

# Assessment for (not of) learning



Pearson National Sales Meeting  
San Diego, CA, 9 January 2014



# Assessment for (not of) learning



@eric\_mazur

Pearson National Sales Meeting  
San Diego, CA, 9 January 2014





**kosten**

1. die Kosten (*pl.*)
2. kostbar

**krank**

1. die Krankheit, —, —en

**cow**

377

**magnificent**  
**glor**

1. magnificent
2. master

430

**das Kind, —(e)s, —er**

1. kindisch
2. kindlich

**der Kellner, —s, —**

1. der Keller, —s, —

**kennen**

kannte-gekannt *irreg.*

1. kennen-lernen
2. erkennen
3. bekannt
4. d



kosten

1. die Kosten

2. 1. Kosten

think

428

kennen

kannte-gekannt

1. kennen

2. erkennen

3. bekannt

4. d.





**35 % retained  
after 1 week**

**we only guarantee  
they'll pass the test**







# 5-minute university



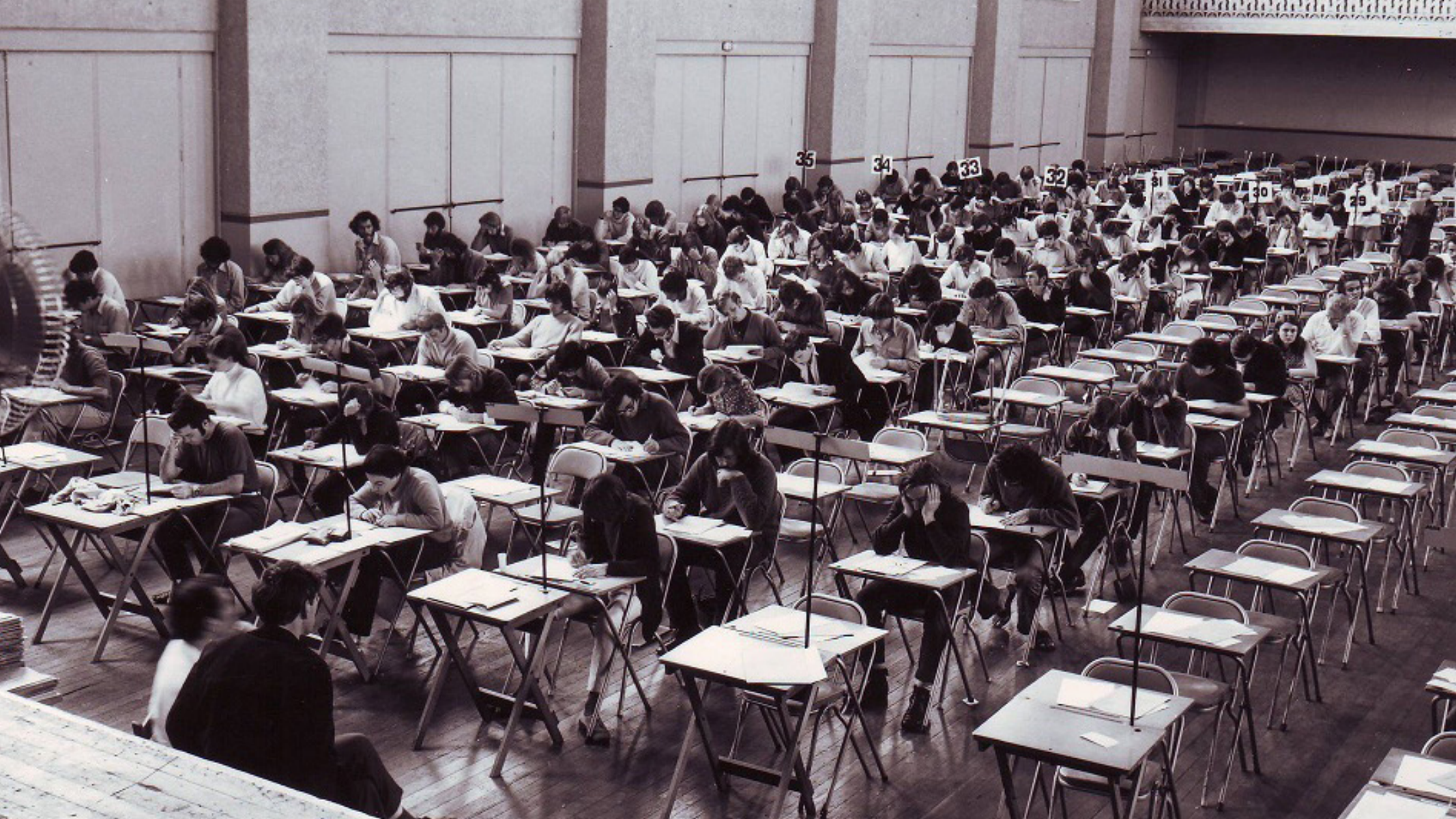
















**assessment focussed on ranking and classifying,  
not on developing 21st century skills**



1 purposes





1 purposes

2 problems



1 purposes

2 problems

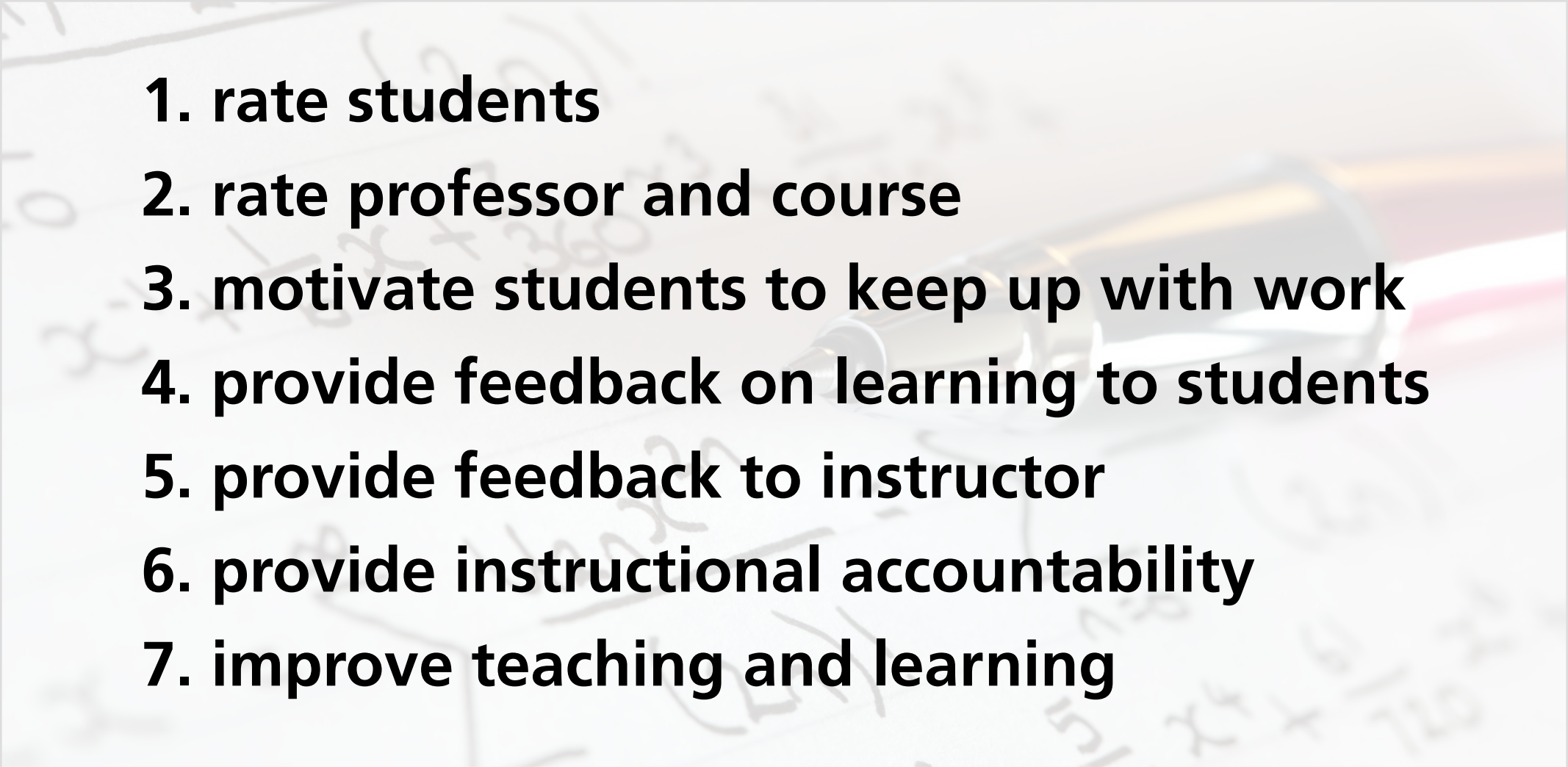
3 improvements



**how many different purposes  
of assessment you can think of?**

**1** purposes



- 
- 1. rate students**
  - 2. rate professor and course**
  - 3. motivate students to keep up with work**
  - 4. provide feedback on learning to students**
  - 5. provide feedback to instructor**
  - 6. provide instructional accountability**
  - 7. improve teaching and learning**



**1** purposes





**1** purposes

**2** problems





## inauthentic tests

**1** purposes

**2** problems





# inauthentic problem solving

**1** purposes

**2** problems





**what is the meaning/definition of...?**

**1** purposes

**2** problems





problem

1 purposes

2 problems





**problem**

**outcome**

**1** purposes

**2** problems

problem

outcome

**KNOWN**

**1** purposes

**2** problems



**problem**

**solution**

**outcome**

**KNOWN**

**1** purposes

**2** problems

problem

solution

outcome

UNKNOWN

KNOWN

1 purposes

2 problems



problem

solution

outcome

UNKNOWN

KNOWN

problem

1 purposes

2 problems

problem

solution

outcome

UNKNOWN

KNOWN

problem

procedure

KNOWN

1 purposes

2 problems



problem

solution

outcome

UNKNOWN

KNOWN

problem

procedure

answer

KNOWN

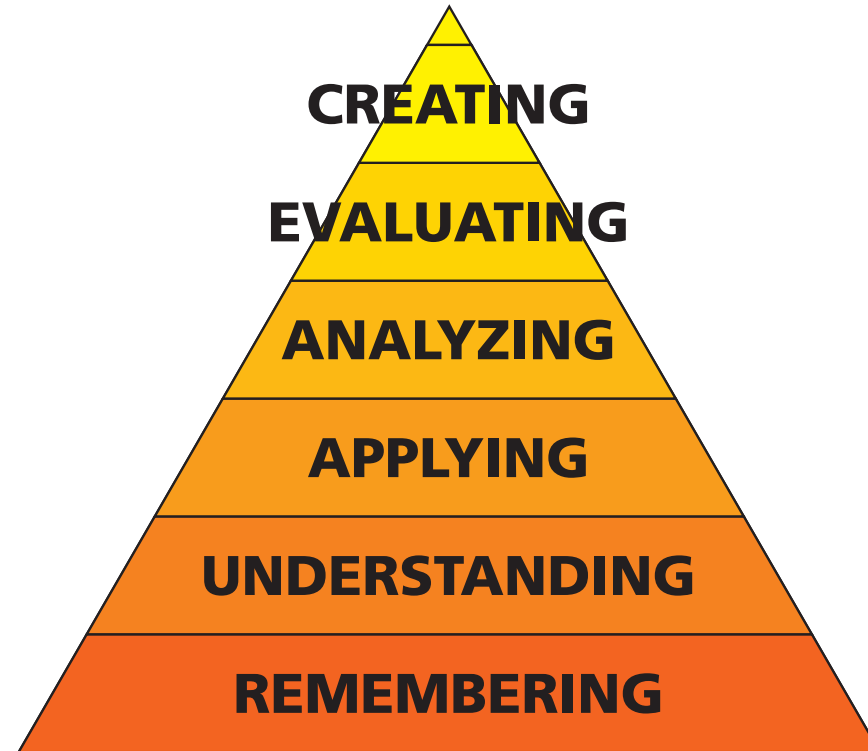
UNKNOWN

1 purposes

2 problems



## Thinking skills



prob

prob

① purposes

② problems

**On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.**

**On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.**

**How long do you have to wait before someone frees up a space?**



**On a Saturday afternoon, you pull into a parking lot with un-metered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.**

**How long do you have to wait before someone frees up a space?**

**Requires:**

**Assumptions**

**Developing a model**

**Applying that model**

**On a Saturday afternoon, you pull into a parking lot with un-metered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.**

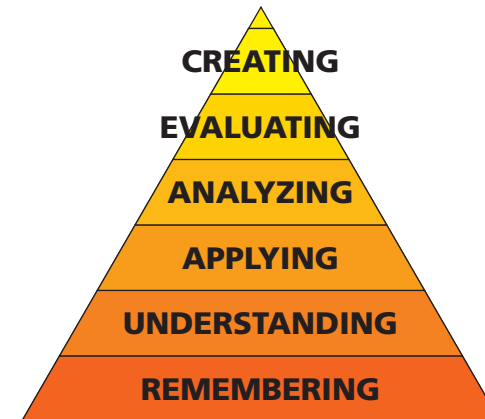
**How long do you have to wait before someone frees up a space?**

**Requires:**

**Assumptions**

**Developing a model**

**Applying that model**



On a Saturday afternoon, you pull into a parking lot with un-metered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. **On average people shop for 2 hours.**

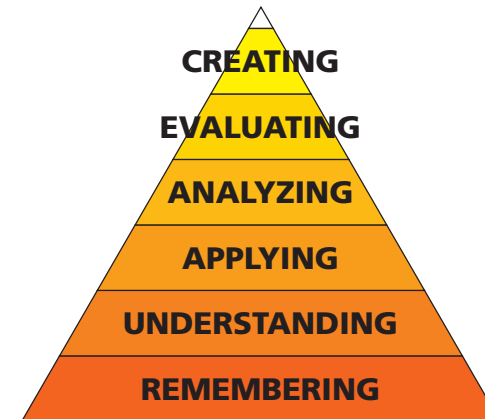
How long do you have to wait before someone frees up a space?

**Requires:**

Assumptions

**Developing a model**

**Applying that model**





On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. On average people shop for 2 hours.

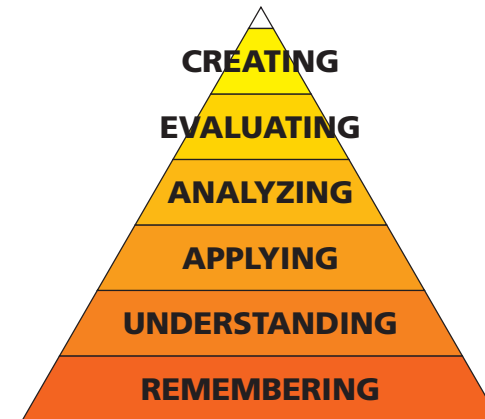
**Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?**

**Requires:**

Assumptions

Developing a model

Applying that model



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces. On average people shop for 2 hours.

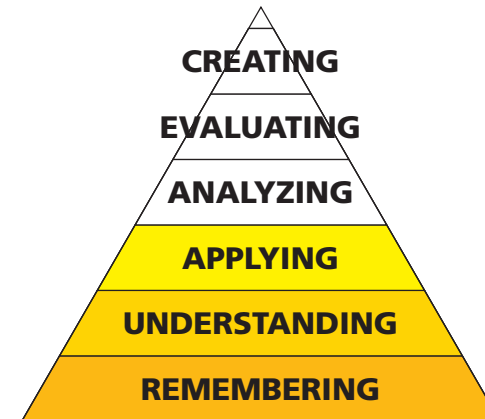
**Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?**

**Requires:**

**Assumptions**

**Developing a model**

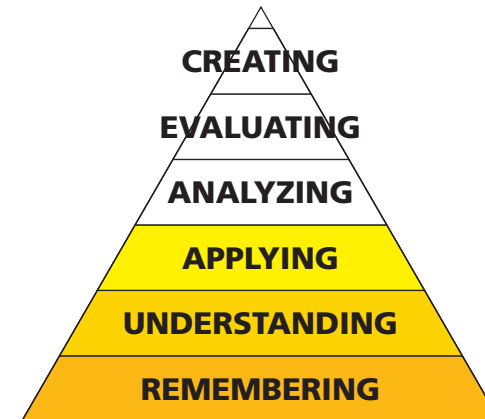
**Applying that model**





**On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, where people are known to shop, on average, for 2 hours. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.**

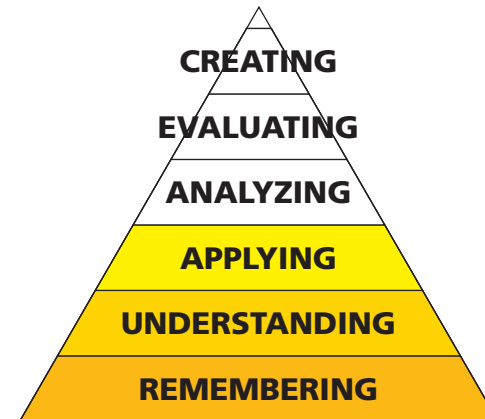
**How long do you have to wait before someone frees up a space?**



On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, where people are known to shop, on average, for 2 hours. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

How long do you have to wait before someone frees up a space?

$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$

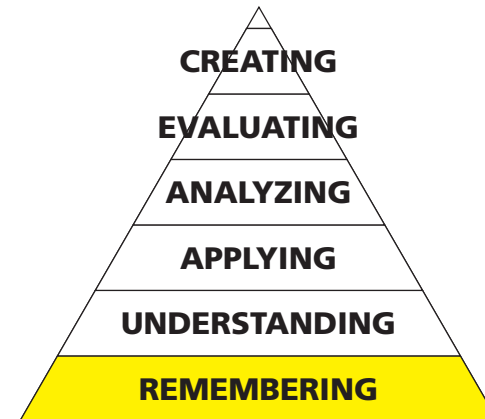




On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area, where people are known to shop, on average, for 2 hours. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

How long do you have to wait before someone frees up a space?

$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$





1 purposes

2 problems





**1** purposes

**2** problems





1 purposes

2 problems



problem

solution

outcome

problem

**REAL**  
problem solving

1 purposes

2 problems



**problem**

**approach 1**

**approach 3**

**approach 2**

**outcome**

**grading incompatible with real problem solving**

**1 purposes**

**2 problems**





1 purposes

2 problems



# isolation

**1** purposes

**2** problems



④ We will use spherical coordinates:

$$0 \leq \rho \leq 4, \quad 0 \leq \theta \leq 2\pi, \quad \leq \phi \leq \pi$$

integral is thus:

$$\int_0^4 \int_0^{2\pi} \int_0^\pi (\rho^2 \sin \phi) \rho \, d\phi \, d\theta \, d\rho$$
$$= \left\{ \int_{\rho=0}^4 \rho^3 \, d\rho \right\} \left\{ \int_{\theta=0}^{2\pi} d\theta \right\} \left\{ \frac{1}{2} \int_{\phi=0}^\pi \sin(2\phi) \, d\phi \right\} = \boxed{0}$$

A person with dark hair is sleeping at a desk. Their head is resting on their hand, and a pen is held in their other hand, poised over an open book. A white mug is on the desk to the left. The scene is dimly lit, suggesting a late night or early morning.

# high-stakes examinations promote cramming

A close-up of a clock face. The hour hand is between 11 and 12, and the minute hand is pointing at 10. The clock is white with black numbers and hands.

**1** purposes

**2** problems

A person with dark hair is sleeping at a desk, their head resting on their hand. A white mug is on the desk to the left. In the background, a clock is visible. The text "information stored in short-term memory" is overlaid in the center.

# information stored in short-term memory

**1** purposes

**2** problems





no retention

information stored in short-term memory

no transfer

1 purposes

2 problems

**grades: measure of standing relative to others**

**1** purposes

**2** problems

**grades: measure of standing relative to others**  
**feedback: reflection on what has been learnt**

**1** purposes

**2** problems



# assessment produces a conflict

1 purposes

2 problems

**assessment produces a conflict**

**coach or judge?**

**1** purposes

**2** problems

**conflict resolved by:**

**objectivity (fairness, reliability)**

**1** purposes

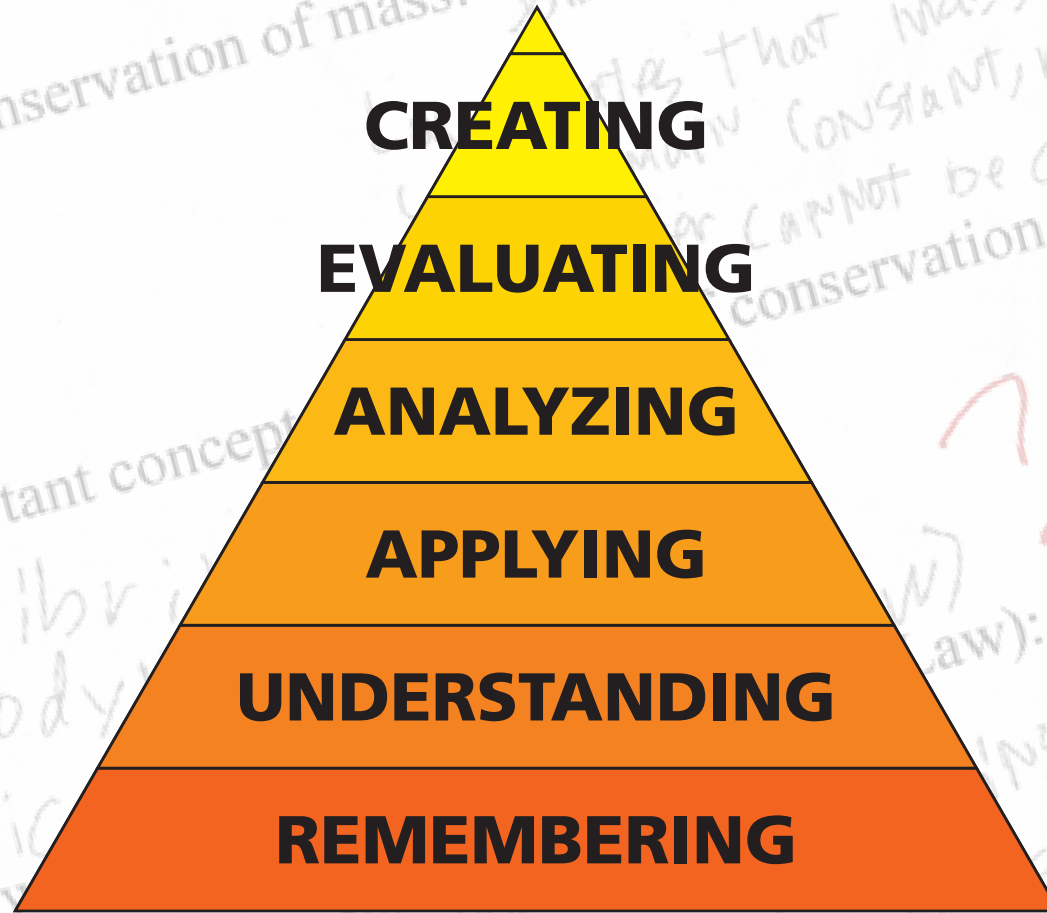
**2** problems



...but ...

1 purposes

2 problems



**1** purposes

**2** problems

**only lowest order thinking skills  
can be judged objectively**

**REMEMBERING**

**1** purposes

**2** problems



and then there is...

- grade inflation
- cheating

1 purposes

2 problems



**1** purposes

**2** problems

**3** improvements



**mimic real life**

**1** purposes

**2** problems

**3** improvements



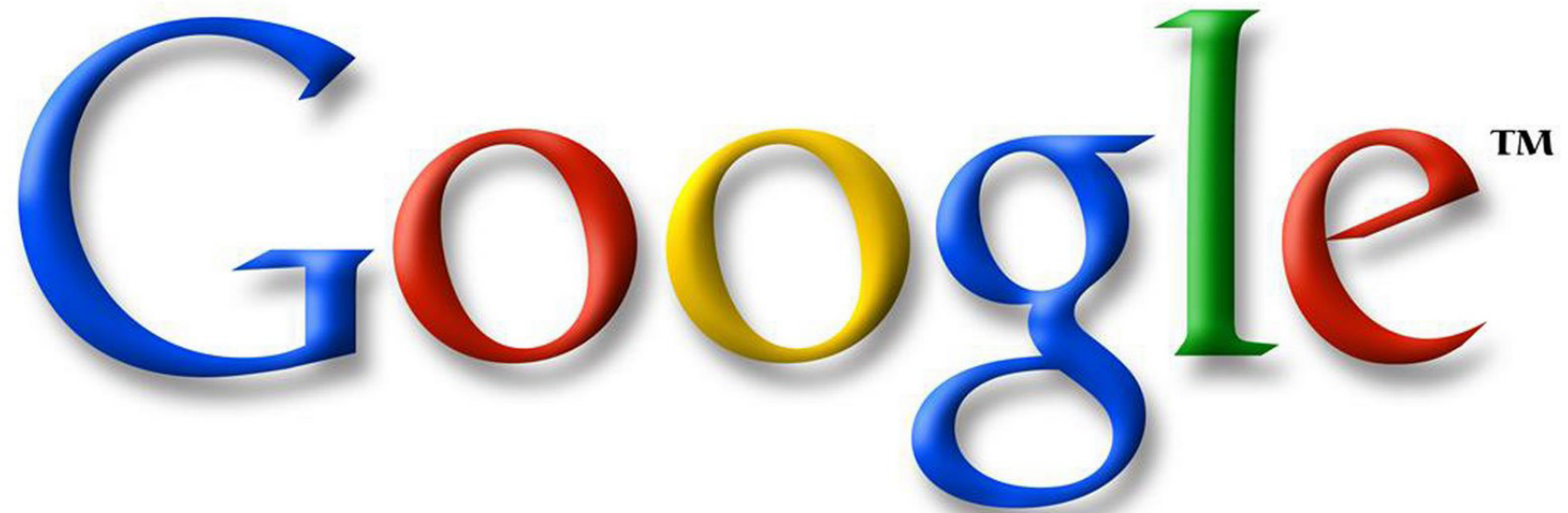


# open-book exam

**1** purposes

**2** problems

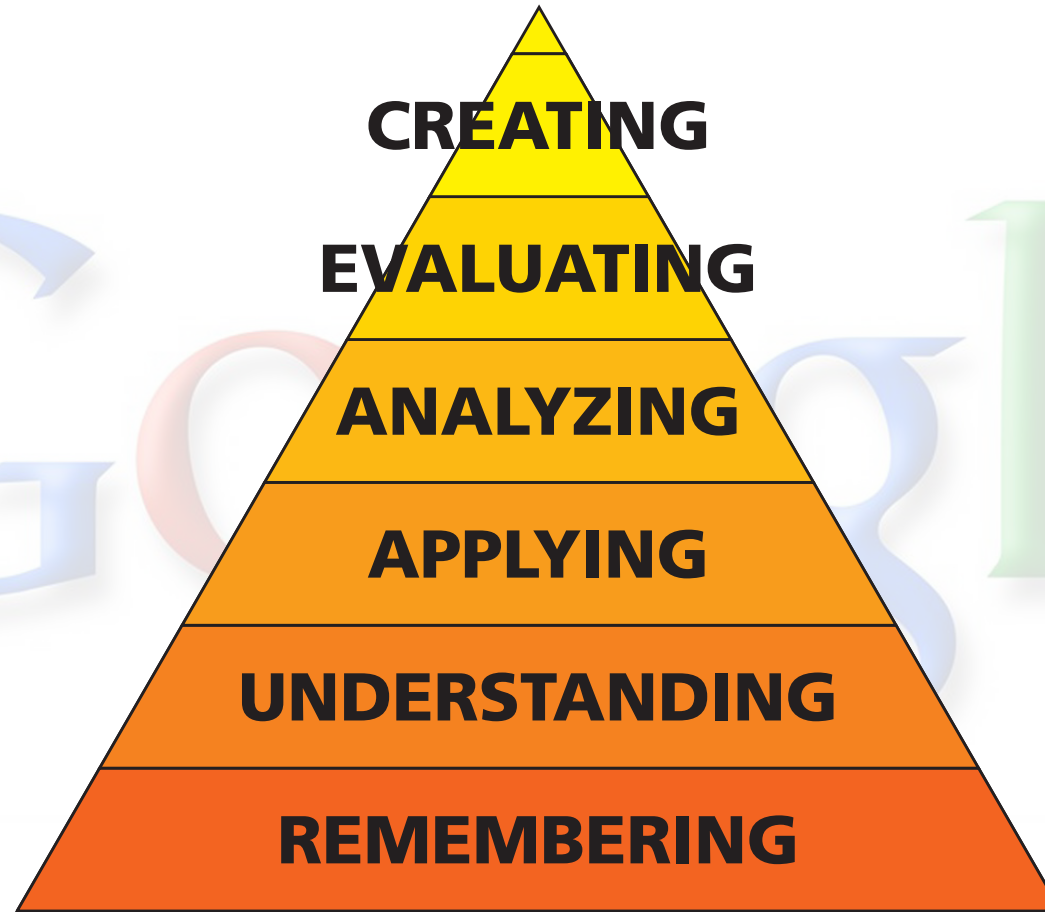
**3** improvements



1 purposes

2 problems

3 improvements

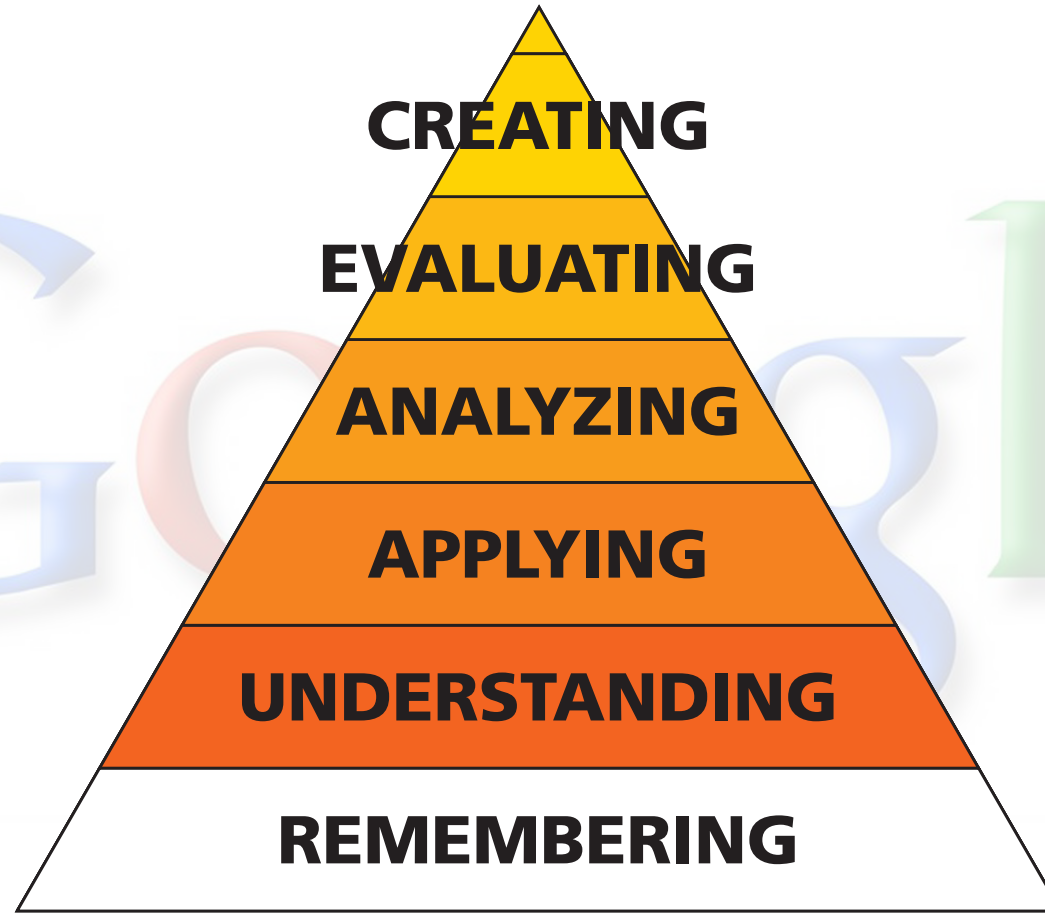


**1** purposes

**2** problems

**3** improvements

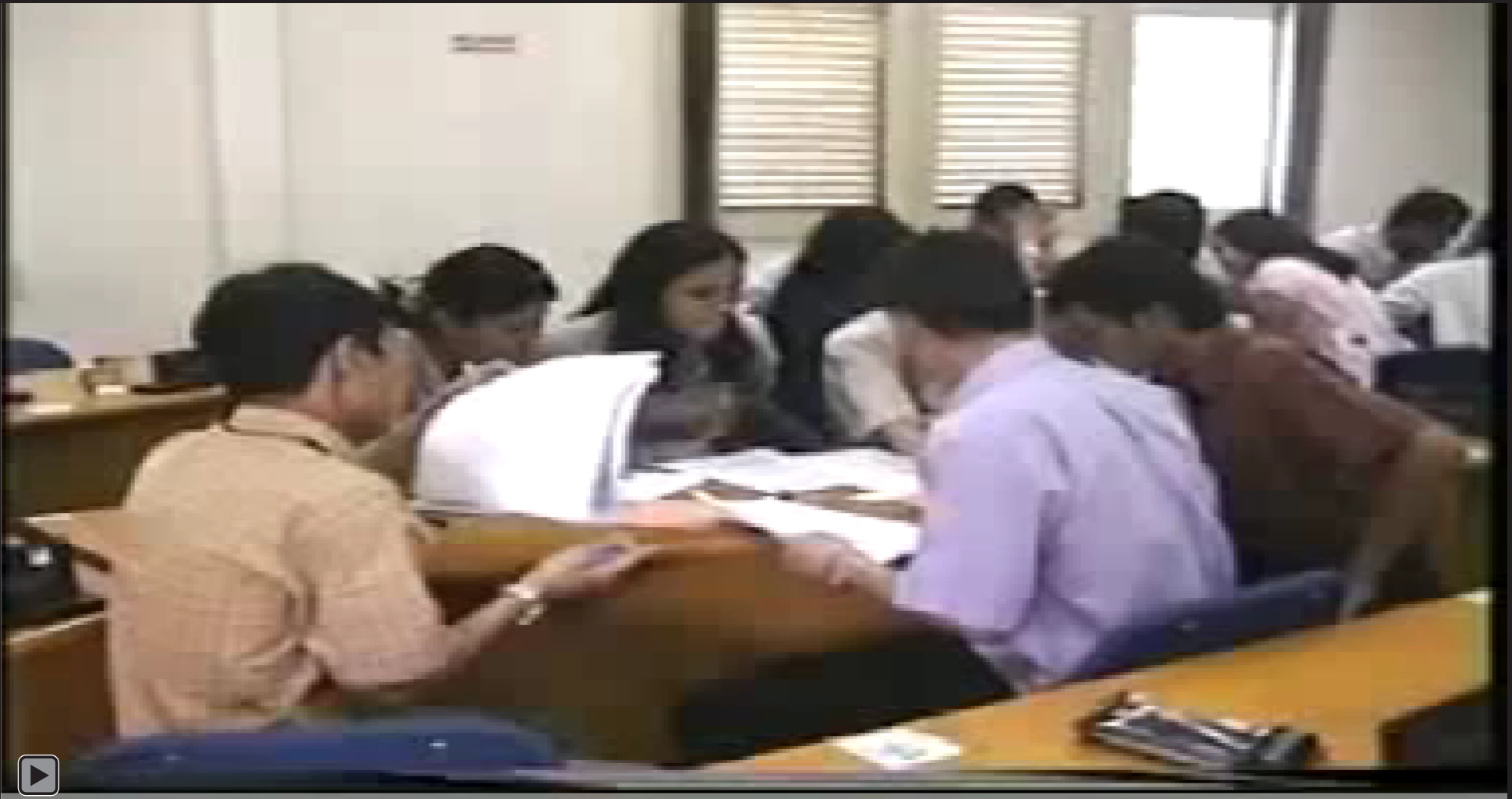




**1** purposes

**2** problems

**3** improvements



**1** purposes

**2** problems

**3** improvements

## IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT)

Name Team #3

Test # 1

Subject \_\_\_\_\_

Total 23

**SCRATCH OFF COVERING TO EXPOSE ANSWER**

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>2</u>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>4</u>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>1</u>
5.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
6.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
7.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>0</u>
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>  </u>
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>  </u>

- 1 purposes
- 2 problems
- 3 improvements





**1** purposes

**2** problems

**3** improvements

## Session 389314

This is the individual round; work on these questions on your own.



Jump to ▼

1

2

3

4

5

### expression question

What is the derivative of  $f(x) = 3x^2 - 6x$ ?

Submit response

Enter an expression, e.g.,  $x^2$  for  $x^2$ ,  $\ln(y) - \sin(x)$  for  $\ln y - \sin x$ ,  $x/(y+1)$  for  $\frac{x}{y+1}$ ,  $(1/2)x$  for  $\frac{1}{2}x$ . Do not enter a complete equation.

Current team: **Blue team**  [Change team](#)

 [Change seat](#)

 [Send a message to the instructor](#)

 [Join another](#)

1 purposes

2 problems

3 improvements

This is the individual round;

**expression question**

What is the derivative of  $f(x) = 3x^2 - 6x$ ?

Submit response

Enter an expression, e.g.,  $x^2$  for  $x^2$ ,  $\ln(y) - \sin(x)$  for  $\ln y - \sin x$

1 purposes

2 problems

3 improvements



This is the individual round;

### expression question

What is the derivative of  $f(x) = 3x^2 - 6x$ ?

Submit response

Enter an expression, e.g.,  $x^2$  for  $x^2$ ,  $\ln(y) - \sin(x)$  for  $\ln y - \sin x$

1 purposes

2 problems

3 improvements

$6x - 6$

Brian Lukoff

$6x$

Brent Jones

$6x - 6$

Beth Sawyer

$6x^2 - 6$

Kip Harmon

### expression question

What is the derivative of  $f(x) = 3x^2 - 6x$ ?

Submit response

Enter an expression, e.g.,  $x^2$  for  $x^2$ ,  $\ln(y) - \sin(x)$  for  $\ln y - \sin x$

1 purposes

2 problems

3 improvements



**1** purposes

**2** problems

**3** improvements





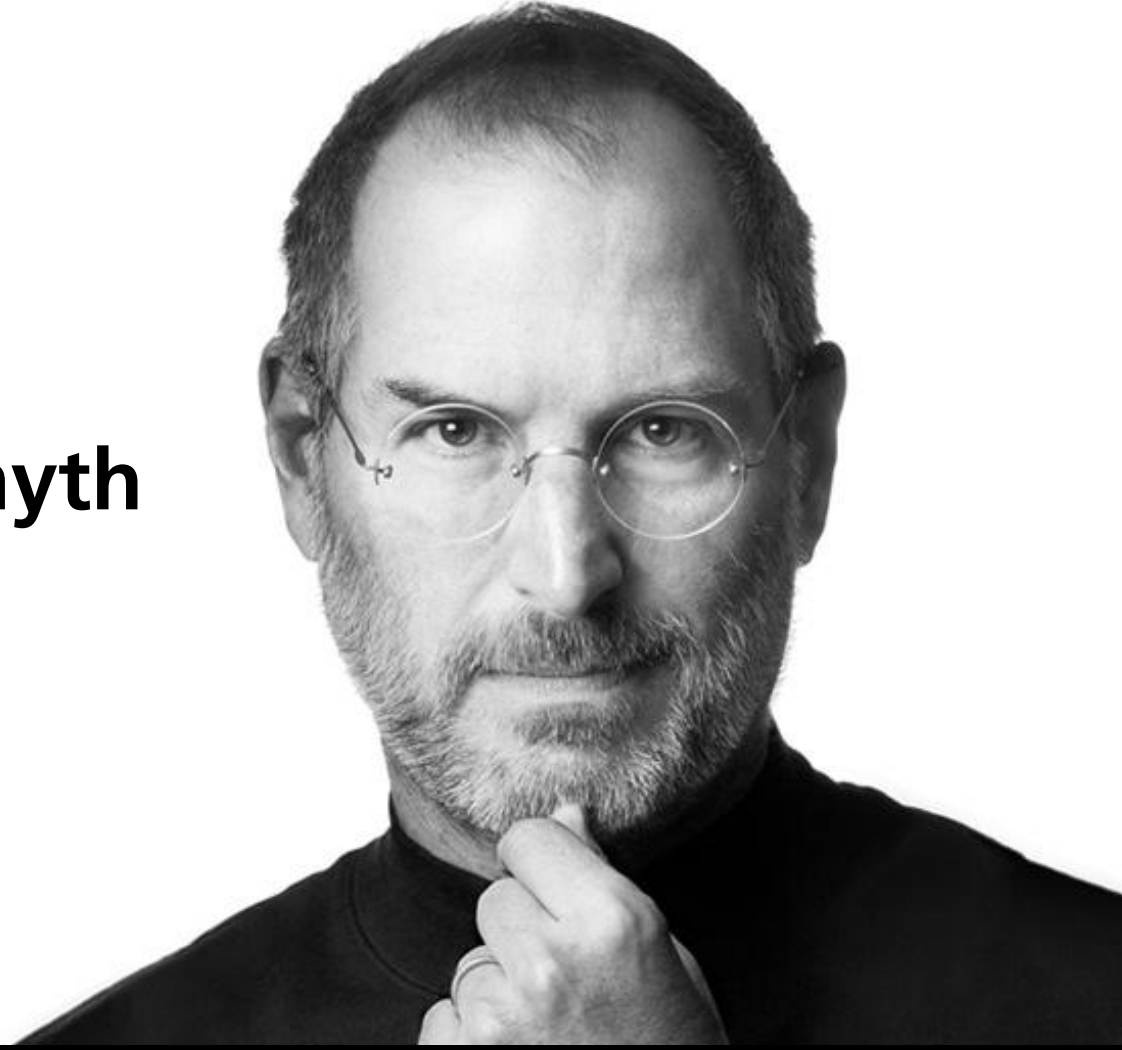
**focus on feedback, not ranking**

**1** purposes

**2** problems

**3** improvements

# objective ranking: a myth

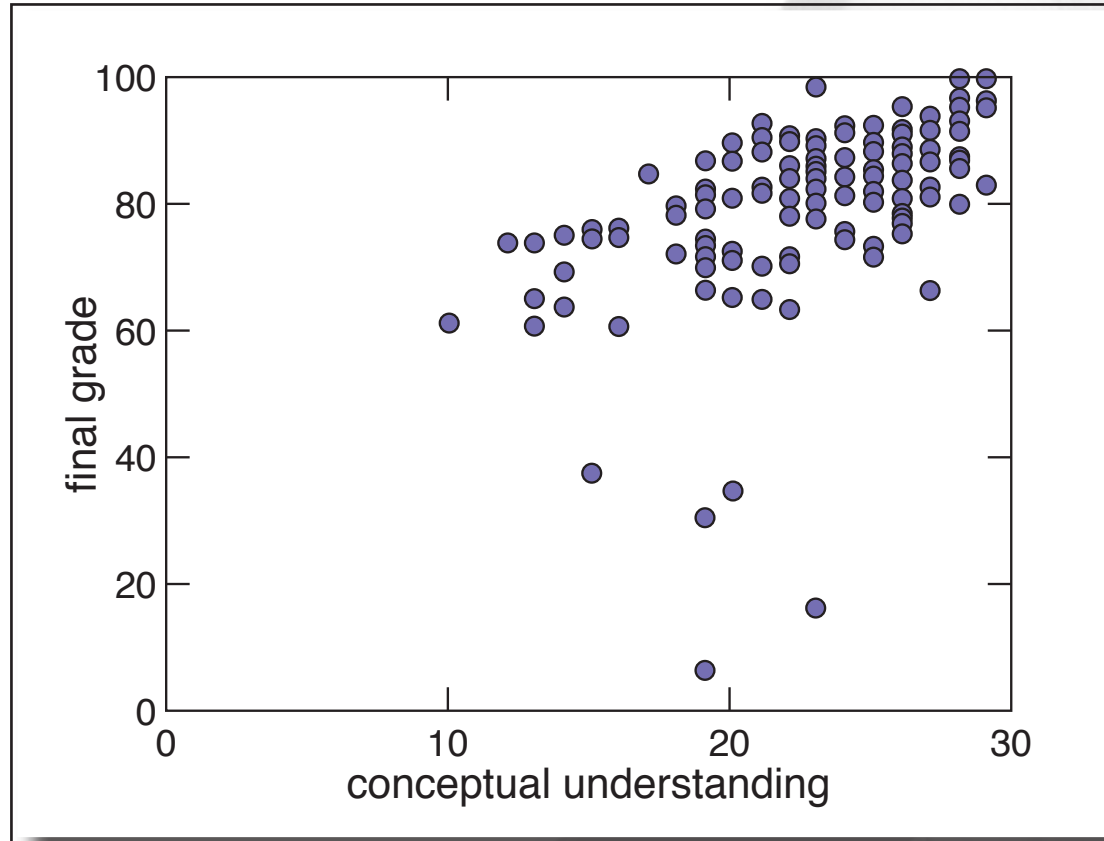


**1** purposes

**2** problems

**3** improvements

# 2 metrics, 2 results



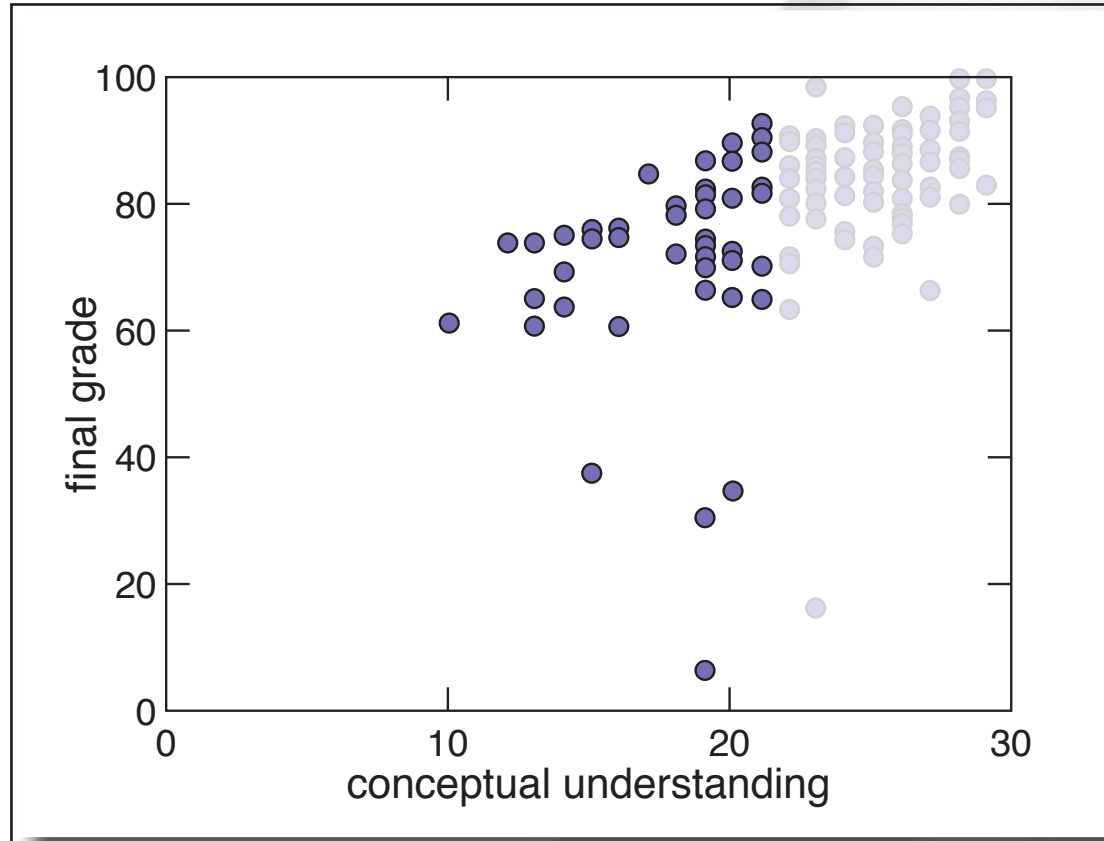
1 purposes

2 problems

3 improvements



# Aristotelian thinkers

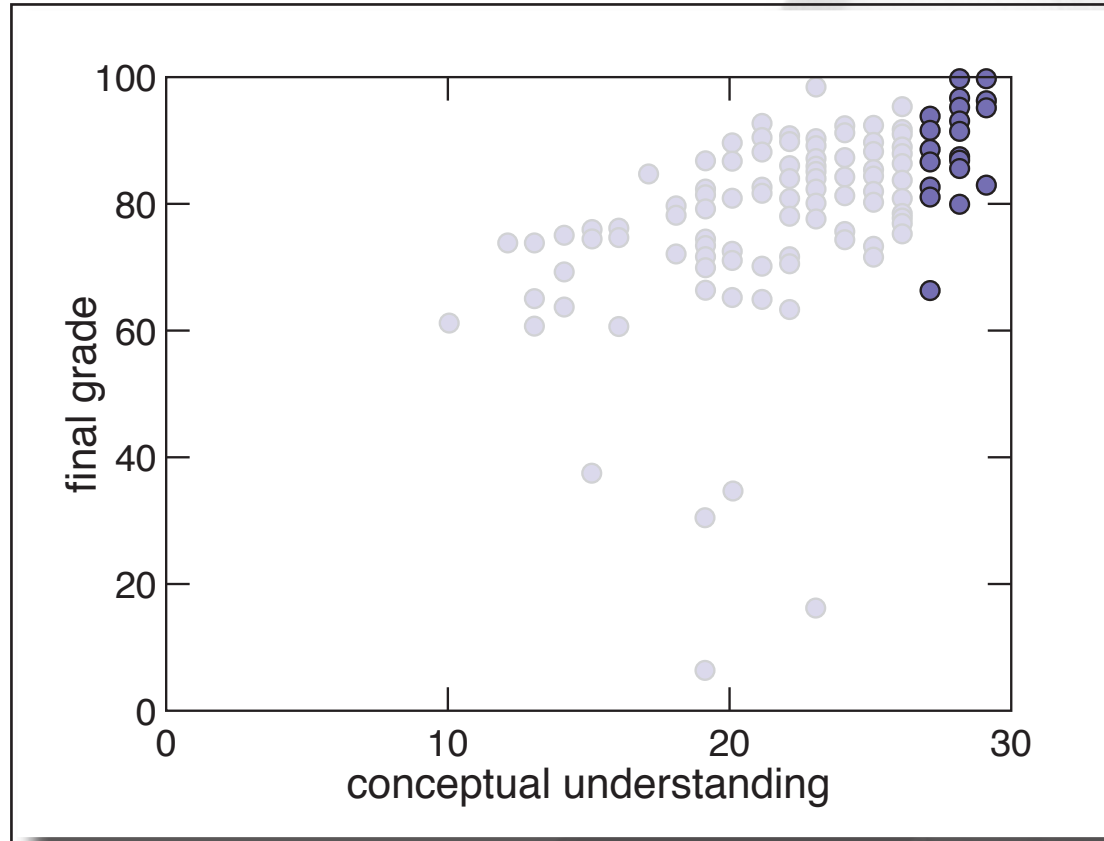


1 purposes

2 problems

3 improvements

# top performers, broad grade distribution

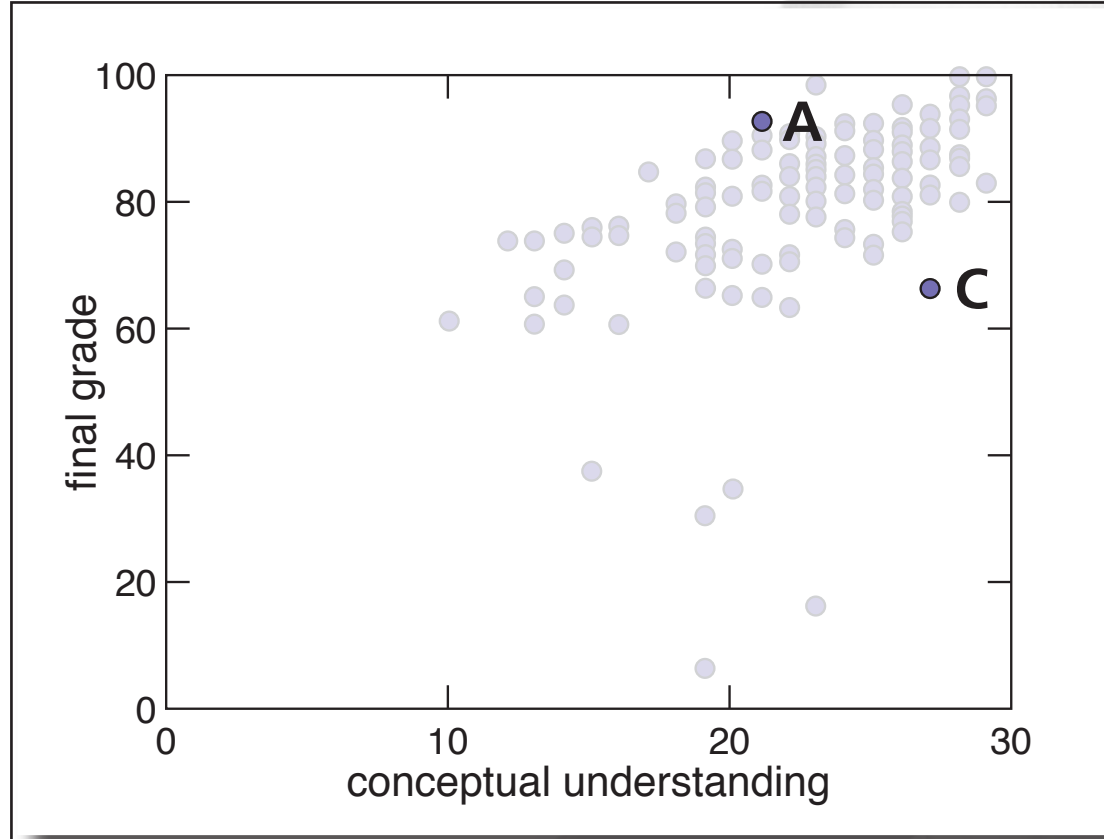


① purposes

② problems

③ improvements

# objectivity or injustice?



① purposes

② problems

③ improvements



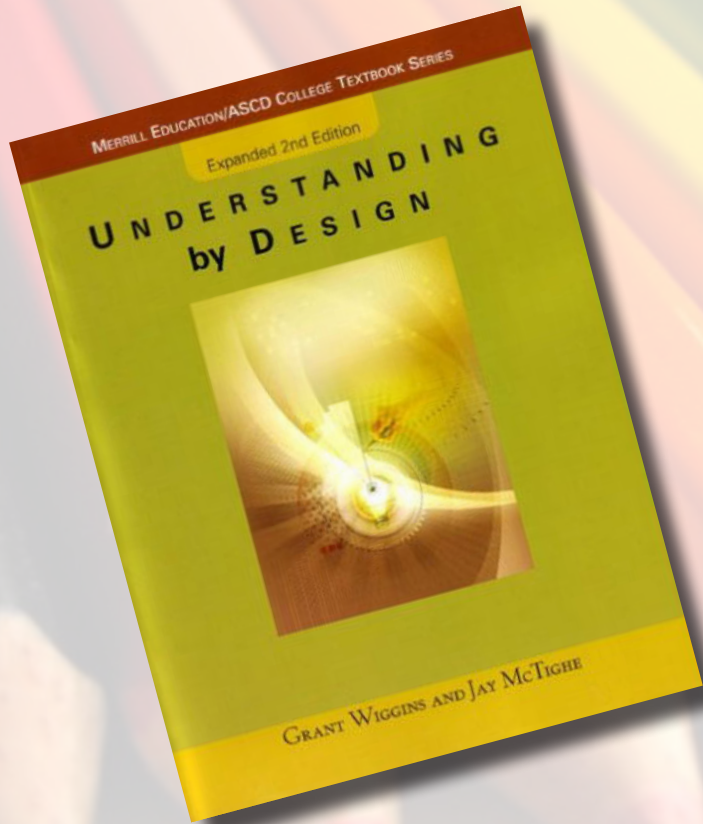


**focus on skills, not content**

**1** purposes

**2** problems

**3** improvements



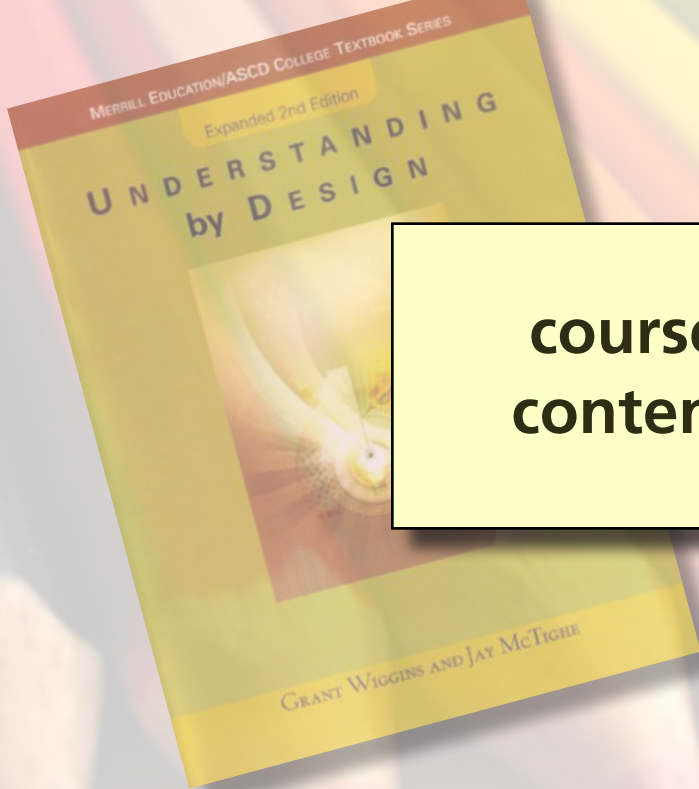
Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)

**1** purposes

**2** problems

**3** improvements

# Traditional approach to course planning



**course  
content**

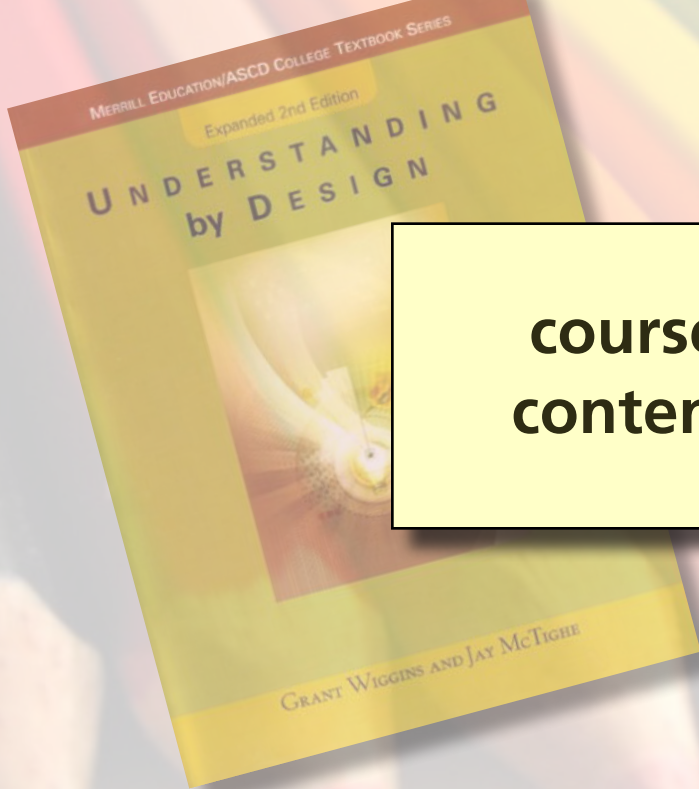
**1** purposes

**2** problems

**3** improvements



# Traditional approach to course planning



**course  
content**



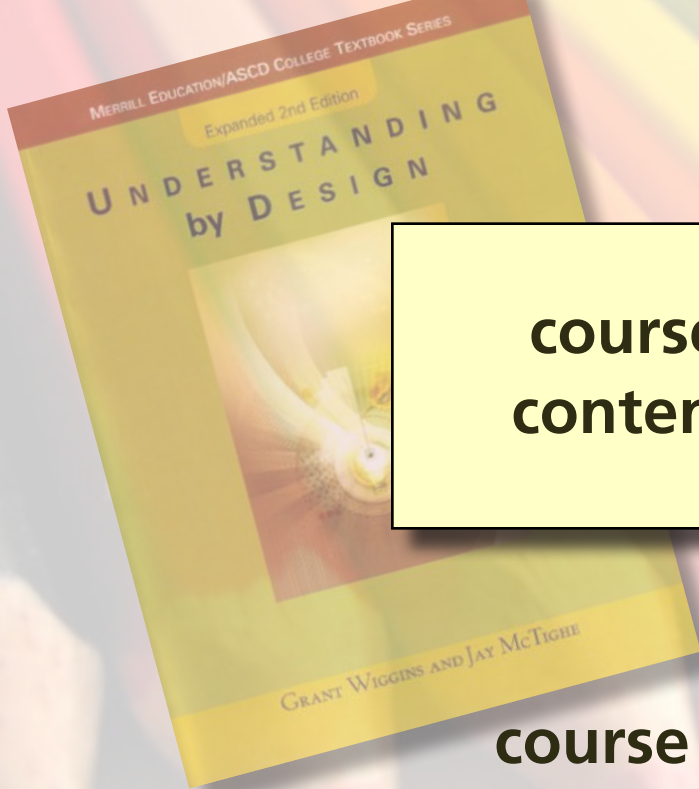
**assessment**

**1** purposes

**2** problems

**3** improvements

# Traditional approach to course planning



**course  
content**



**assessment**

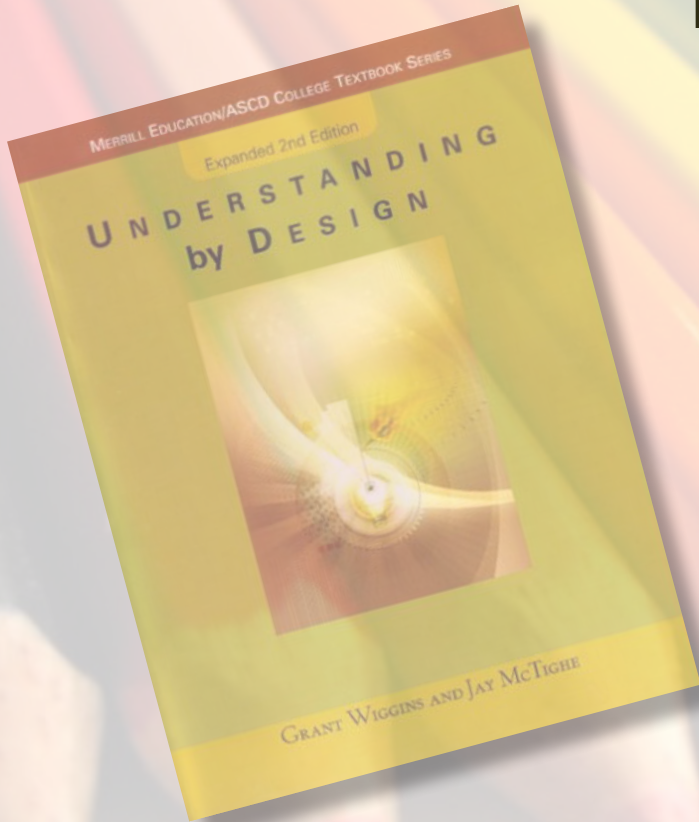
**course determined by content**

**1 purposes**

**2 problems**

**3 improvements**

# Backward design



**desired  
outcomes**

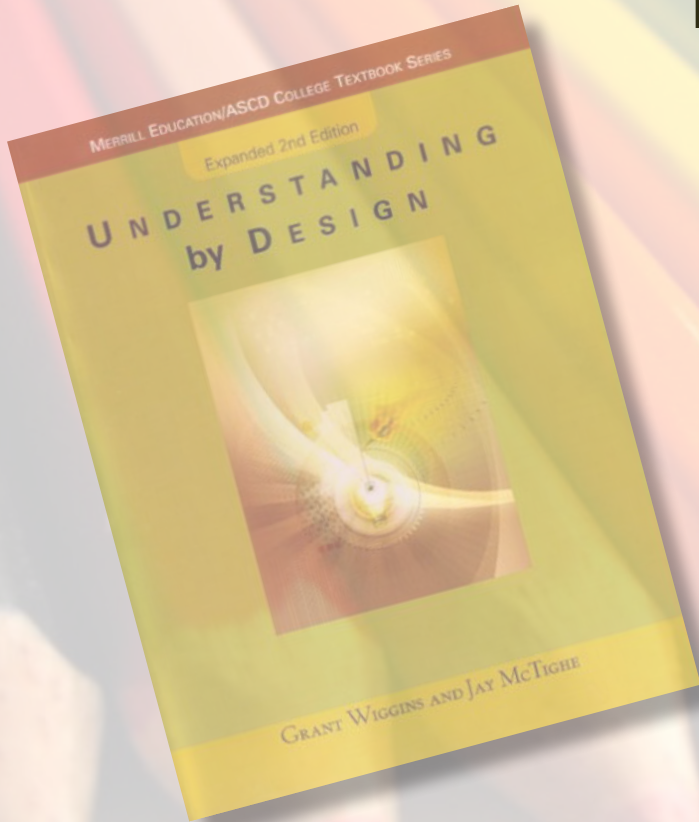
**1** purposes

**2** problems

**3** improvements



# Backward design



**acceptable  
evidence**



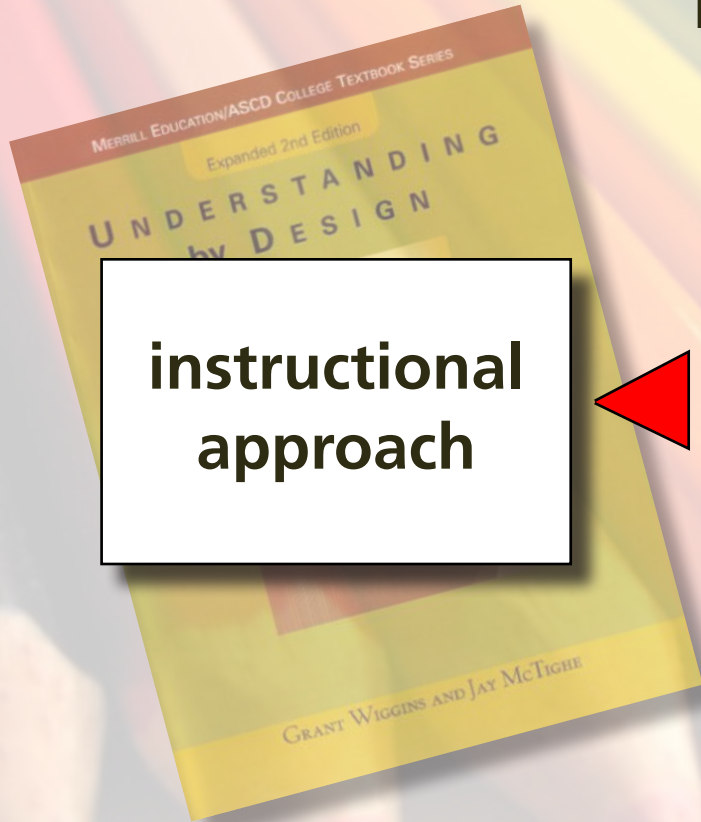
**desired  
outcomes**

**1 purposes**

**2 problems**

**3 improvements**

# Backward design



**instructional  
approach**



**acceptable  
evidence**



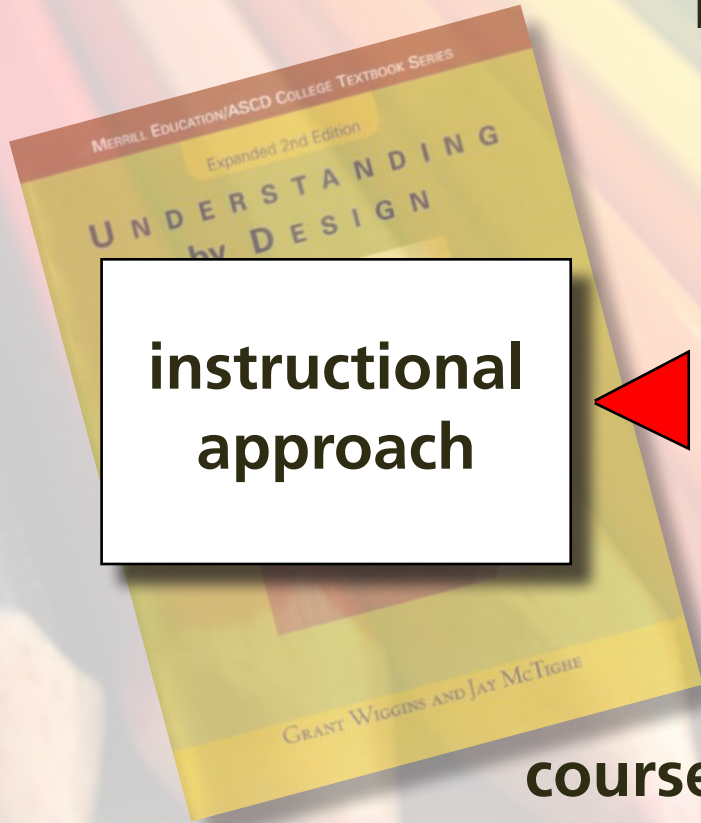
**desired  
outcomes**

**1 purposes**

**2 problems**

**3 improvements**

# Backward design



**instructional  
approach**



**acceptable  
evidence**



**desired  
outcomes**

**course defined by outcomes**

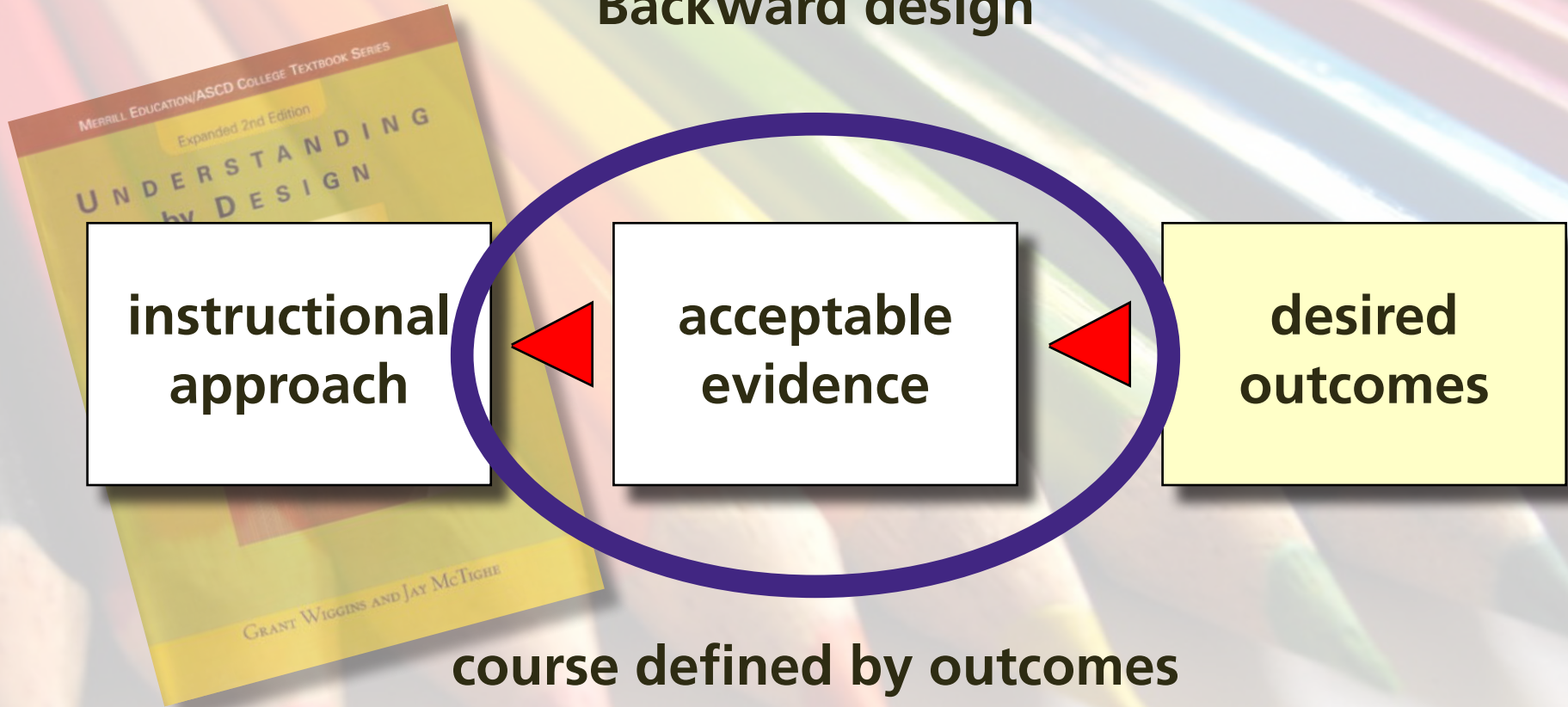
**1 purposes**

**2 problems**

**3 improvements**



# Backward design



1 purposes

2 problems

3 improvements



**resolve coach/judge conflict**

**1 purposes**

**2 problems**

**3 improvements**

**use external evaluators**

**1** purposes

**2** problems

**3** improvements



# peer- and self-assessment

1 purposes

2 problems

3 improvements

# Calibrated Peer Review

[cpr.molsci.ucla.edu](http://cpr.molsci.ucla.edu)

1 purposes

2 problems

3 improvements







A large, empty classroom with rows of desks and chairs, overlaid with the text "rethink assessment". The classroom is filled with rows of light-colored wooden desks and black chairs, arranged in a grid pattern. The floor is a light blue color with yellow and red lines marking the aisles. The walls are a light beige color, and there are several doors visible in the background. The text "rethink assessment" is written in a large, bold, black font with a blue outline, centered over the image.

**rethink  
assessment**





**mazur.harvard.edu**

**Follow me!**



**eric\_mazur**