The Flipped Classroom on a Shoestring

SSAT National Conference 2014
Manchester, UK, 5 December 2014

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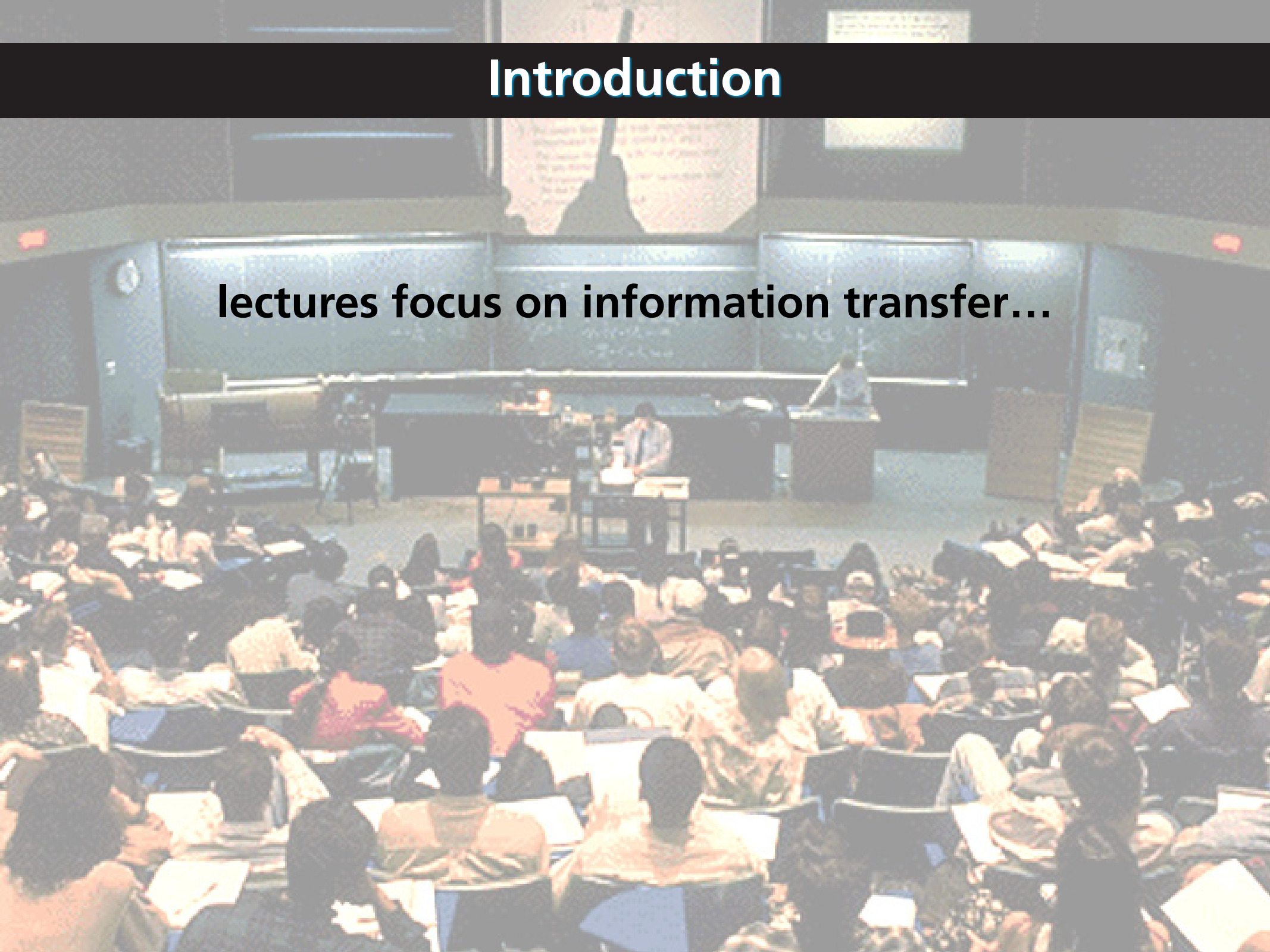
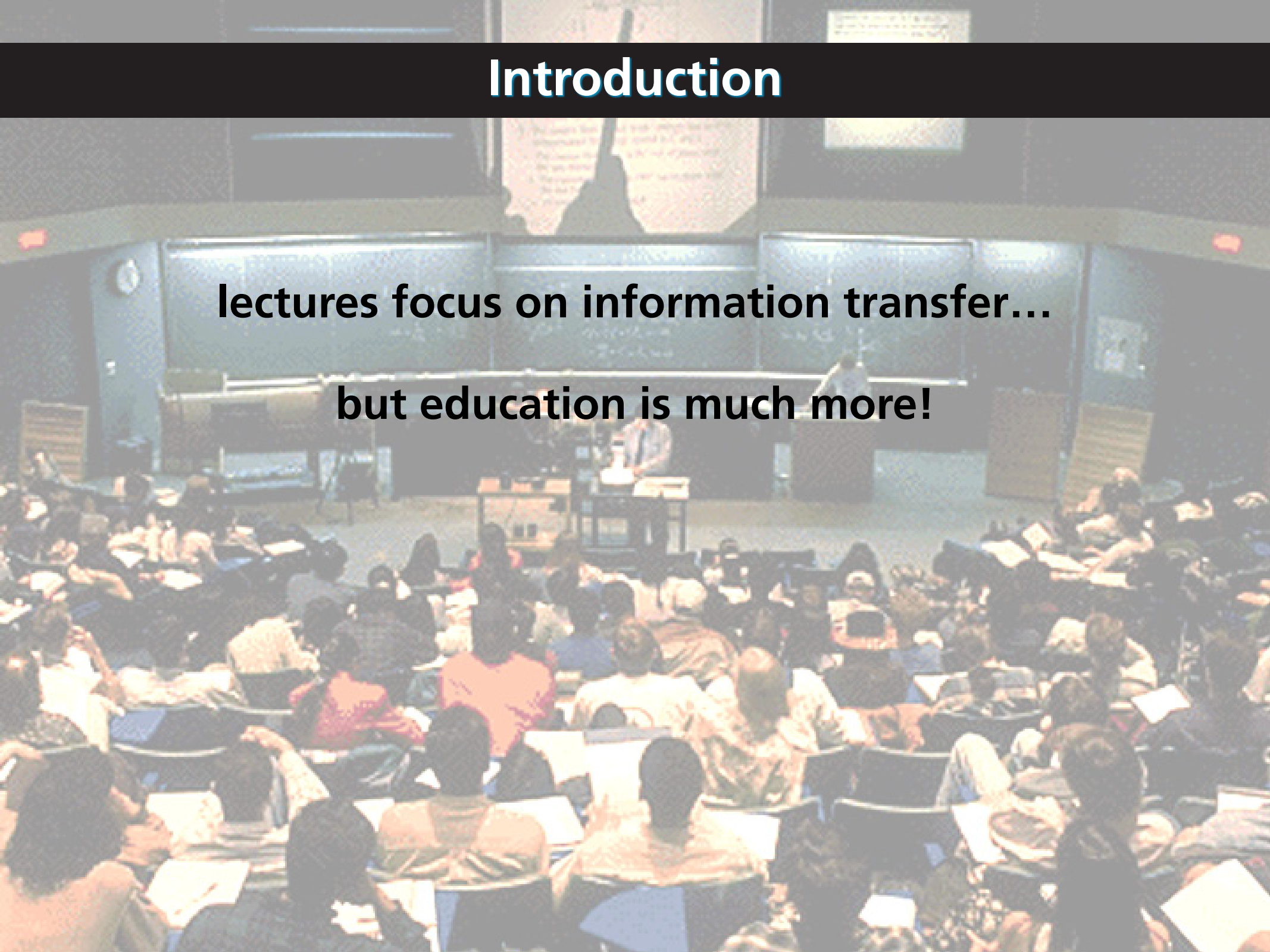
Introduction



lectures focus on information transfer…

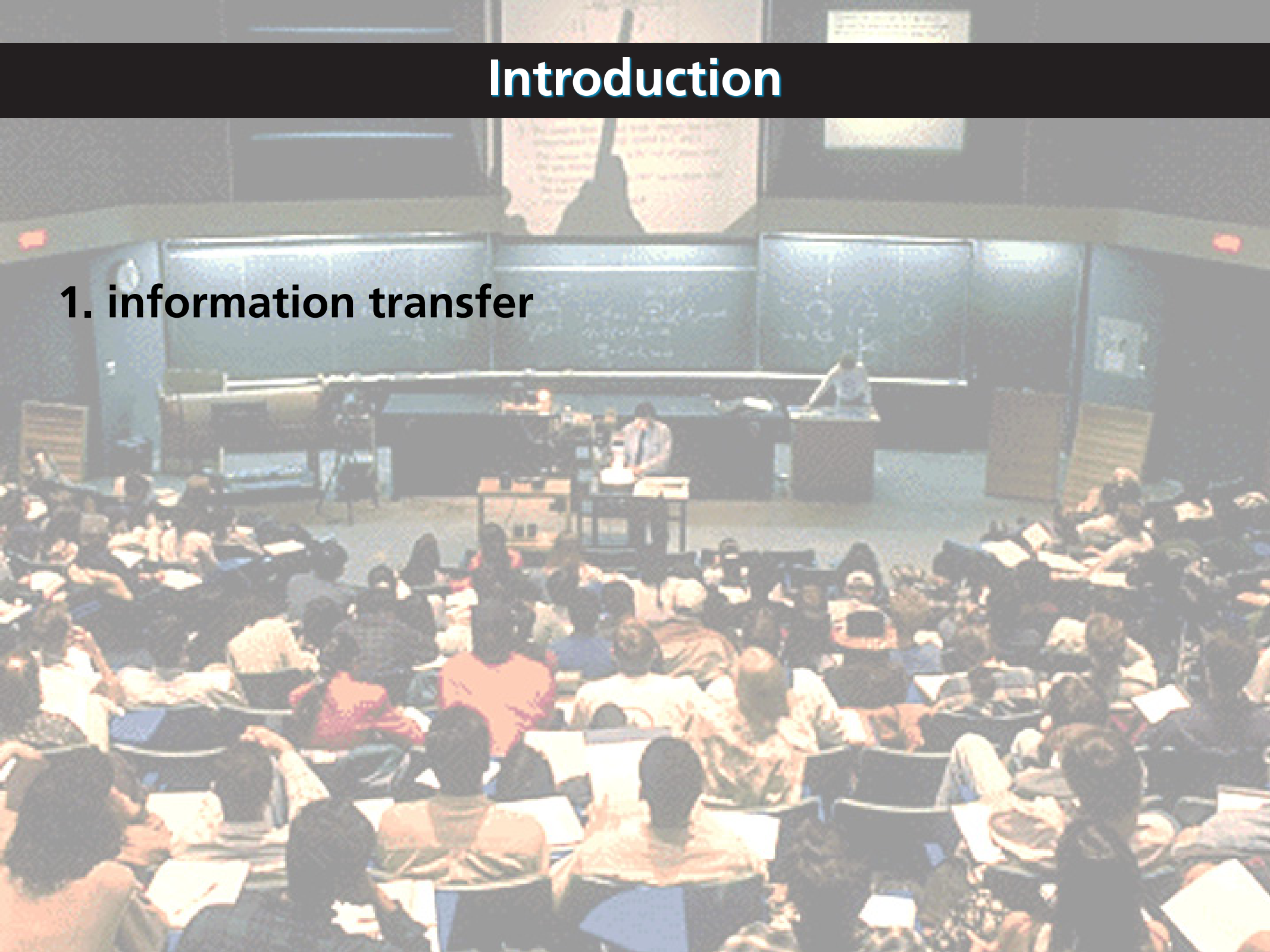
Introduction



lectures focus on information transfer…

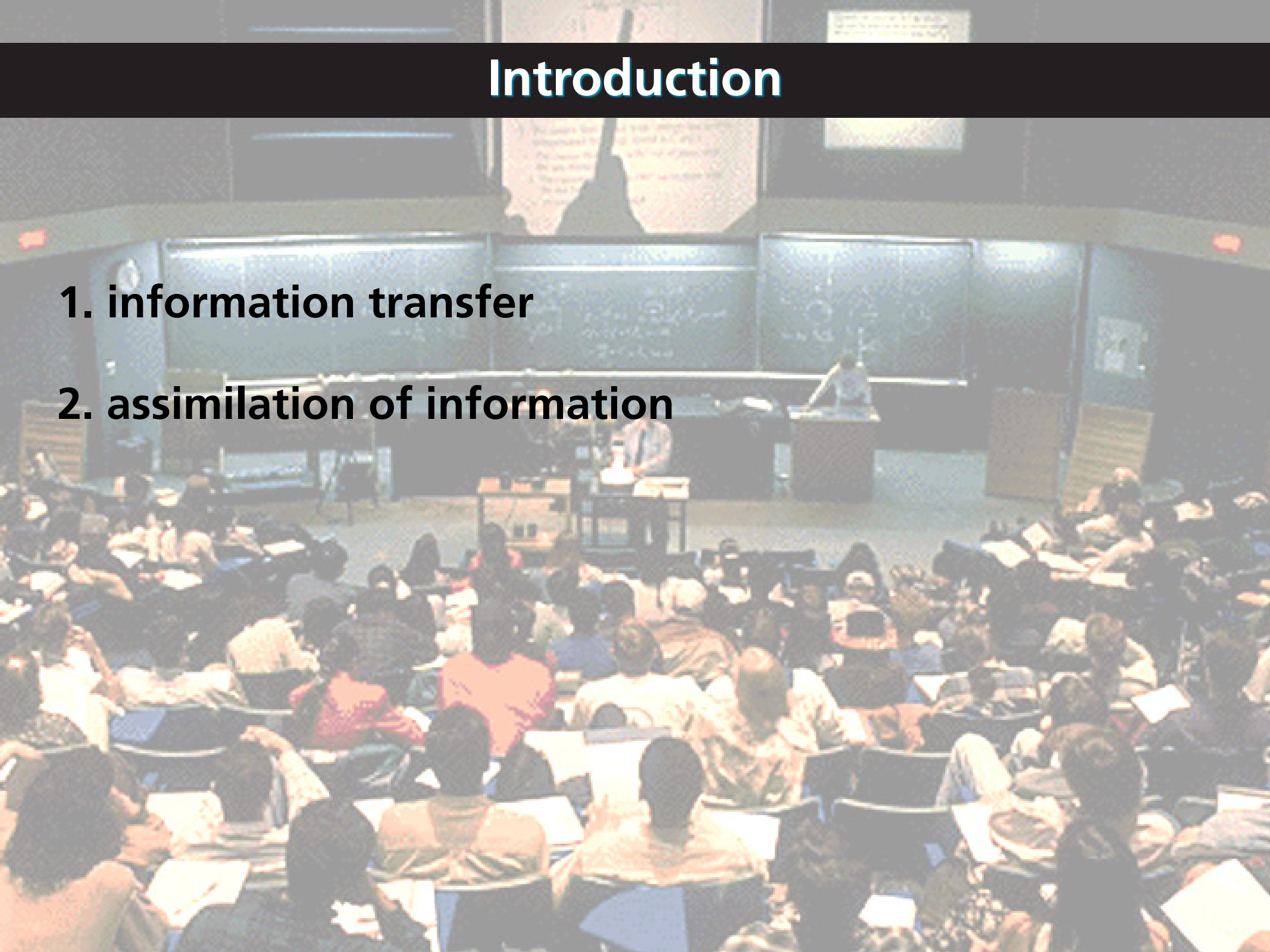
but education is much more!

Introduction



1. information transfer

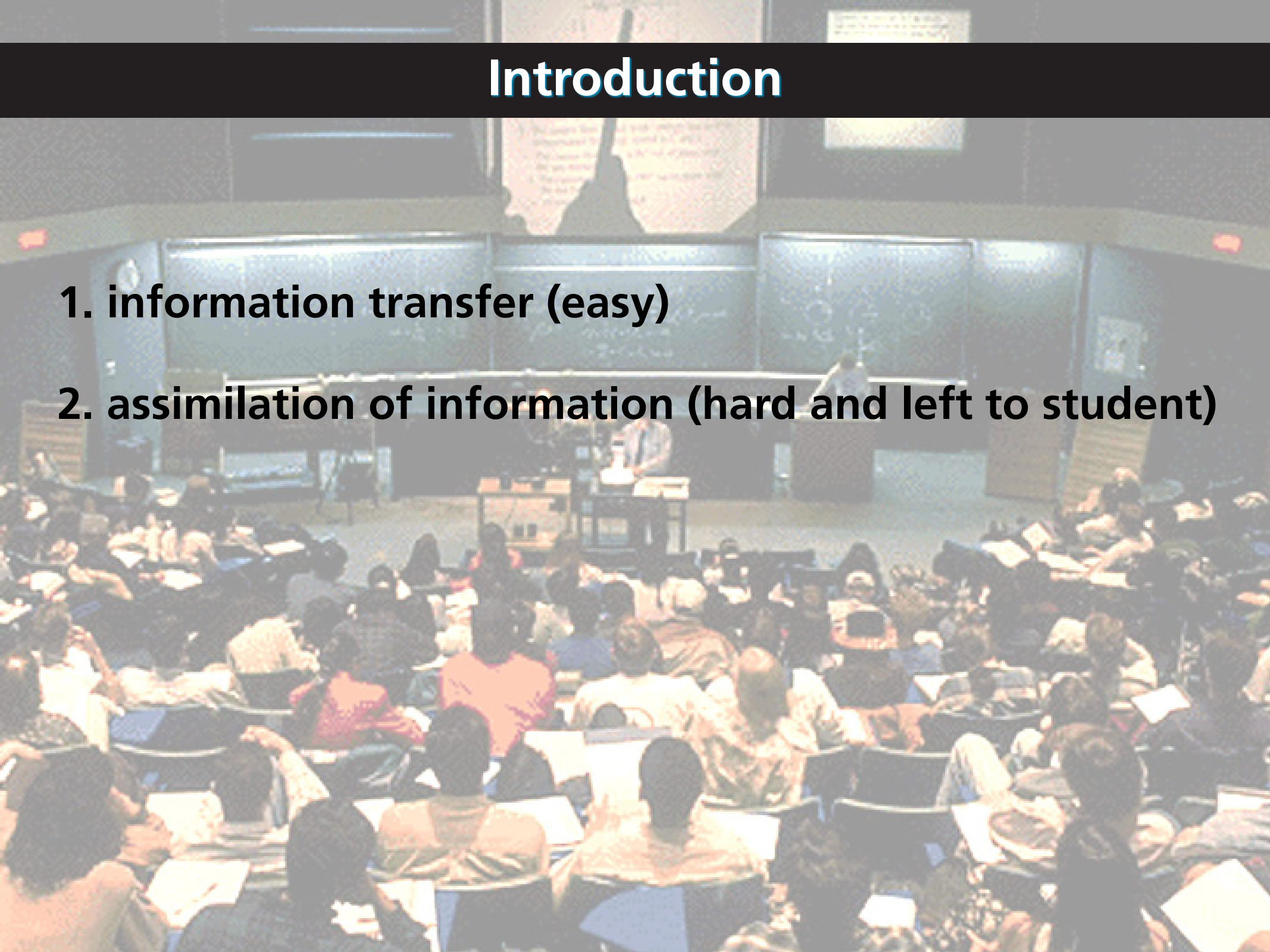
Introduction



1. information transfer

2. assimilation of information

Introduction



1. information transfer (easy)

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

Introduction

Solution: move information transfer out of classroom!

Introduction

How to move information transfer out of classroom?

Introduction

How to move information transfer out of classroom?

Use JiTT (before class) and PI (in class)!

PI & JiTT Overview

"How can I be sure that my students will prepare for class?"

PI & JiTT Overview

Students do not come to class prepared, because...

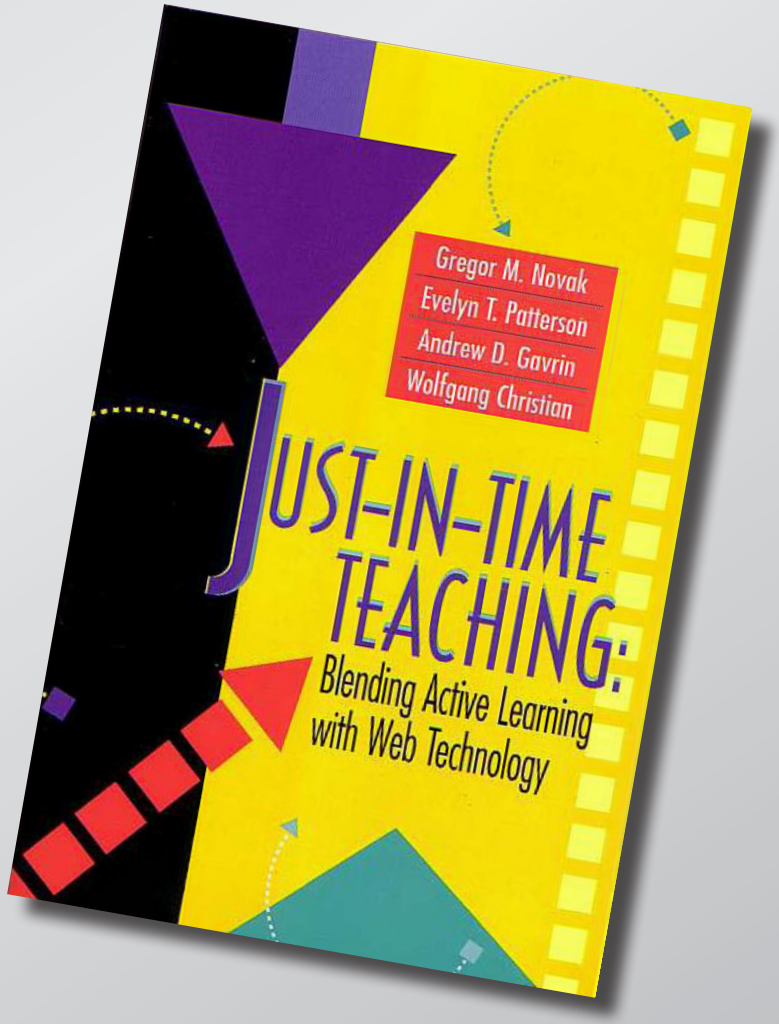
1. they don't have time.
2. they are not motivated to learn.
3. their instructors take away the incentive.
4. they do not have the requisite skills.
5. of some other reason.
6. They do come prepared in my class!

(select what you consider to be the main reason)

PI & JiTT Overview

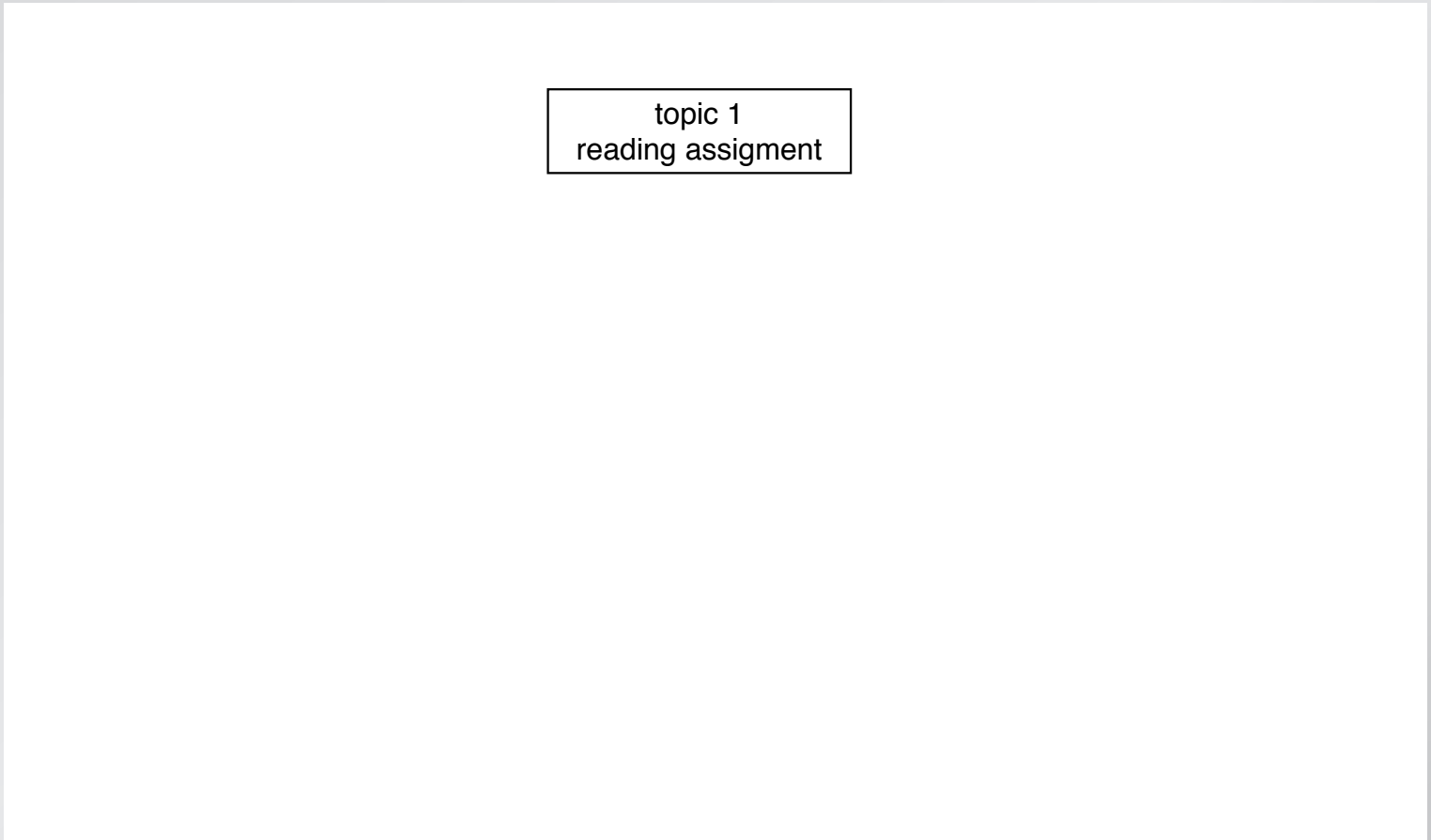
Just-in-time-Teaching (JiTT)

www.jitt.org



PI & JiTT Overview

JiTT workflow



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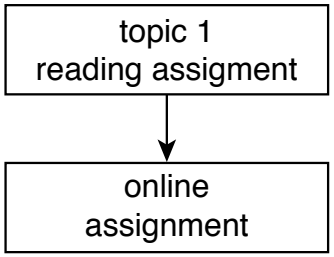
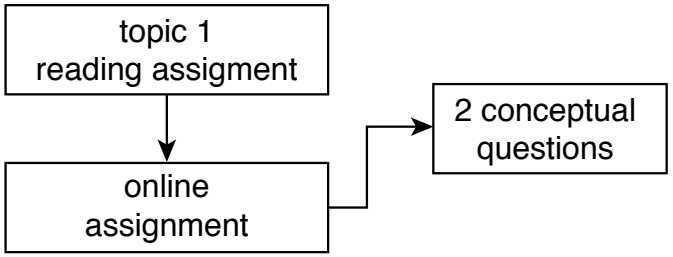


PI & JiTT Overview

JiTT workflow



PI & JiTT Overview

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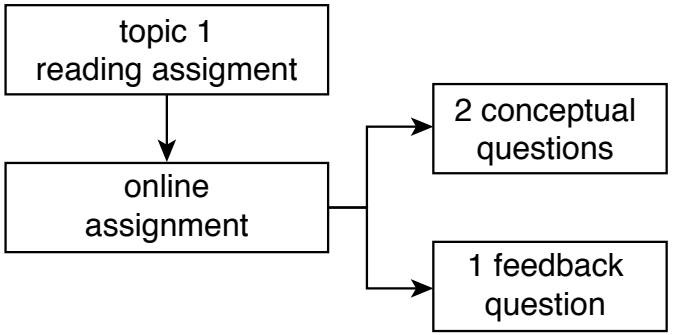
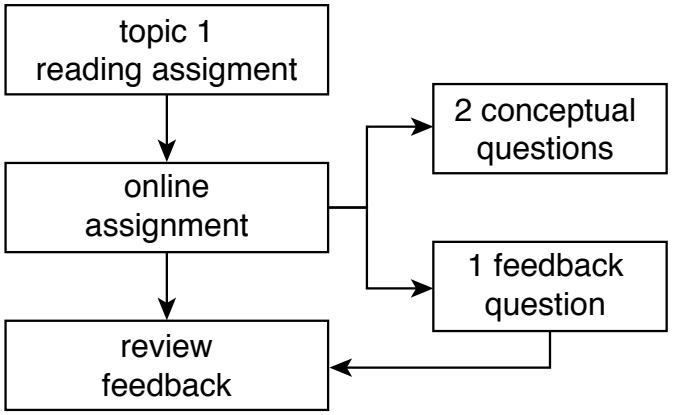


PI & JiTT Overview

JiTT workflow



PI & JiTT Overview

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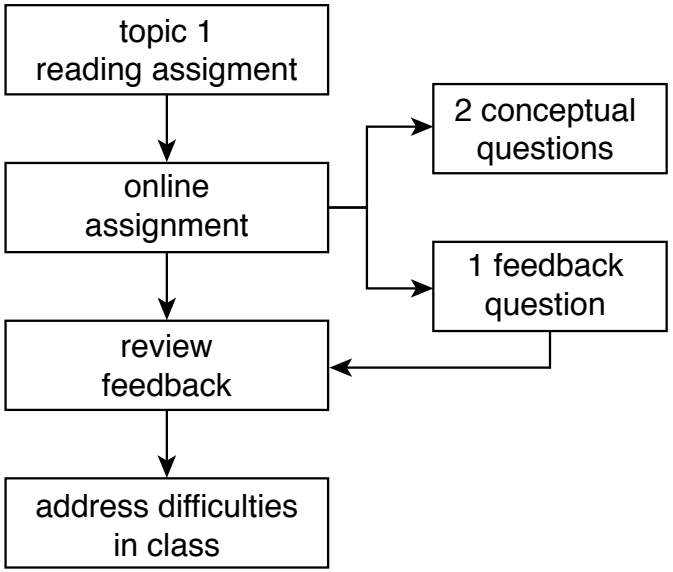

PI & JiTT Overview

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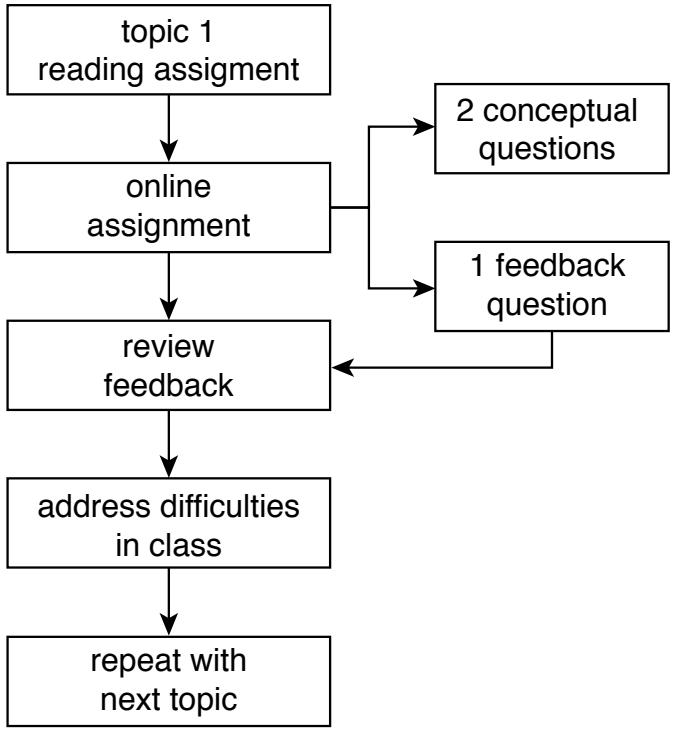


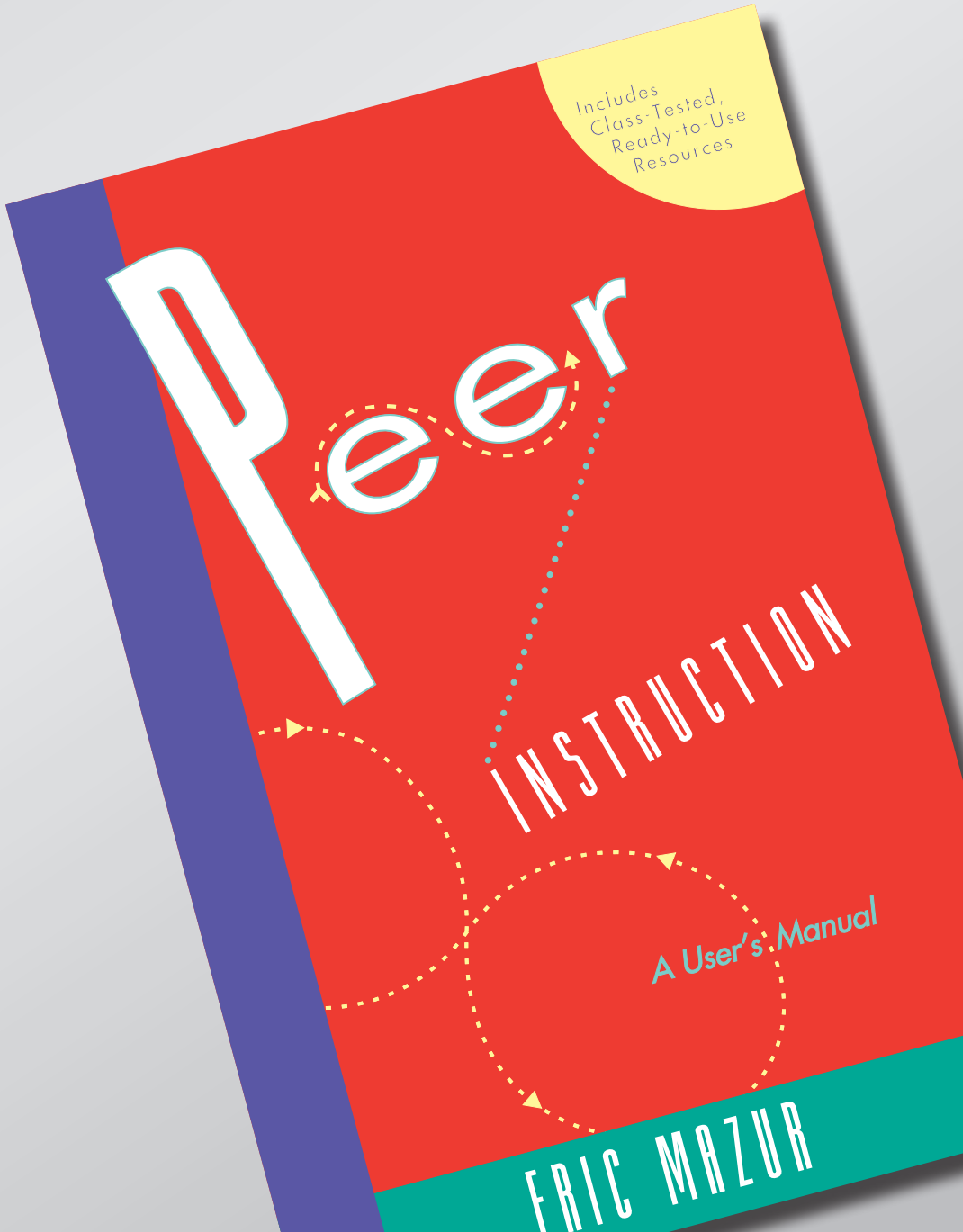
PI & JiTT Overview

JiTT:

- prepares you for class
- prepares students for class
- helps you address student difficulties

PI & JiTT Overview

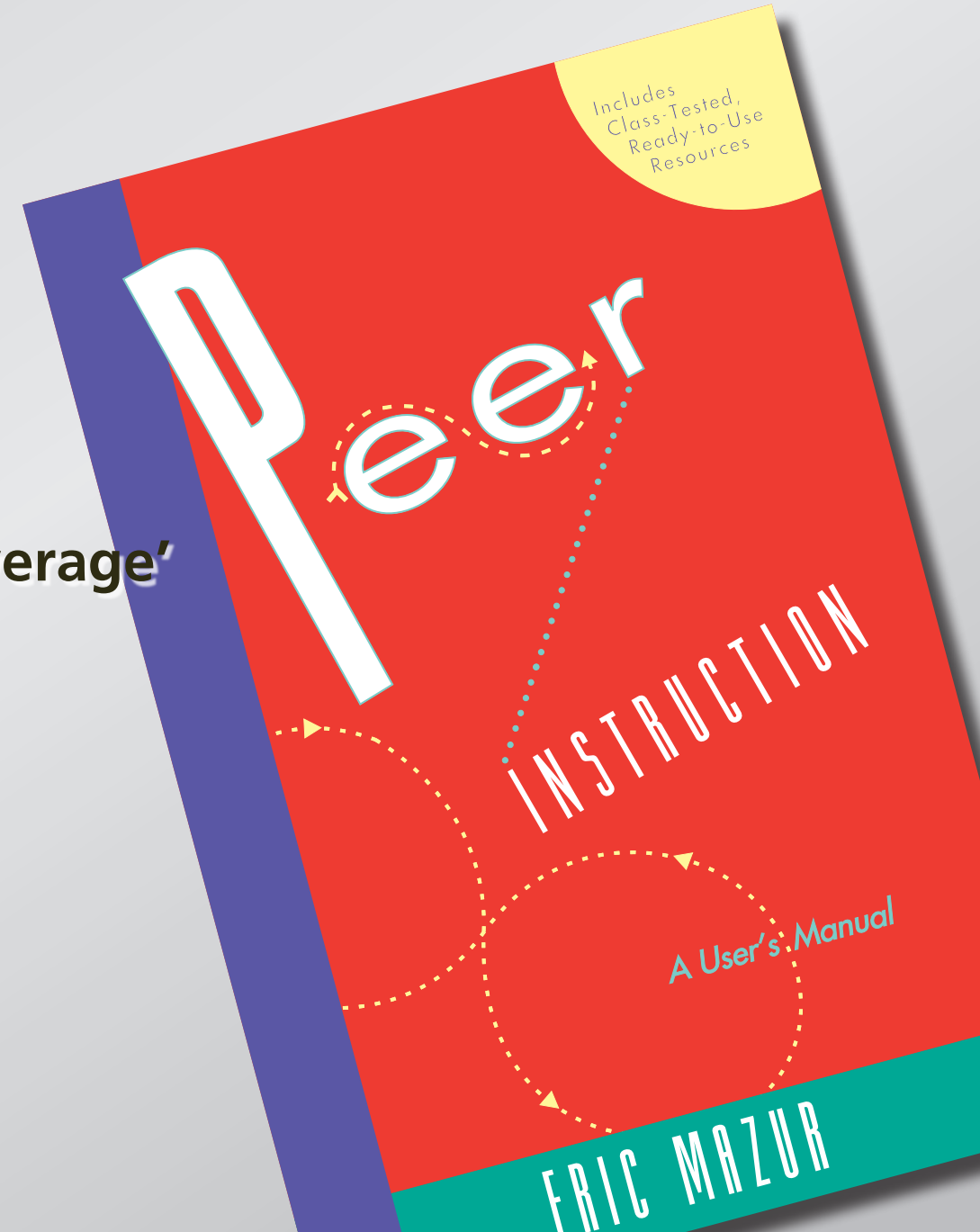
Peer Instruction (PI)



PI & JiTT Overview

Main features:

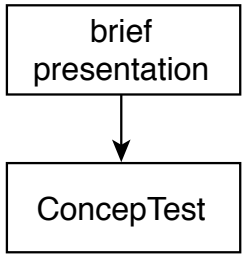
- **pre-class assignment**
- **in-class: depth, not 'coverage'**
- **ConcepTests**



PI & JiTT Overview

brief
presentation

PI & JiTT Overview



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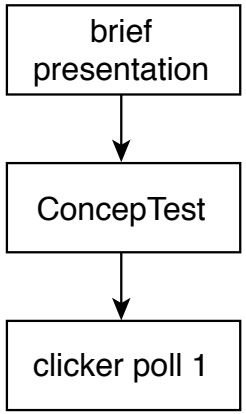

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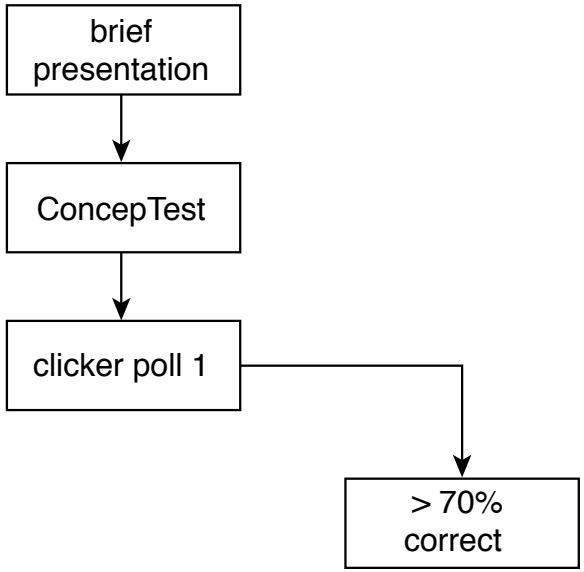

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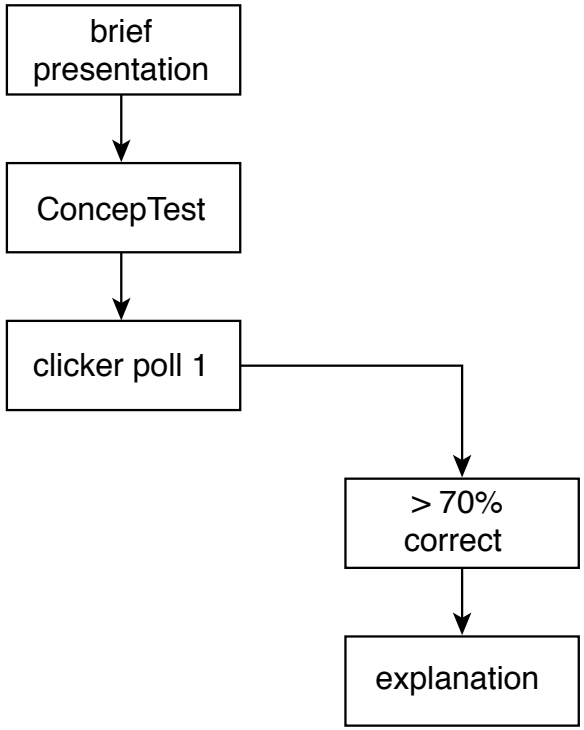

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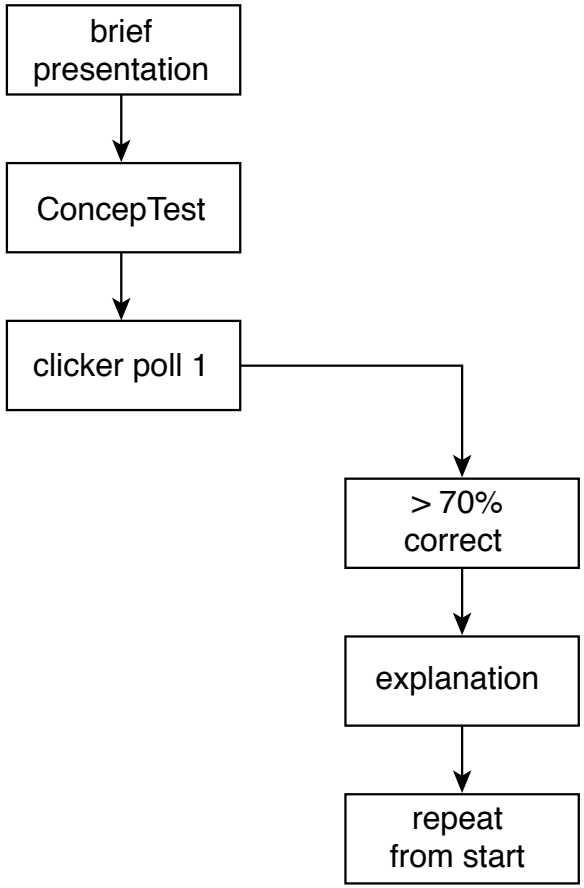

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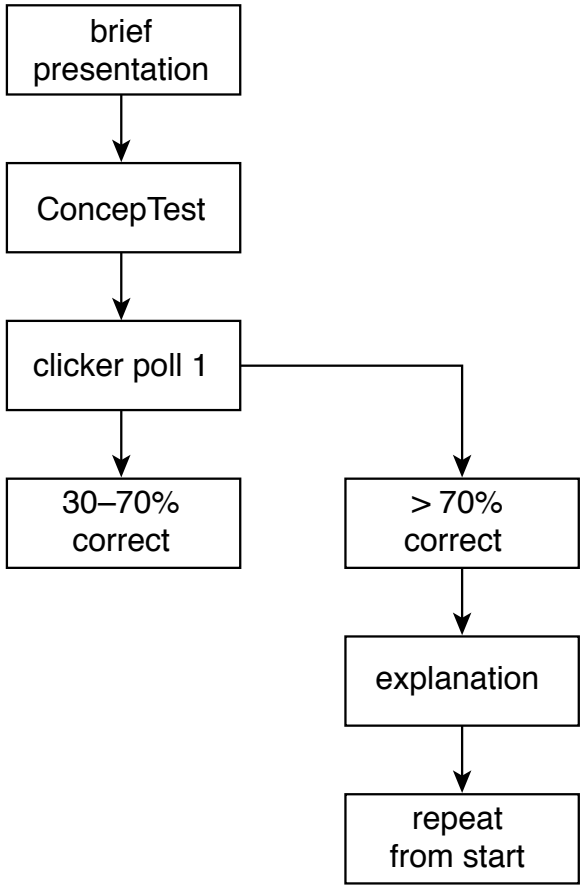

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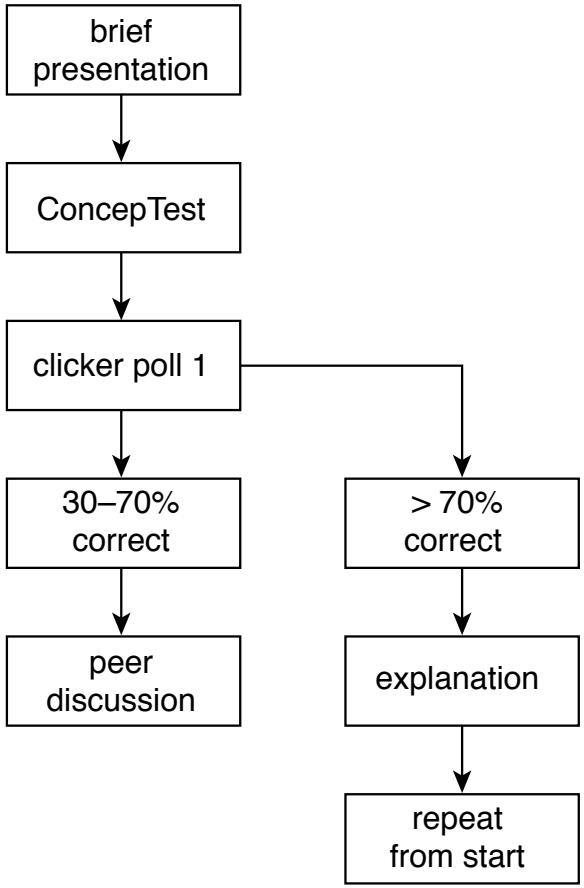

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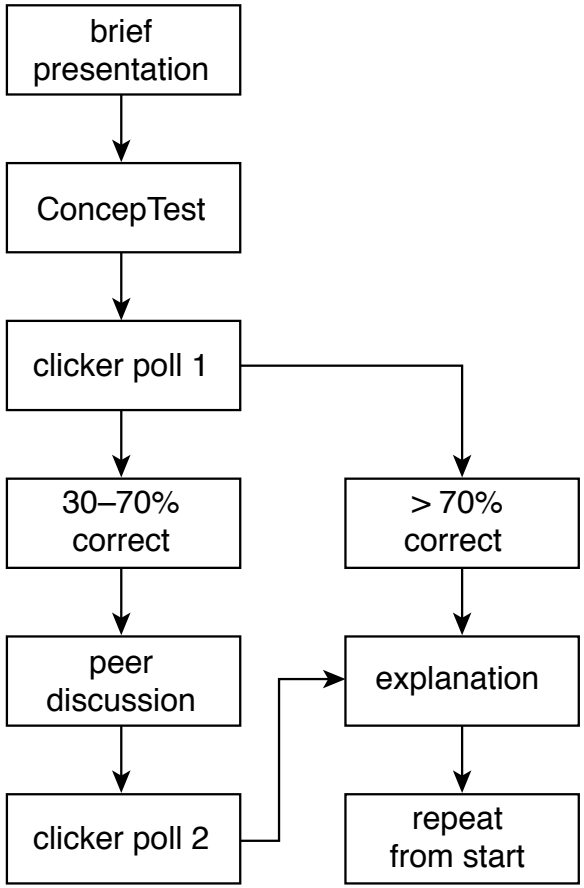

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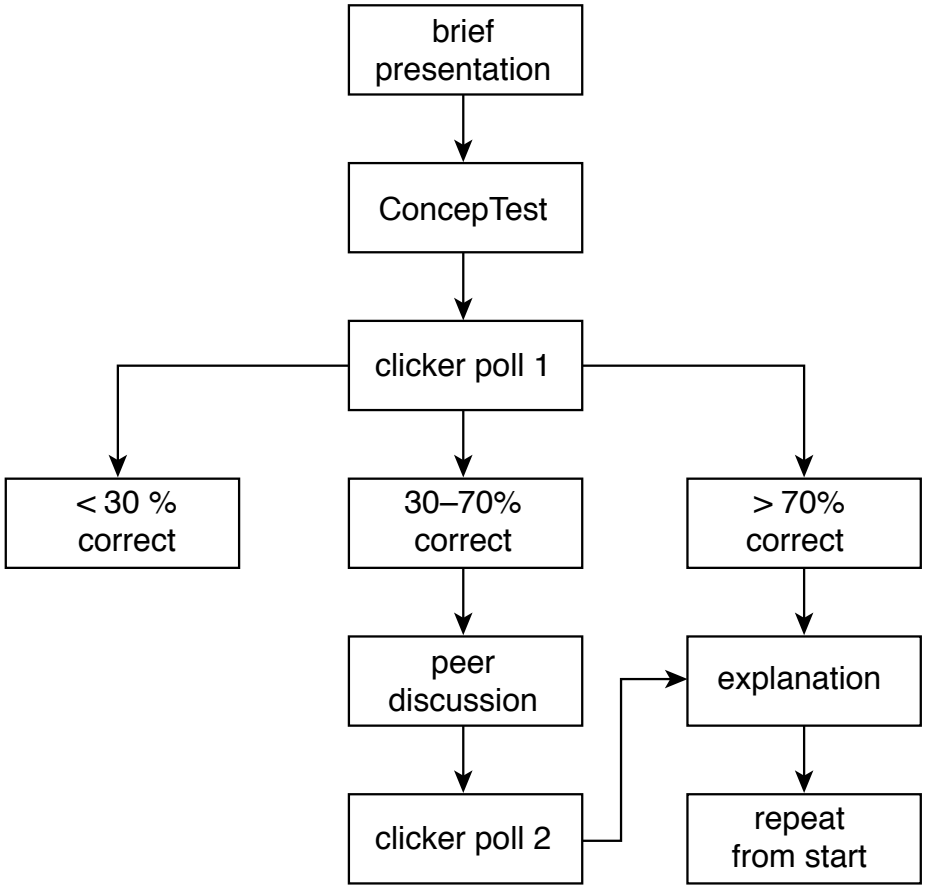

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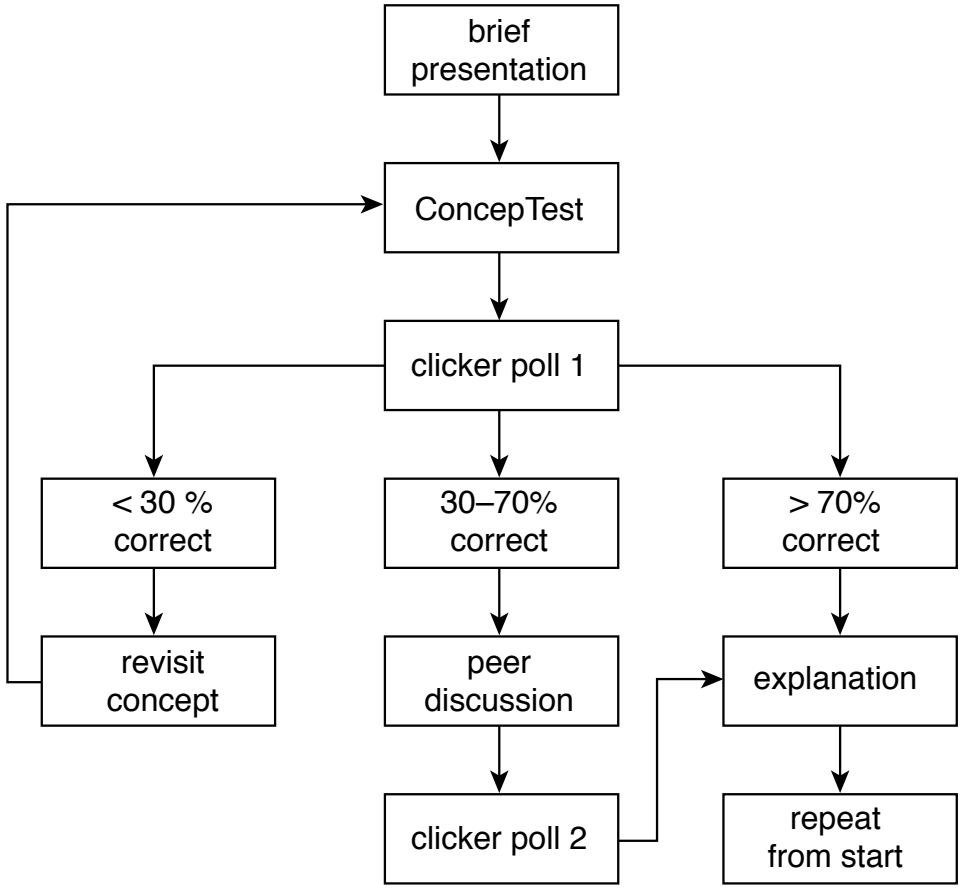

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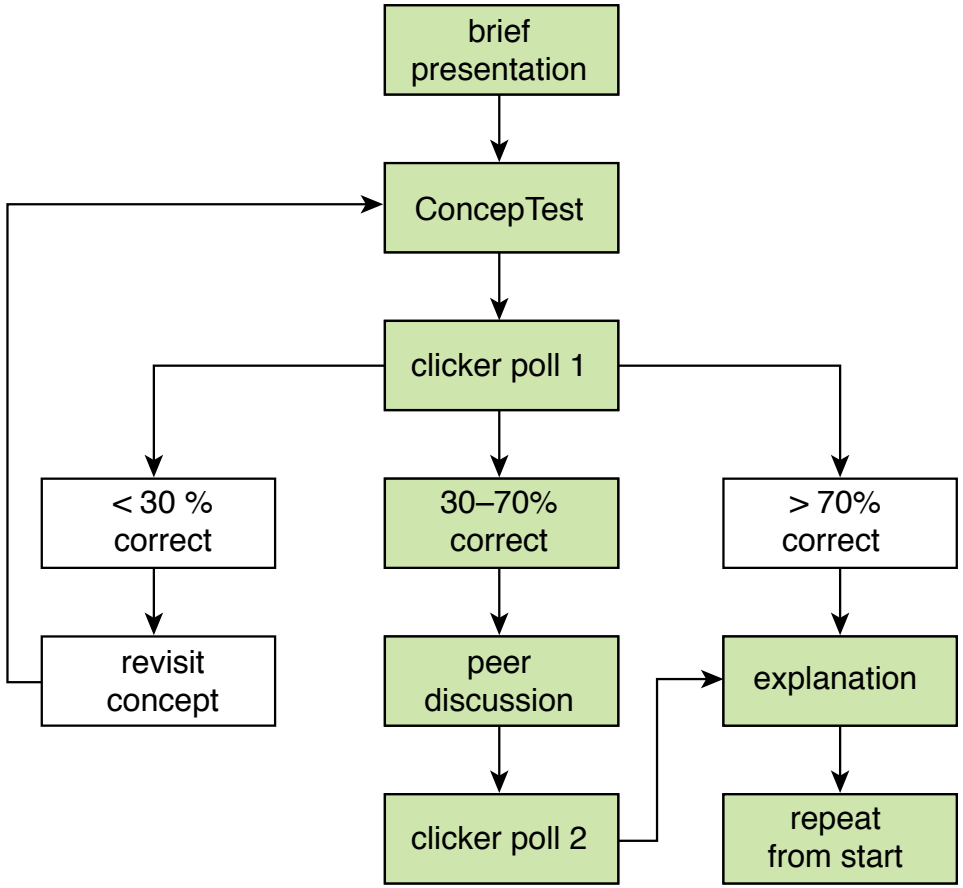

PI & JiTT Overview

PI:

- **helps students overcome difficulties**
- **encourages deep learning**
- **provides depth, not “coverage”**
- **helps you become aware of misconceptions**

PI & JiTT Overview

“How do I promote fruitful discussion?”

PI & JiTT Overview

Find someone with a *different* answer

Let's try it!

Archimedes' Principle

Let's try it!

An object submerged either fully or partially in a fluid experiences an upward buoyant force the magnitude of which is equal to the magnitude of the force of gravity exerted on the fluid displaced by the object.

Let's try it!

An object submerged either fully or partially in a fluid experiences an upward buoyant force the magnitude of which is equal to the magnitude of the force of gravity exerted on the fluid displaced by the object. The volume of displaced fluid is equal to the volume of the submerged portion of the object.

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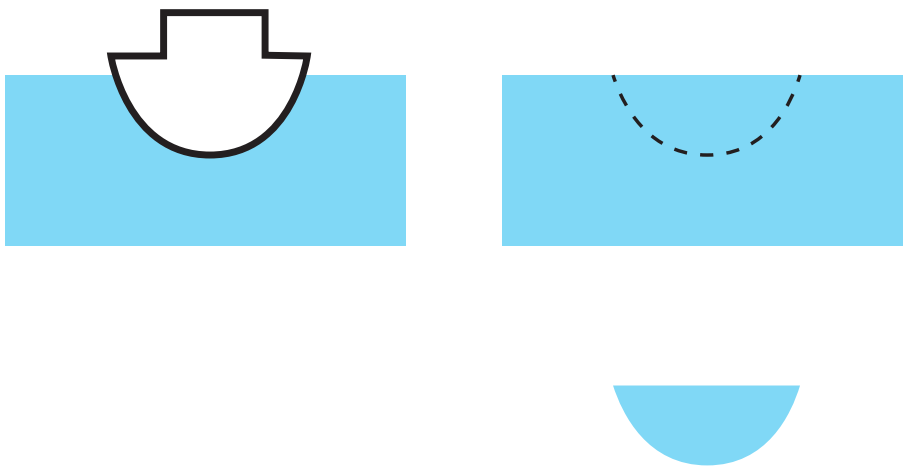

"displaced water"

Let's try it!

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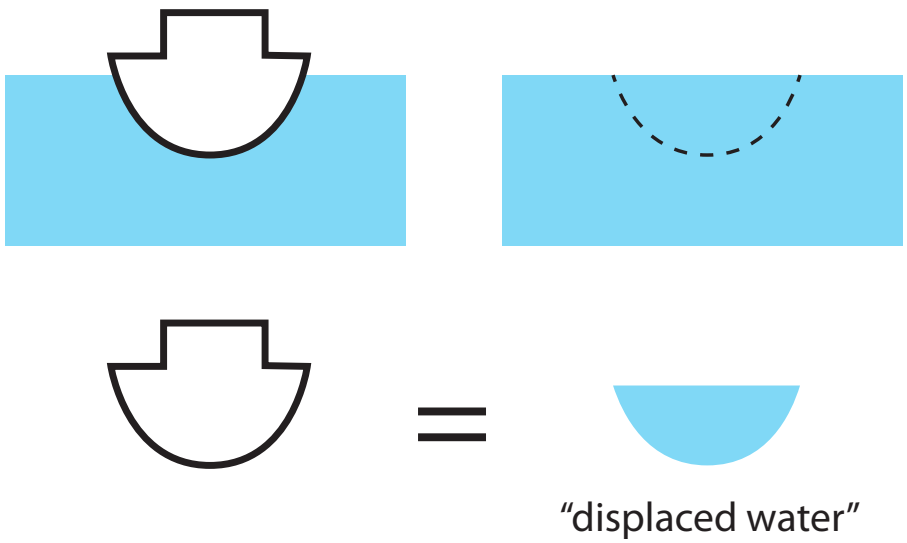


Let's try it!

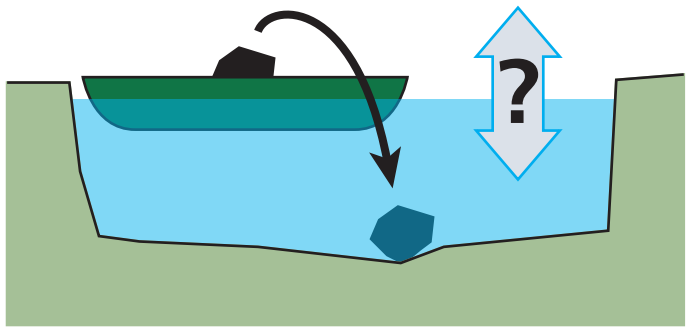
An object submerged either fully or partially in a fluid experiences an upward buoyant force the magnitude of which is equal to the magnitude of the force of gravity exerted on the fluid displaced by the object. The volume of displaced fluid is equal to the volume of the submerged portion of the object.

questions!

"displaced water"

Let's try it!

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



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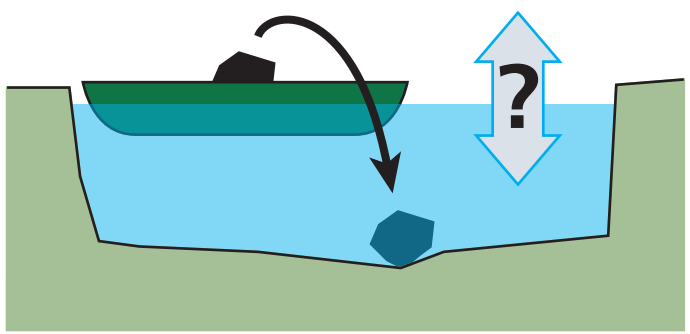


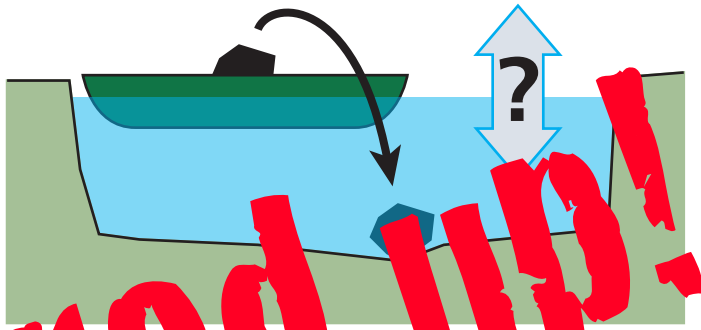
After the boulder sinks to the bottom of the pond, the level of the water in the pond is

1. higher than
2. the same as
3. lower than

it was when the boulder was in the boat.

Let's try it!

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



After the boulder sinks to the bottom of the pond, the level of the water in the pond is

1. higher than
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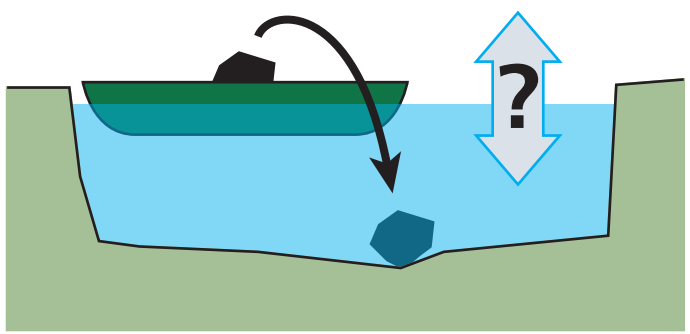
it was when the boulder was in the boat.

you got all fired up!

Let's try it!

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



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1. higher than
2. the same as
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it was when the boulder was in the boat.

Let's try it!

Before I tell you the answer…

Let's try it!

Before I tell you the answer, let's analyze what happened.

Let's try it!

Before I tell you the answer, let's analyze what happened.

You…

Let's try it!

Before I tell you the answer, let's analyze what happened.

You…

1. made a commitment

Let's try it!

Before I tell you the answer, let's analyze what happened.

You…

1. made a commitment
2. externalized your answer

Let's try it!

Before I tell you the answer, let's analyze what happened.

You…

1. made a commitment
2. externalized your answer
3. moved from the answer/fact to reasoning

Let's try it!

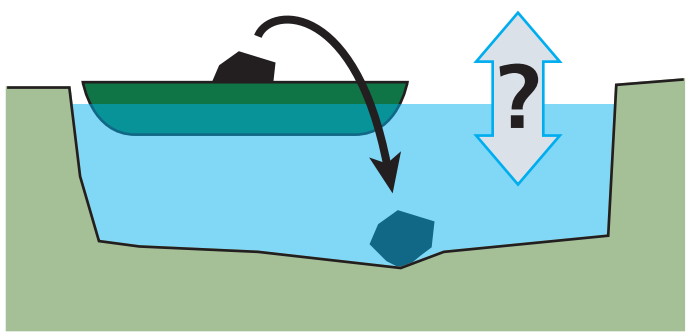
Before I tell you the answer, let's analyze what happened.

You…

1. made a commitment
2. externalized your answer
3. moved from the answer/fact to reasoning
4. became emotionally invested in the learning process

Let's try it!

A boat carrying a large boulder is floating on a small pond. The boulder is thrown overboard and sinks to the bottom of the pond.



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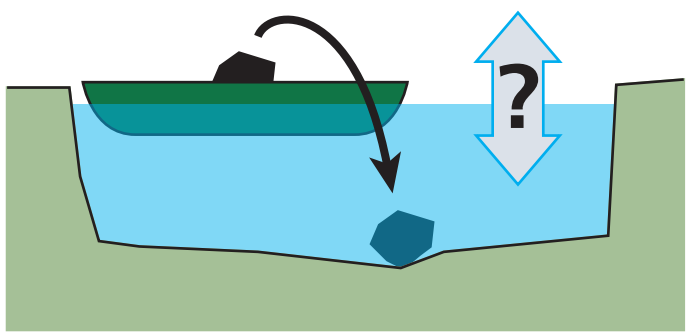

After the boulder sinks to the bottom of the pond, the level of the water in the pond is

1. higher than
2. the same as
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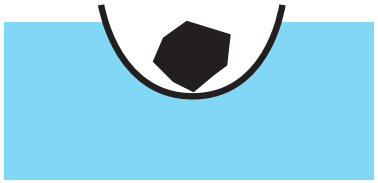
it was when the boulder was in the boat.

Let's try it!

remember: amount of displaced water

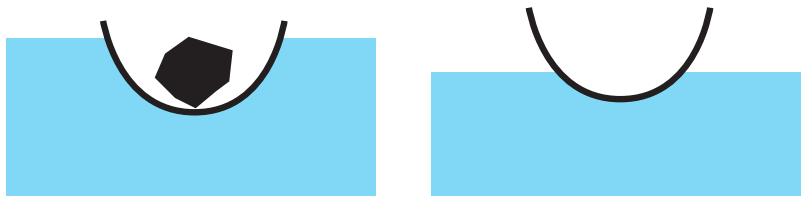
Let's try it!

remember: amount of displaced water



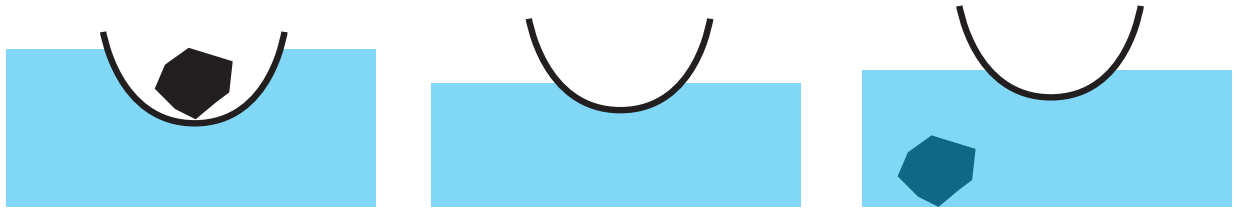
Let's try it!

remember: amount of displaced water



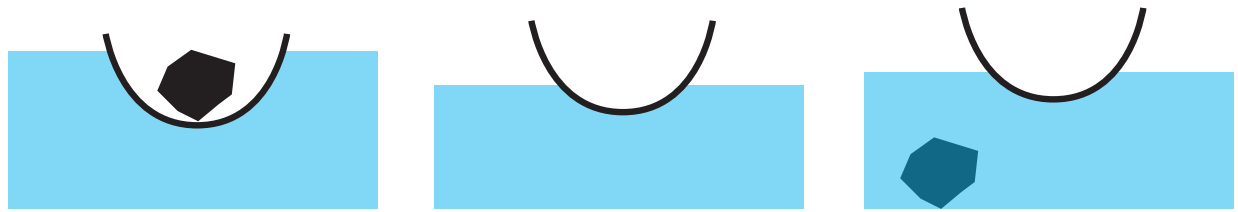
Let's try it!

remember: amount of displaced water



Let's try it!

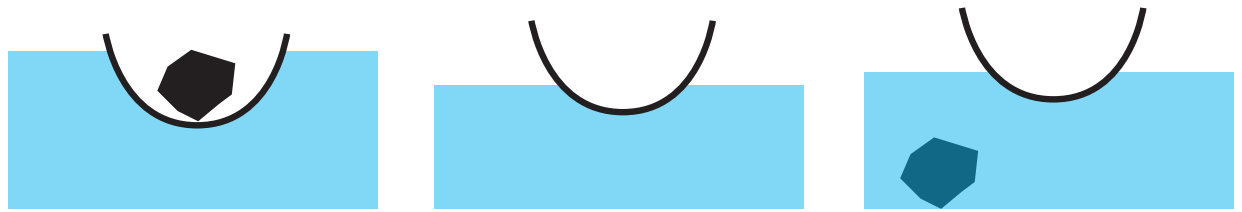
remember: amount of displaced water



displaced
water

Let's try it!

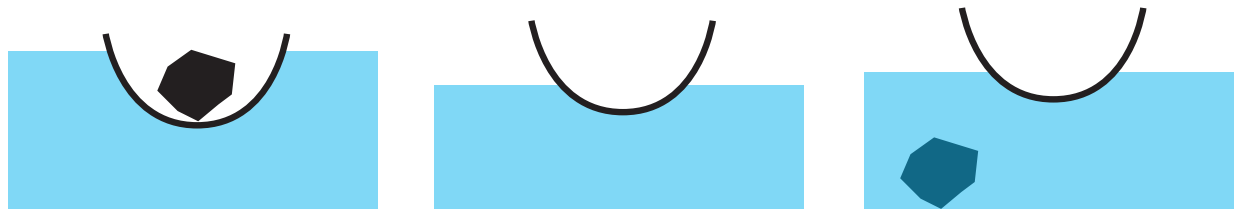
remember: amount of displaced water



displaced water = weight of rock

Let's try it!

remember: amount of displaced water

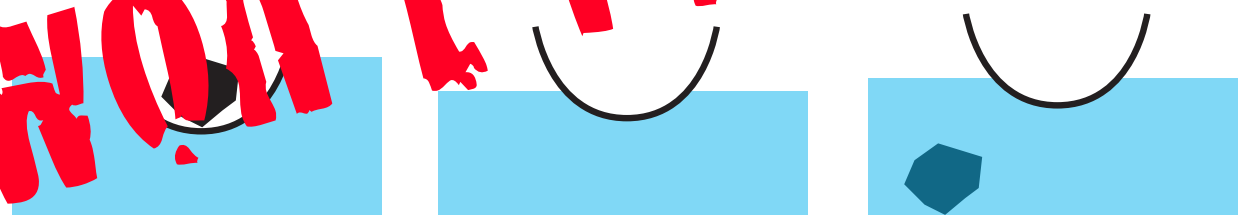


displaced water = weight of rock

= volume of rock

Let's try it!

remember: amount of displaced water



displaced water = weight of rock

= volume of rock

you won't forget this

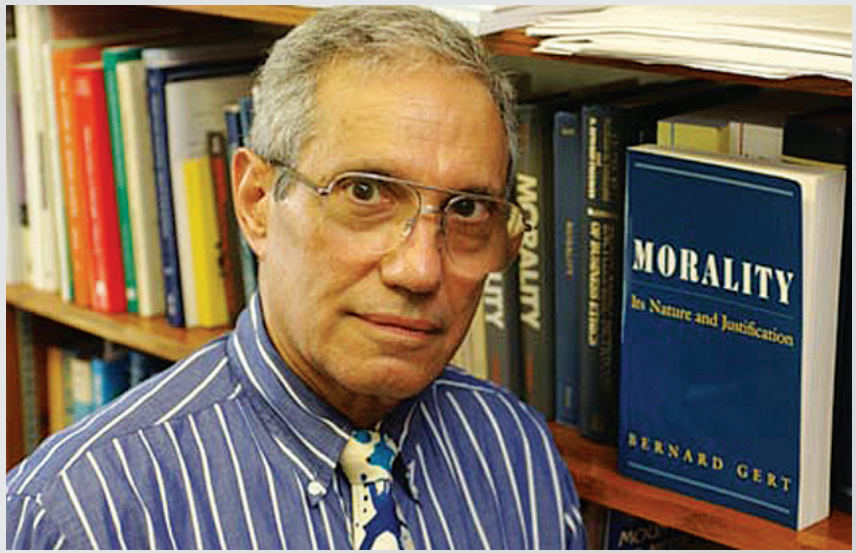
PI & JiTT Overview

“Can this method be used in my class,

where questions don’t necessarily have right answers?”

Let's try it!

Bernard Gert (1934 – 2011)

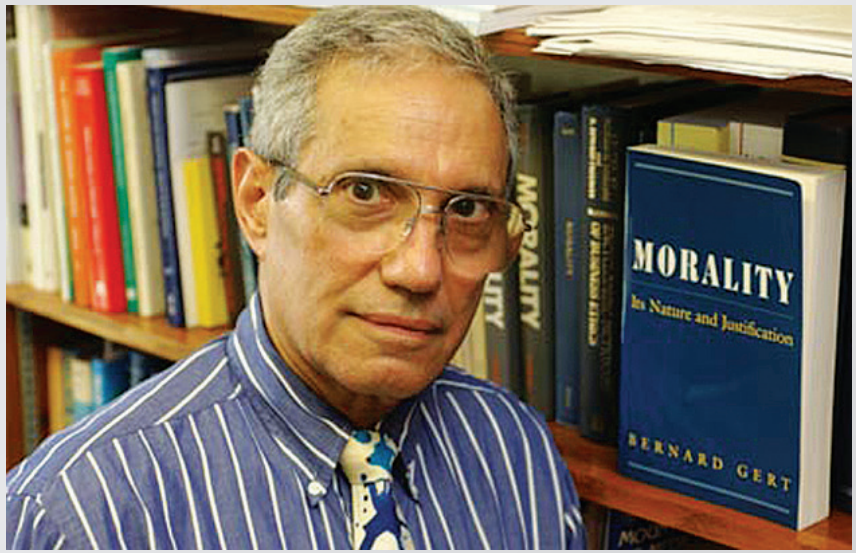


Moral philospher

Professor at Dartmouth

Let's try it!

Bernard Gert (1934 – 2011)



Moral philospher
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'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).

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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.

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

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

1. Yes
2. No

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you got all engaged!

PI & JiTT Overview

Don’t need a correct answer!

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