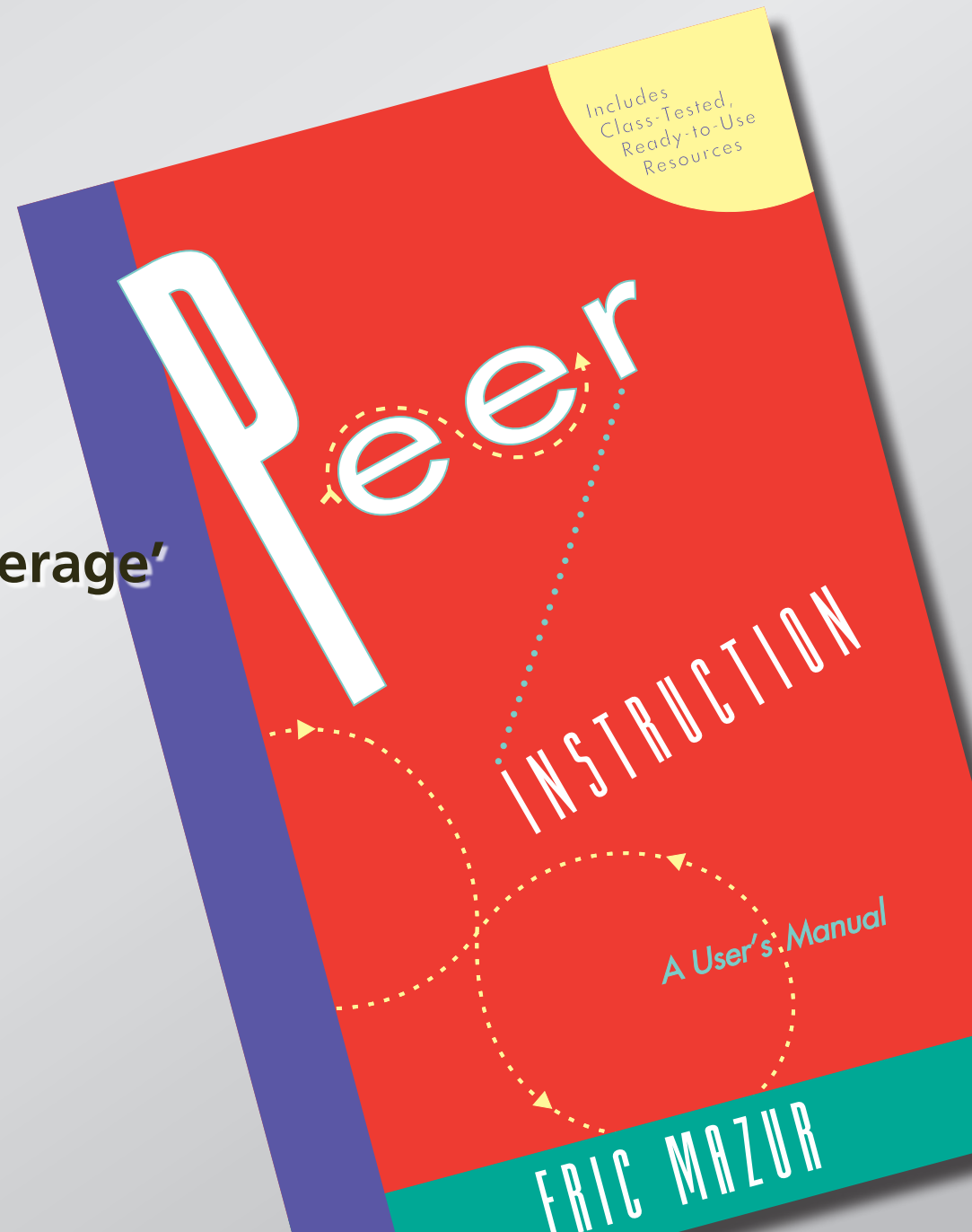
**Solution: move information transfer out of classroom!**



# Peer Instruction: a primer

## Main features:

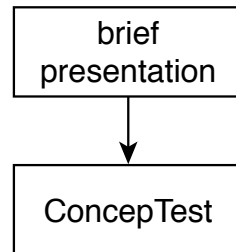
- pre-class reading
- in-class: depth, not 'coverage'
- ConcepTests



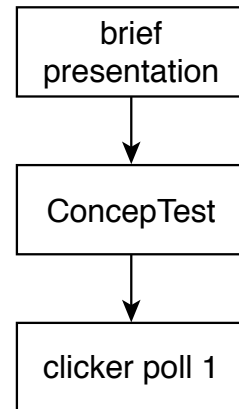
# Peer Instruction: a primer

brief  
presentation

# Peer Instruction: a primer

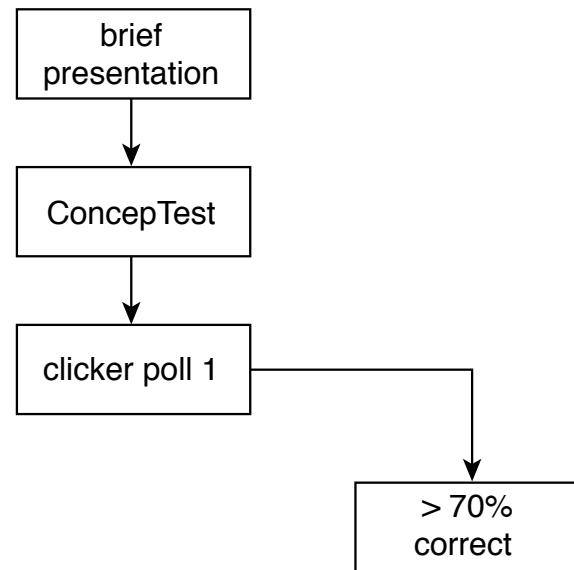


# Peer Instruction: a primer

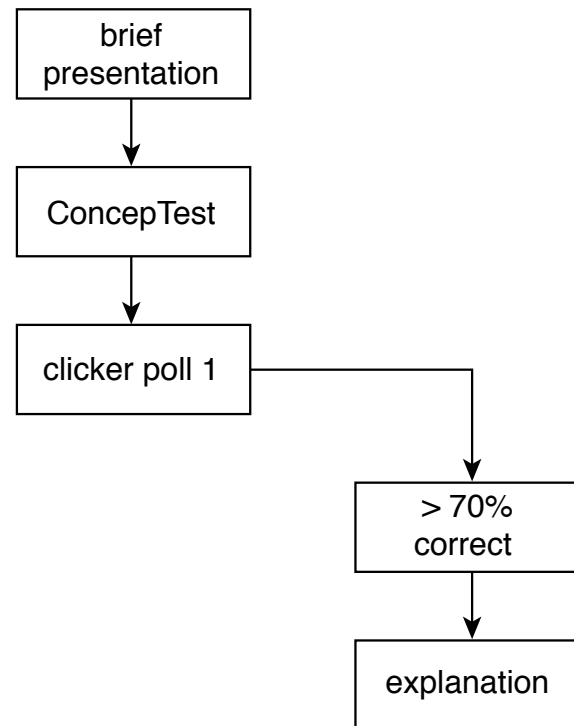




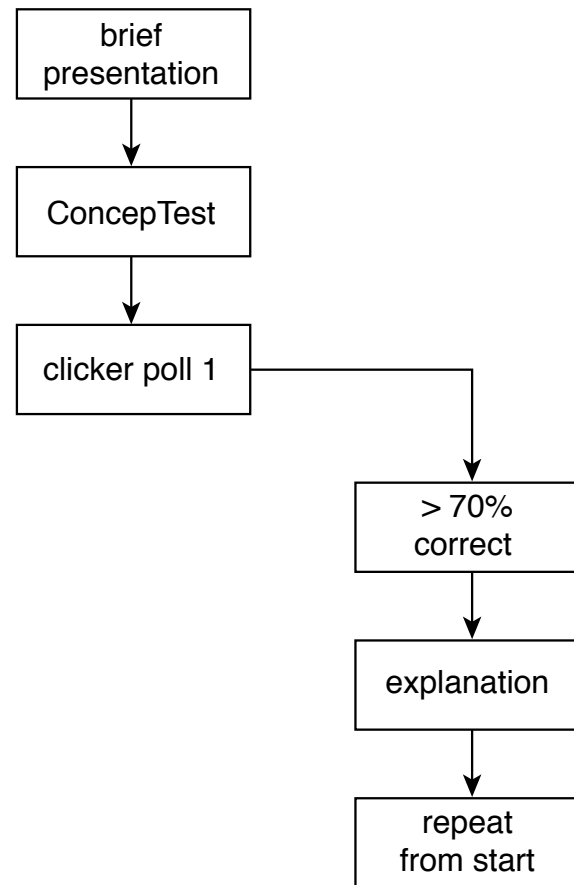
# Peer Instruction: a primer



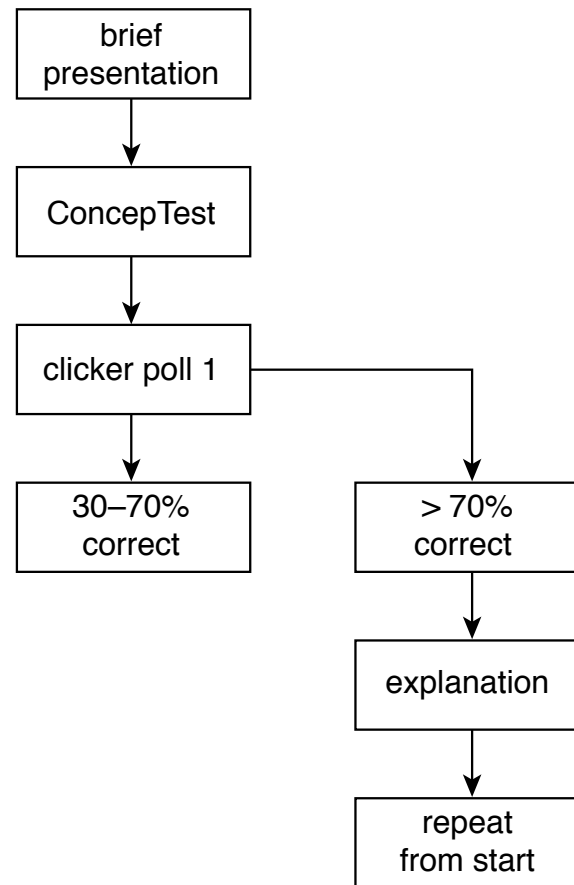
# Peer Instruction: a primer



# Peer Instruction: a primer

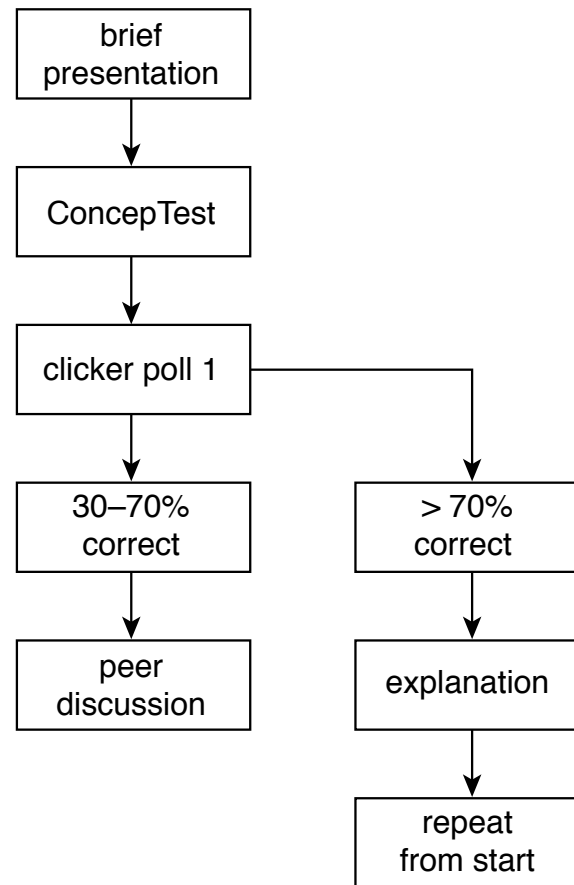


# Peer Instruction: a primer

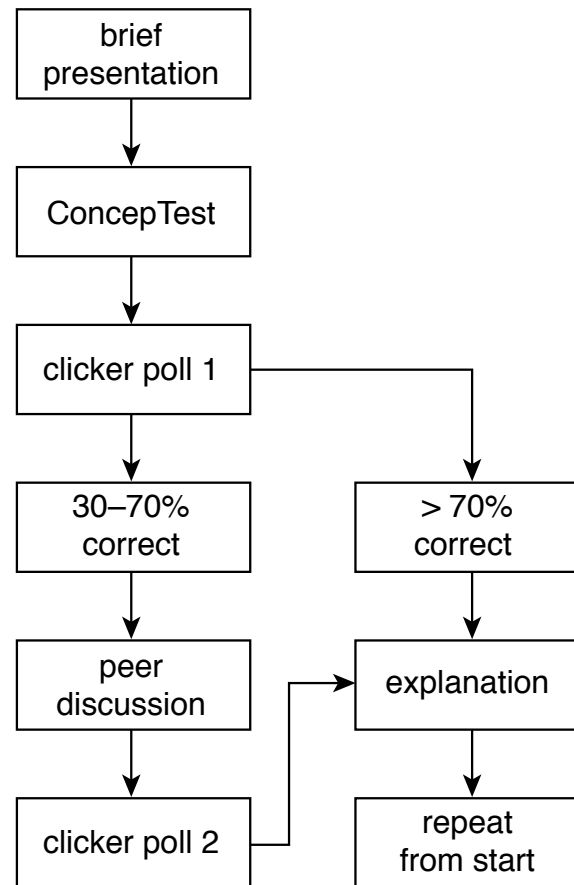




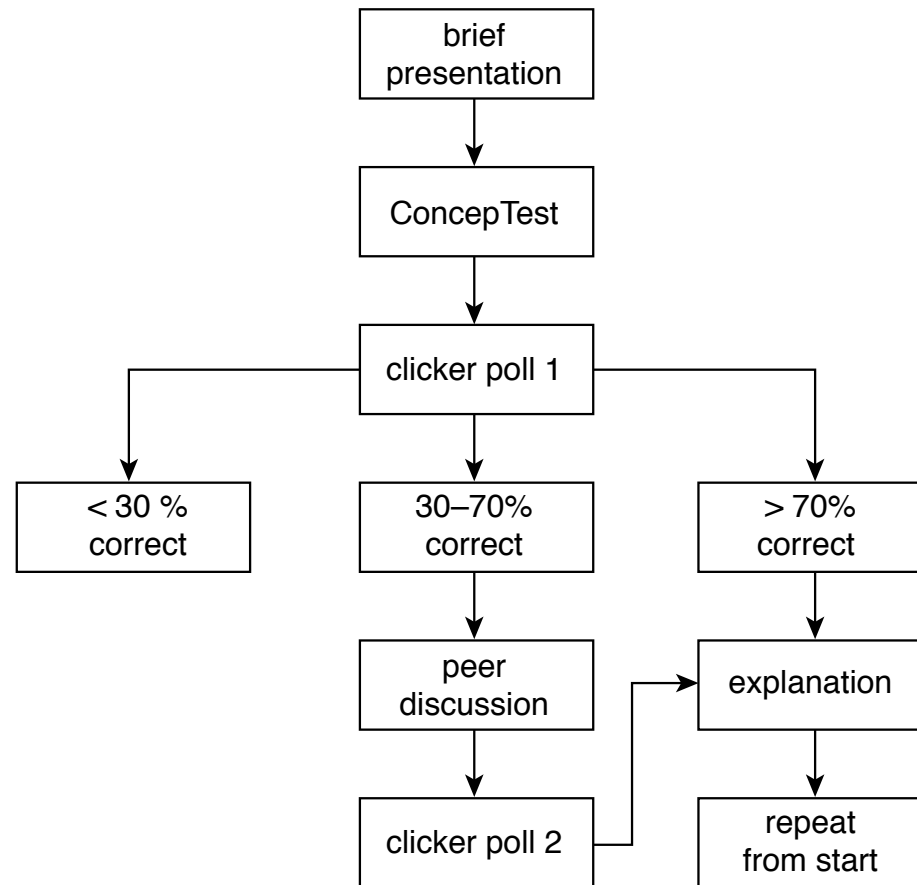
# Peer Instruction: a primer



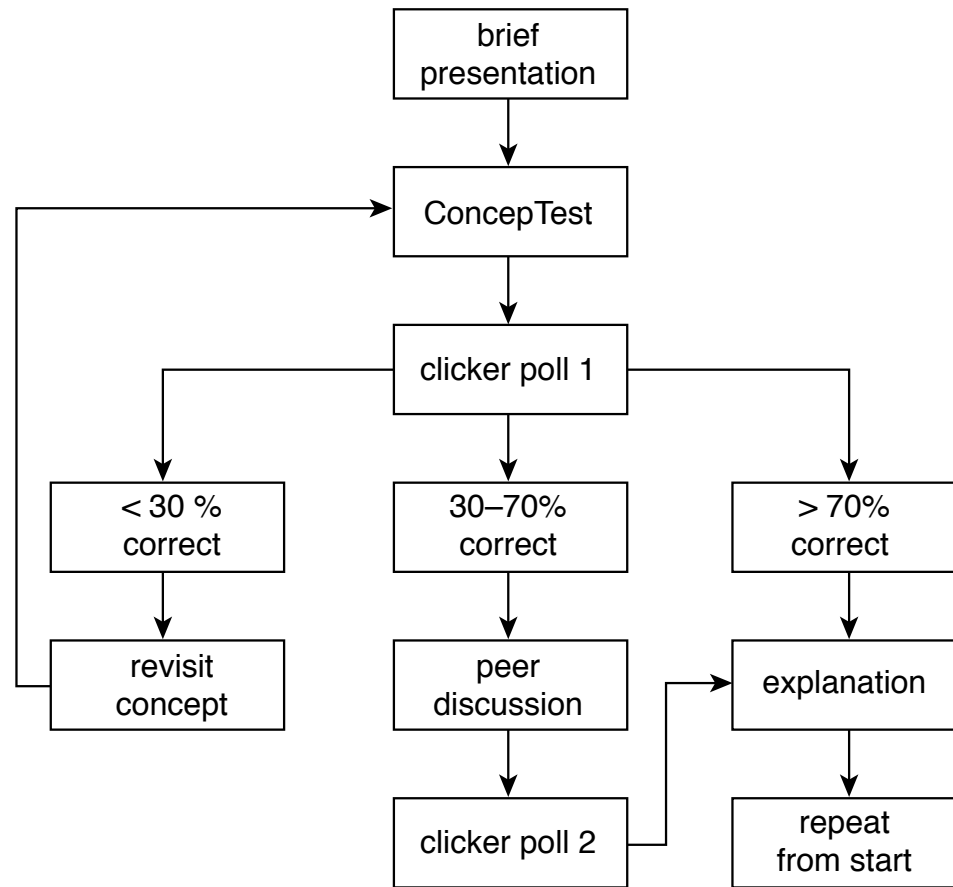
# Peer Instruction: a primer



# Peer Instruction: a primer

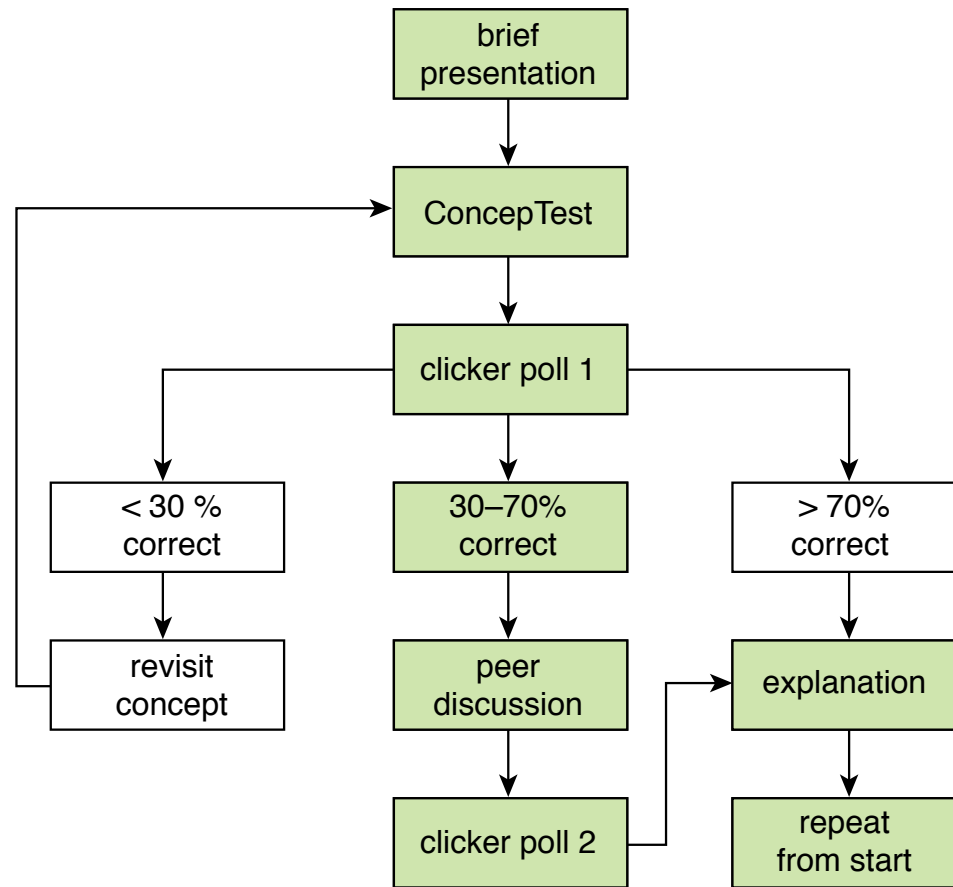


# Peer Instruction: a primer





# Peer Instruction: a primer



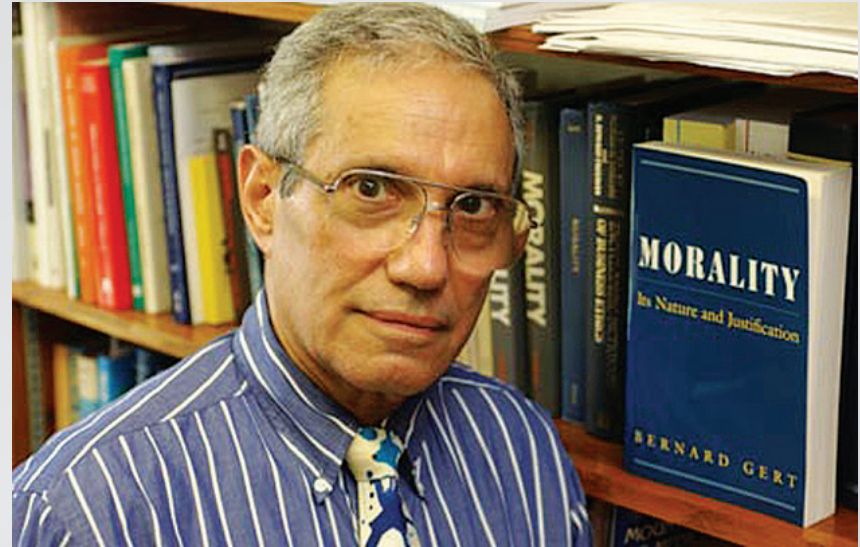
# Frequently Asked Questions

*“Can this method be used in my class,  
where questions don’t necessarily have right answers?”*

# Let's try it!

**Bernard Gert (1934 – 2011)**

**Moral philosopher  
Professor at Dartmouth**



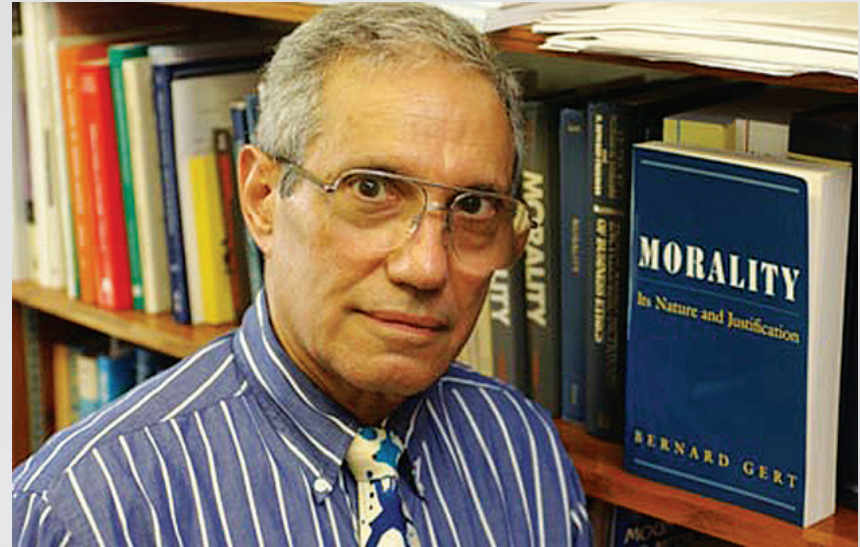
**“Morality is an informal public system applying to all rational persons, governing behavior that affects others, and includes what are commonly known as the moral rules, ideals, and virtues and has the lessening of evil or harm as its goal.”**

# Let's try it!

**Bernard Gert (1934 – 2011)**

**Moral philosopher**

**Professor at Dartmouth**





# Let's try it!

**Bernard Gert's moral system created by 10 rules:**

- 1. Do not kill**
- 2. Do not cause pain**
- 3. Do not disable**
- 4. Do not deprive of freedom**
- 5. Do not deprive of pleasure**
- 6. Do not deceive**
- 7. Keep your promises**
- 8. Do not cheat**
- 9. Obey the law**
- 10. Do your duty (as required by job, circumstances).**

# Let's try it!

Heinz's wife was near death, and her only hope was a drug that had been discovered by a pharmacist who was selling it for an exorbitant price. The drug cost \$20,000 to make, and the pharmacist was selling it for \$200,000. Heinz could only raise \$50,000 and insurance wouldn't make up the difference. He offered what he had to the pharmacist, and when his offer was rejected, Heinz said he would pay the rest later. Still the pharmacist refused. In desperation, Heinz broke into the store and stole the drug.

# Let's try it!

Heinz's wife was near death, and her only hope was a drug that had been discovered by a pharmacist who was selling it for an exorbitant price. The drug cost \$20,000 to make, and the pharmacist was selling it for \$200,000. Heinz could only raise \$50,000 and insurance wouldn't make up the difference. He offered what he had to the pharmacist, and when his offer was rejected, Heinz said he would pay the rest later. Still the pharmacist refused. In desperation, Heinz broke into the store and stole the drug.

Should Heinz have broken into the store to steal the drug for his wife?

# Let's try it!

**Bernard Gert's moral system created by 10 rules:**

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- 8. Do not cheat**
- 9. Obey the law**
- 10. Do your duty (as required by job, circumstances).**

# Let's try it!

Bernard Gert's moral system created by 10 rules:

1. Do not kill
2. Do not cause pain
3. Do not disable
4. Do not deprive of freedom
5. Do not deprive of property
6. Do not deceive
7. Keep your promises
8. Do not cheat
9. Obey the law
10. Do your duty (as required by job, circumstances).

**Should Heinz have broken into the store to steal the drug for his wife?**

- 1. Yes**
- 2. No**



# Let's try it!

Bernard Gert's moral system created by 10 rules:

1. Do not kill
2. Do not cause pain
3. Do not disable
4. Do not deprive of freedom
5. Do not deprive of pleasure
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7. Keep your promises
8. Do not cheat
9. Obey the law
10. Do your duty (as required by job, circumstances).

Should Heinz have broken into the store to steal the drug for his wife?

1. Yes
2. No

**you got all engaged!**





**Let's try it!**

**Don't need a correct answer!**

# Frequently Asked Questions

*“How do I move information transfer out of classroom?”*

# Getting students to read

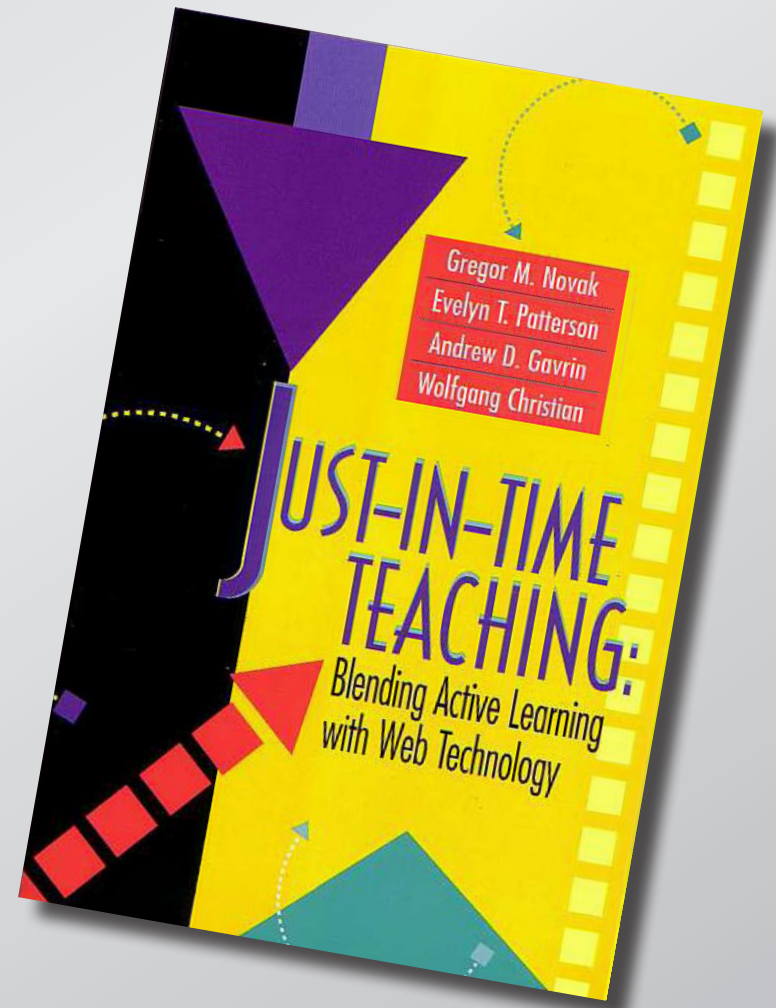
**My approach:**

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

# Getting students to read

Just-in-time-Teaching (JiTT)

[www.jitt.org](http://www.jitt.org)



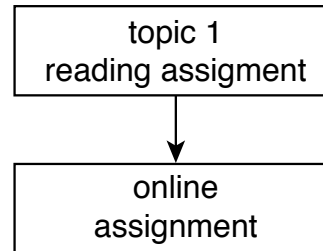
# Getting students to read

## JiTT workflow

topic 1  
reading assignment

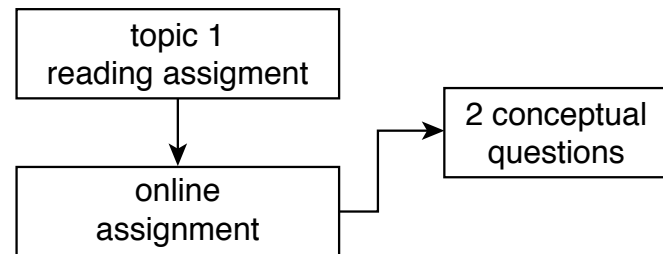
# Getting students to read

## JiTT workflow



# Getting students to read

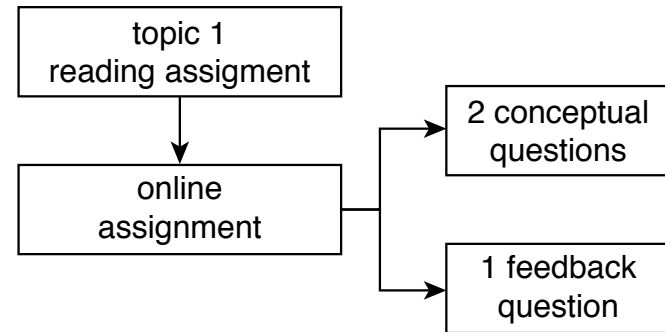
## JiTT workflow





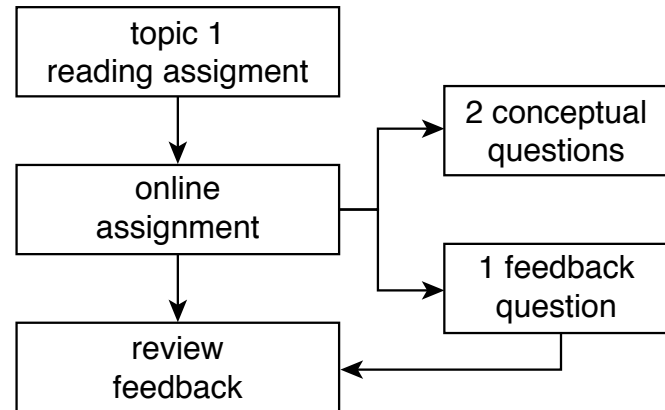
# Getting students to read

## JiTT workflow



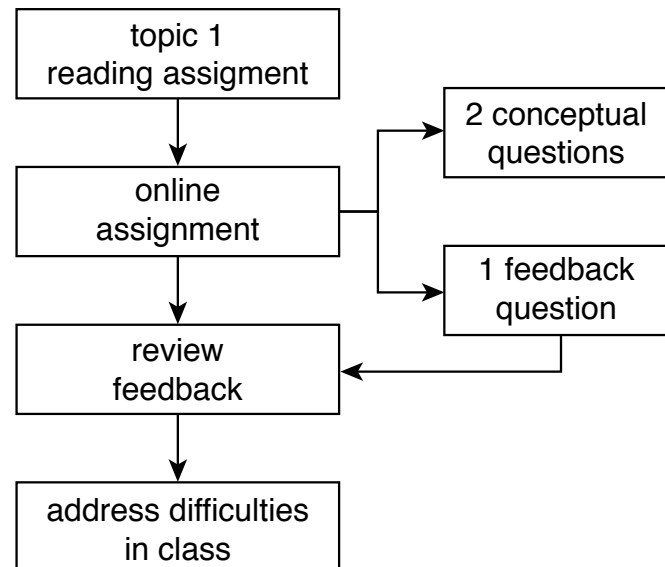
# Getting students to read

## JiTT workflow



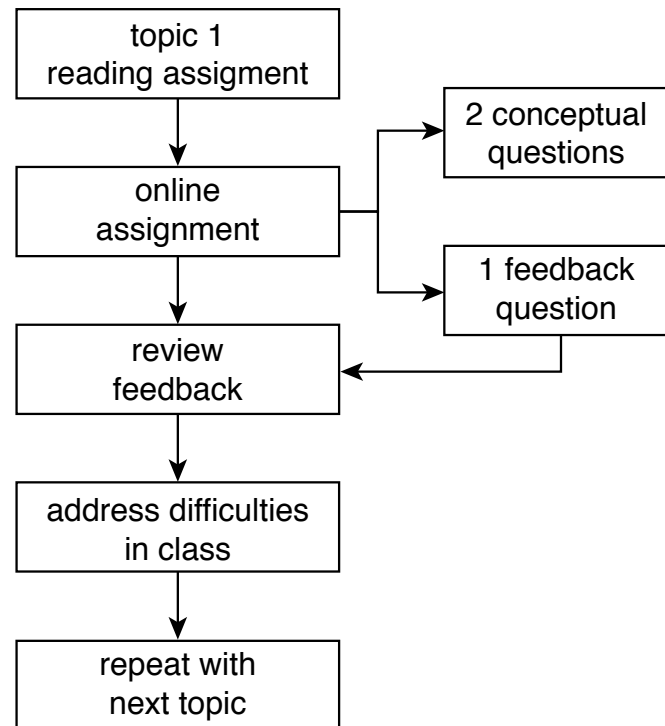
# Getting students to read

## JiTT workflow



# Getting students to read

## JiTT workflow

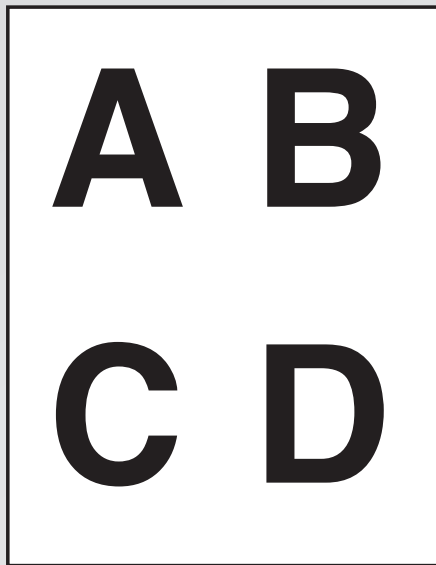


# Frequently Asked Questions

*“Do I need clickers?”*

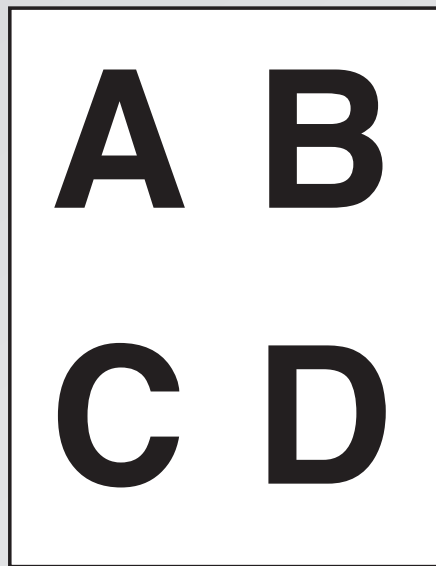
# Clickers necessary?

Flashcards: simple and effective



# Clickers necessary?

Flashcards: simple and effective



Meltzer and Mannivanan, South Eastern Louisiana University

# Let's try it!

When we hold a page of printed text in front of a mirror, the text on the image in the mirror runs from right to left:

**The New York Times**



# Let's try it!

When we hold a page of printed text in front of a mirror, the text on the image in the mirror runs from right to left:

**semit kYoY weH eHT**

Why is it that right and left are interchanged and not top and bottom? Because:

1. the mirror is oriented vertically.
2. we have two eyes in the horizontal plane.
3. the Earth's gravitation is directed downward.
4. a habit we have when looking at images in a mirror.
5. It only *appears* to run from left to right.

# Let's try it!

When we hold a page of printed text in front of a mirror, the text on the image in the mirror runs from right to left:

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# Clickers necessary?

**It's not the technology, but the pedagogy!**

# Clickers necessary?

**It's not the technology, but the pedagogy!**

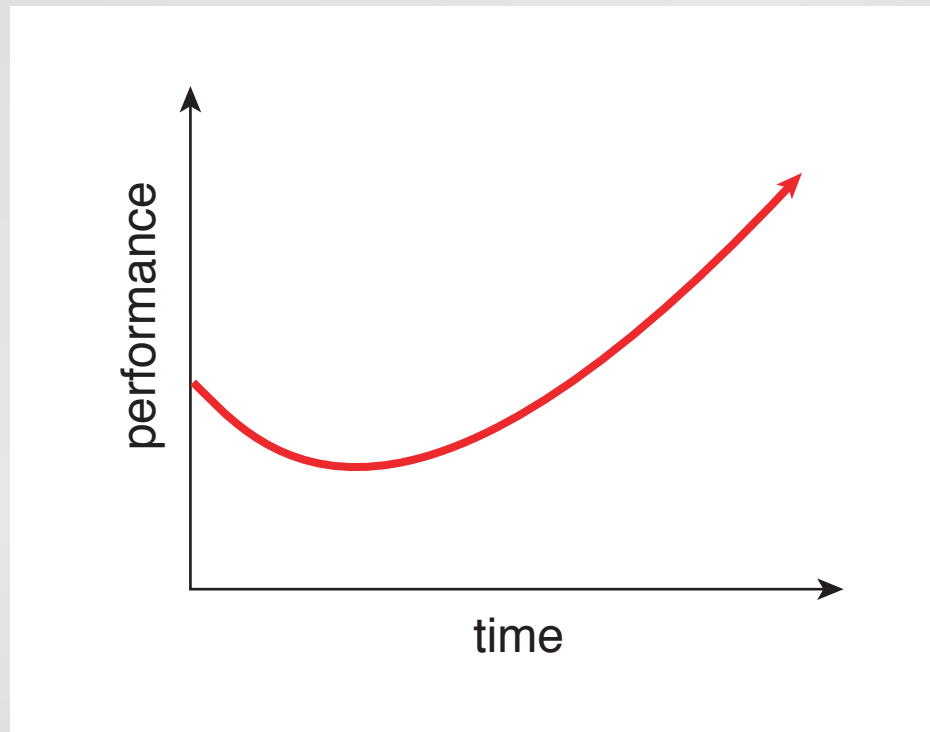
**(but clickers do offer advantages)**

# Frequently Asked Questions

*“How do I deal with students who resist  
this new approach to studying?”*

# 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 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.

# 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!



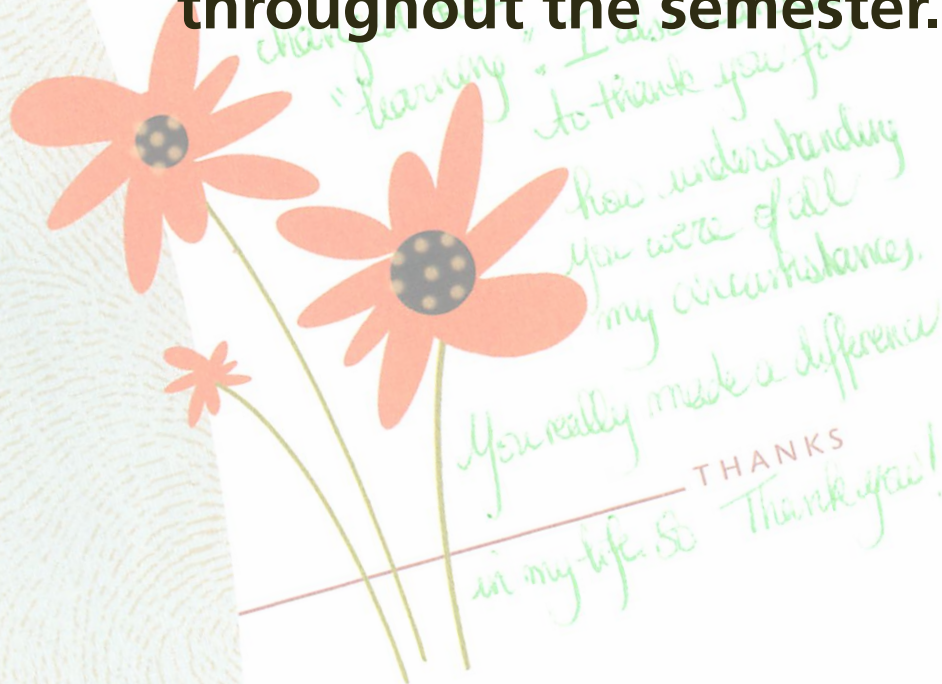
You made a difference.

Love, 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 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 really made a difference in my life."**

*You made a difference.*

*THANKS  
in my life. So Thank you!*

*Best*

# Student resistance

**and don't forget...**

# Student resistance

**and don't forget...**

**PI leads to better learning and retention!**



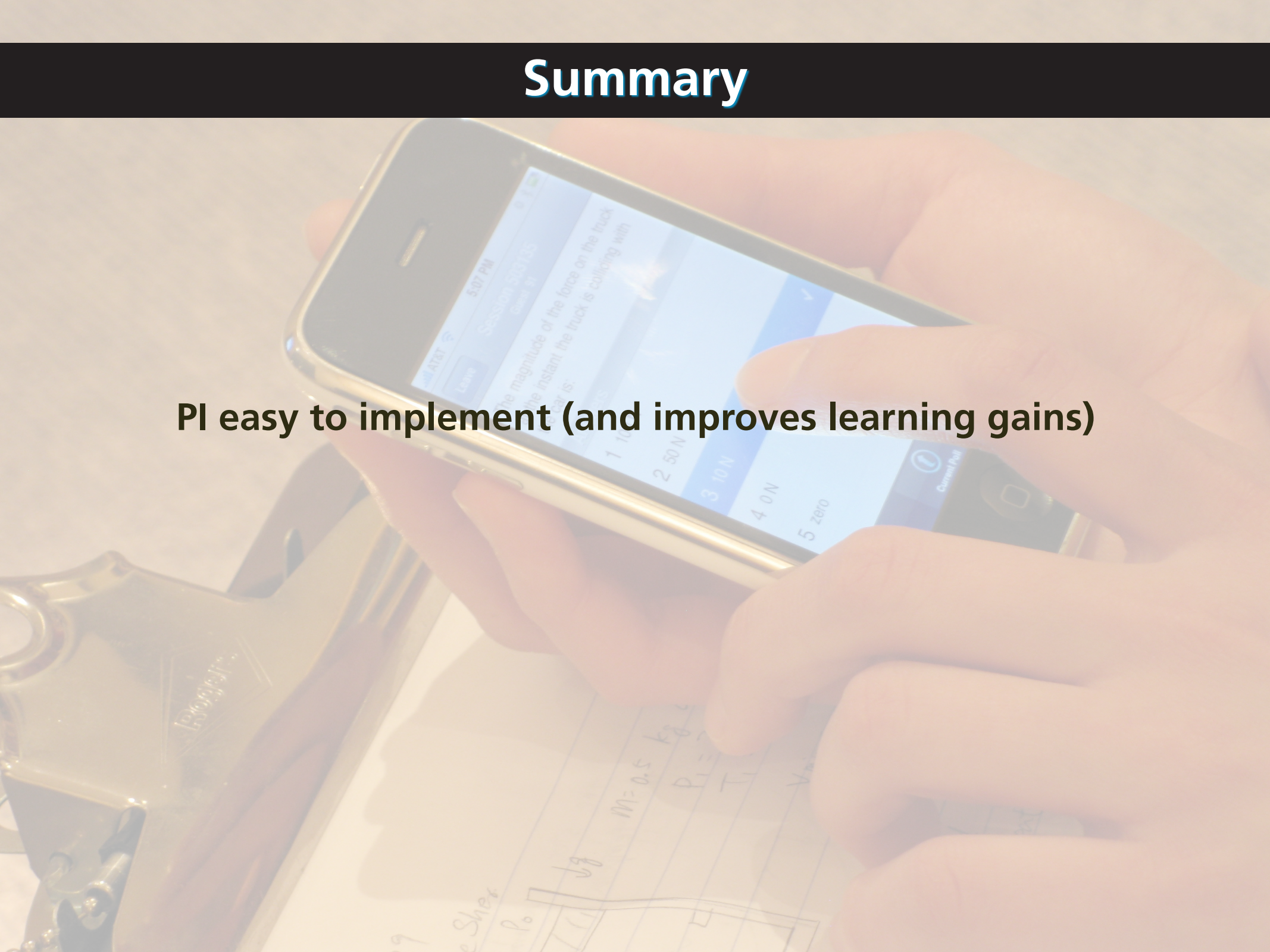
# Summary





# Summary

**PI easy to implement (and improves learning gains)**





# Summary

**PI easy to implement (and improves learning gains)**

**technology facilitates active engagement (but not required)**

**Funding:**

**National Science Foundation**

**for a copy of this presentation:**

**<http://mazur.harvard.edu>**

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**eric\_mazur**