

Assessment: The silent killer of learning



Universiteit Twente
Enschede, Netherlands, 25 November 2015



Assessment: The silent killer of learning



@eric_mazur

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kosten

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

krank

1. die Krankheit, —, —en

cow

377

magnificent
glorious

1. magnificent
2. master

430

das Kind, —(e)s, —er

1. kindisch
2. kindlich

der Kellner, —s, —en

1. der Keller, —s, —en

kennen

kannte-gekannt *irreg.*

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



kosten

1. die Kosten

2. 1. Kosten

accel.

poco rit.

think

428

kennen

kannte-gekannt

1. kennen

2. erkennen

3. bekannt

4. d.



**35 % retained
after 1 week**

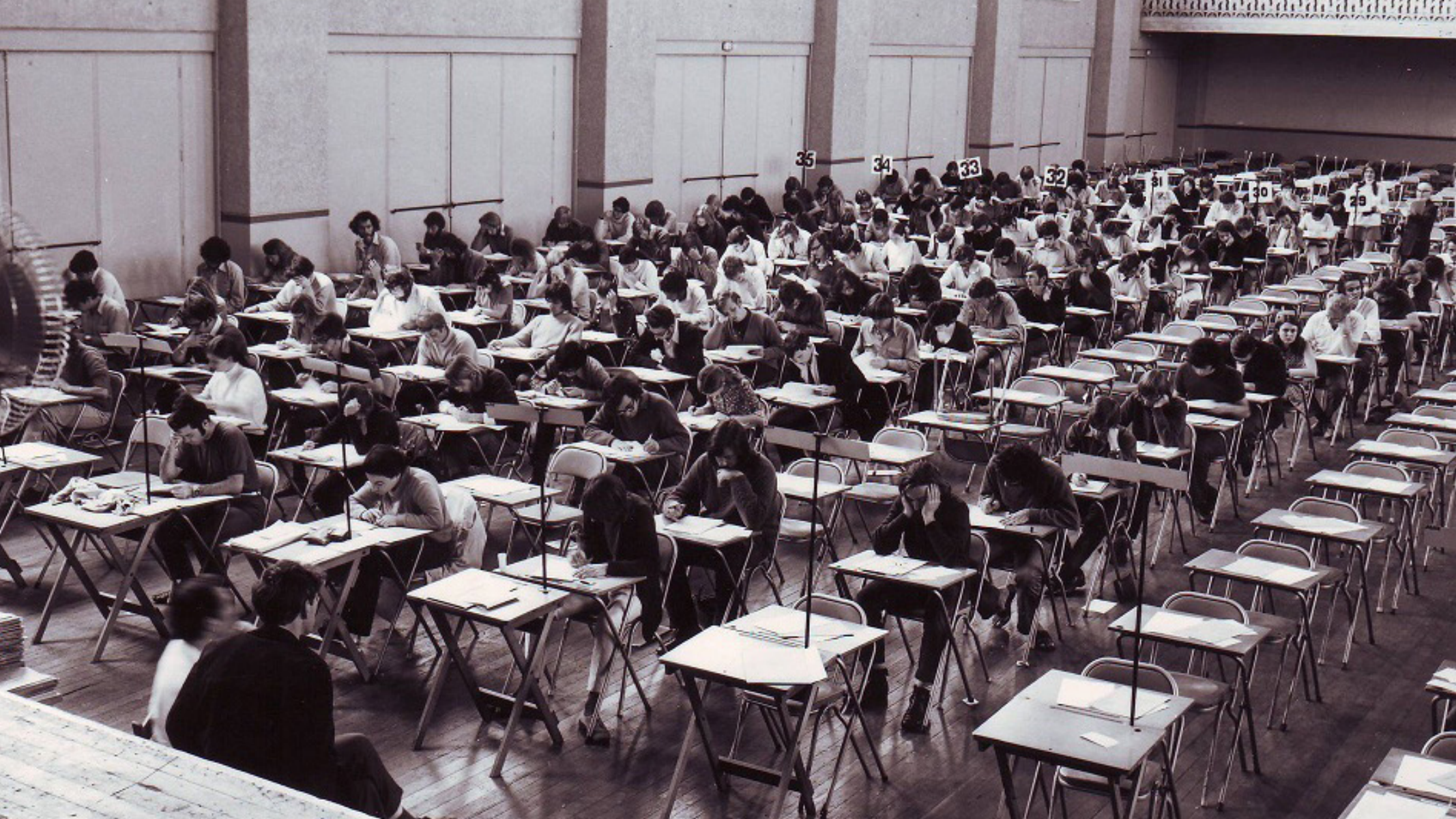
**we only guarantee
they'll pass the test**













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



1 purposes



1 purposes

2 problems



1 purposes

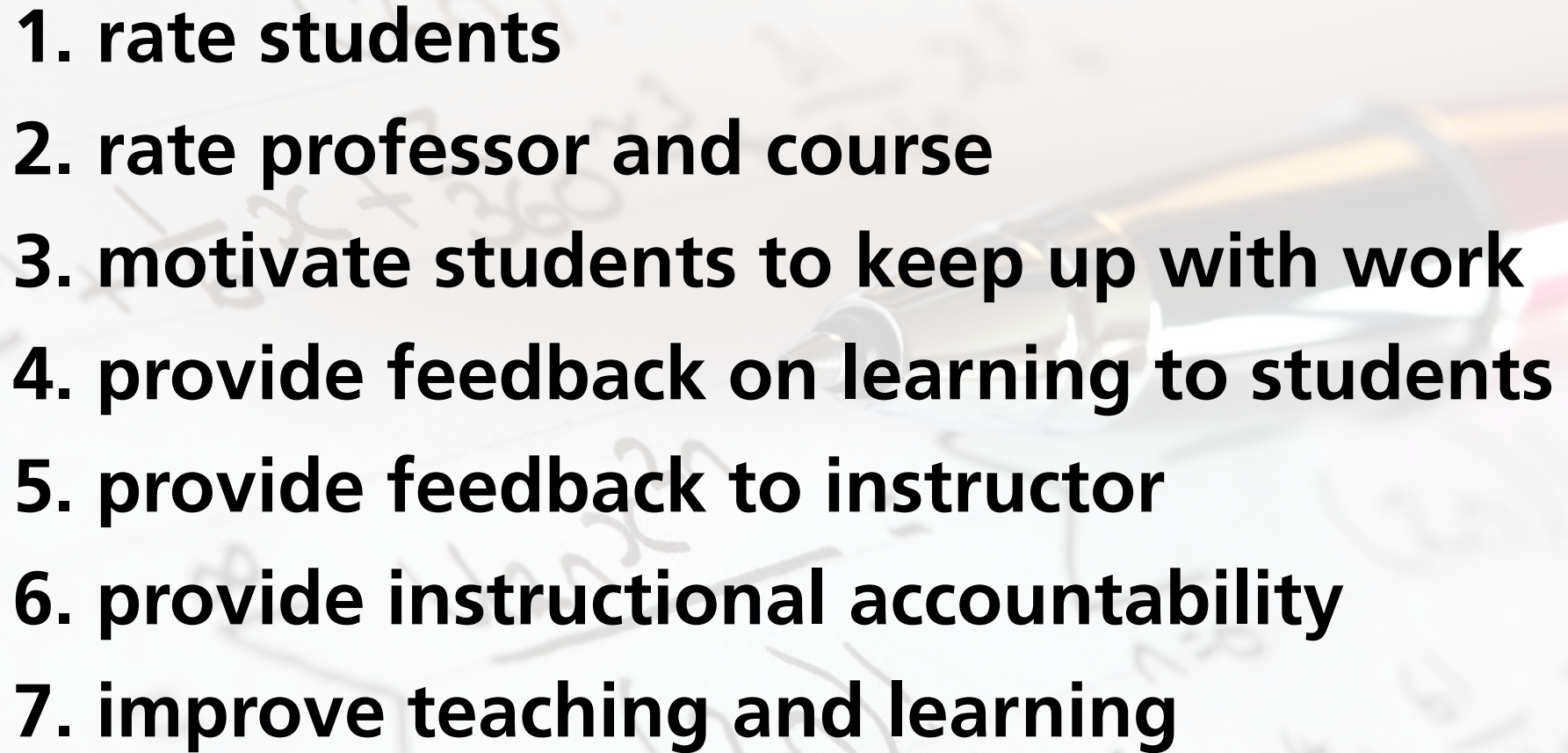
2 problems

3 improvements



**how many different purposes
of assessment can you 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



what is the meaning/definition of...?

1 purposes

2 problems



inauthentic problem solving

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

problem

procedure

answer

UNKNOWN

KNOWN

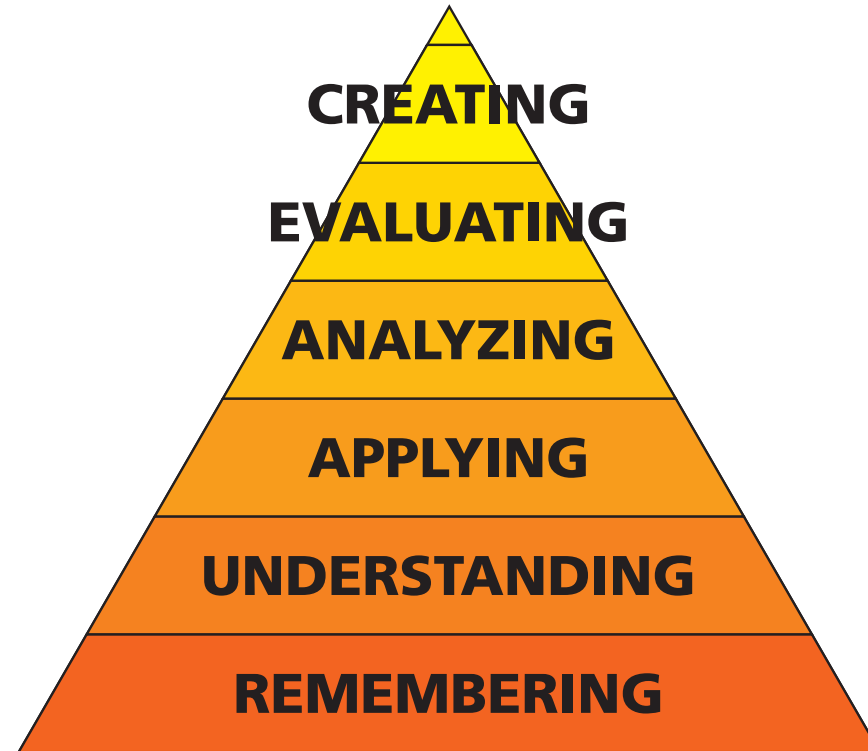
KNOWN

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

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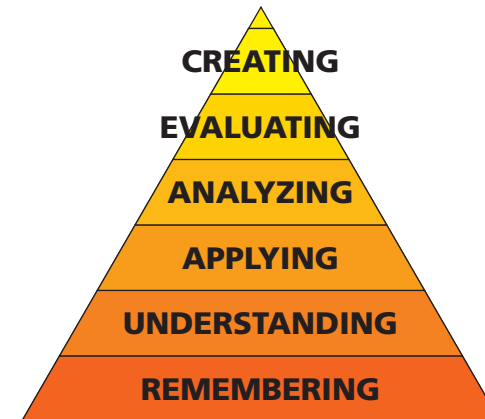
How long do you have to wait before someone frees up a space?

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.**

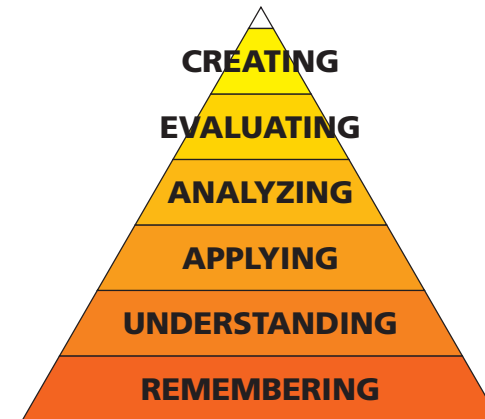
How long do you have to wait before someone frees up a space?

Requires:

Assumptions

Developing a model

Applying that model



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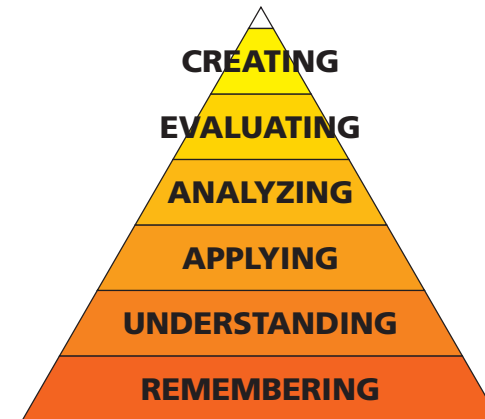
Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?

Requires:

Assumptions

Developing a model

Applying that model



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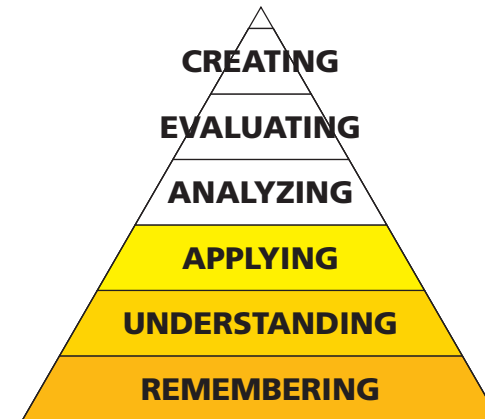
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Requires:

Assumptions

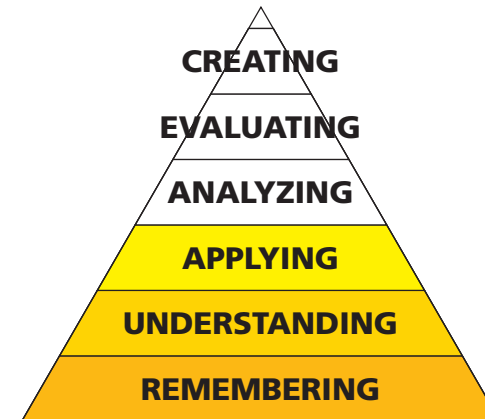
Developing a model

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.

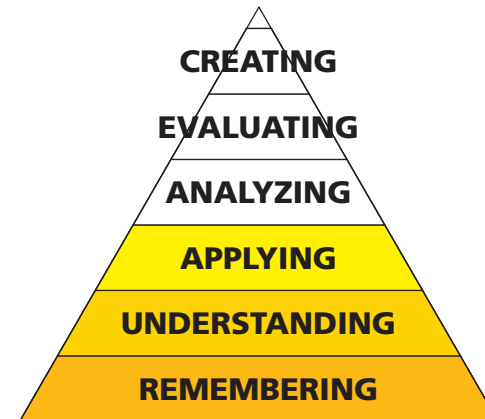
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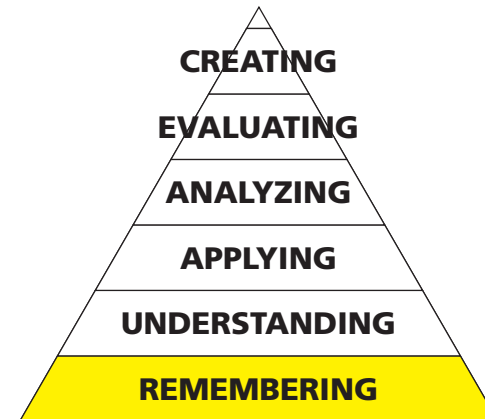
$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$



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 setting.

high-stakes examinations promote cramming

A close-up of a round analog clock face. The numbers 10, 11, 12, 1, and 2 are visible. The hands are positioned to show a time very close to 12:00, likely 11:50 or 11:55.

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)

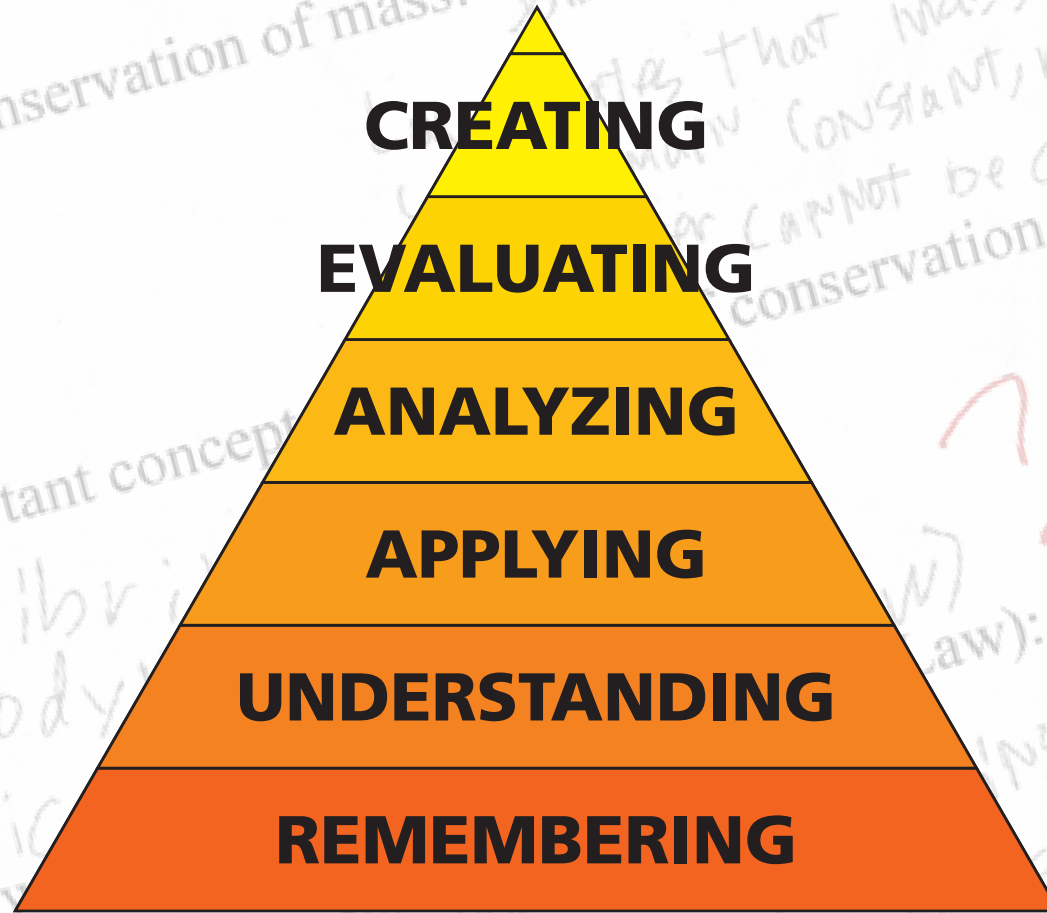
1 purposes

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

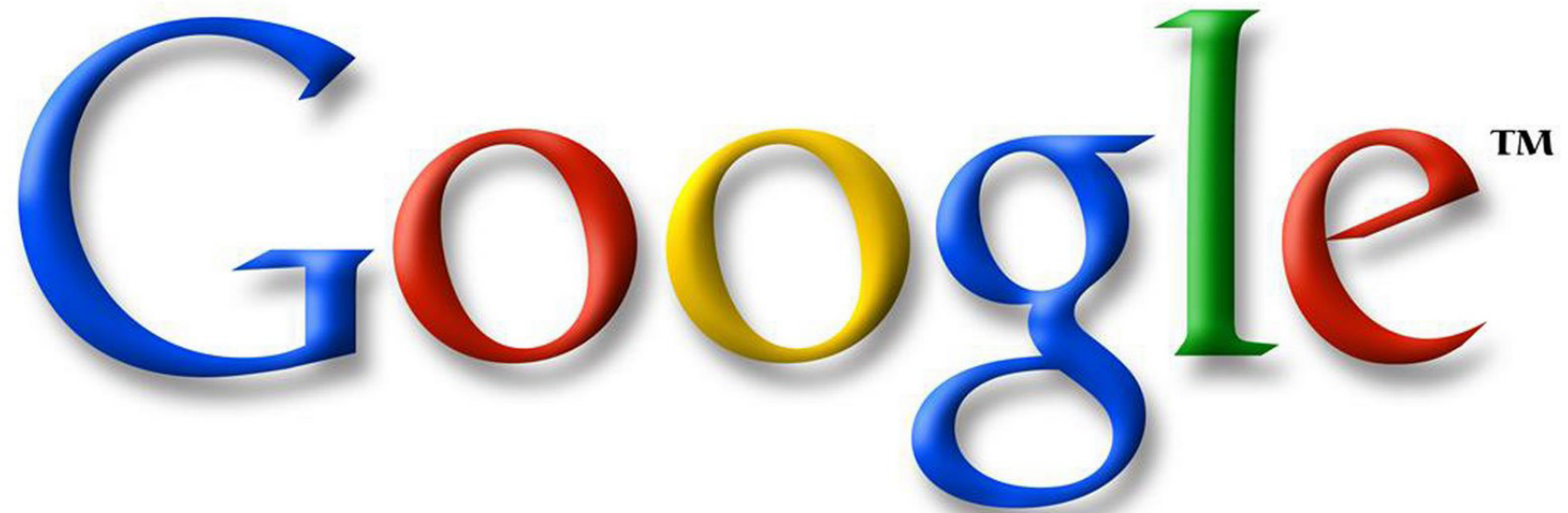


open-book exam

1 purposes

2 problems

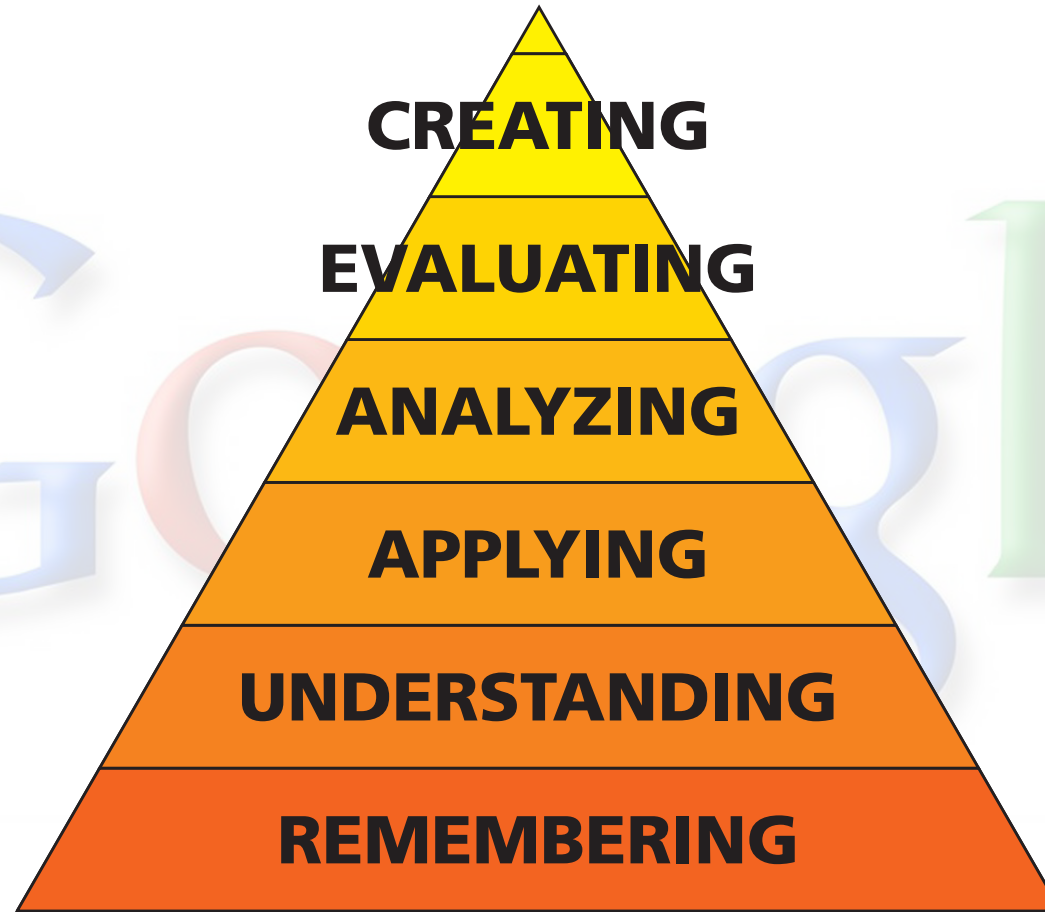
3 improvements



1 purposes

2 problems

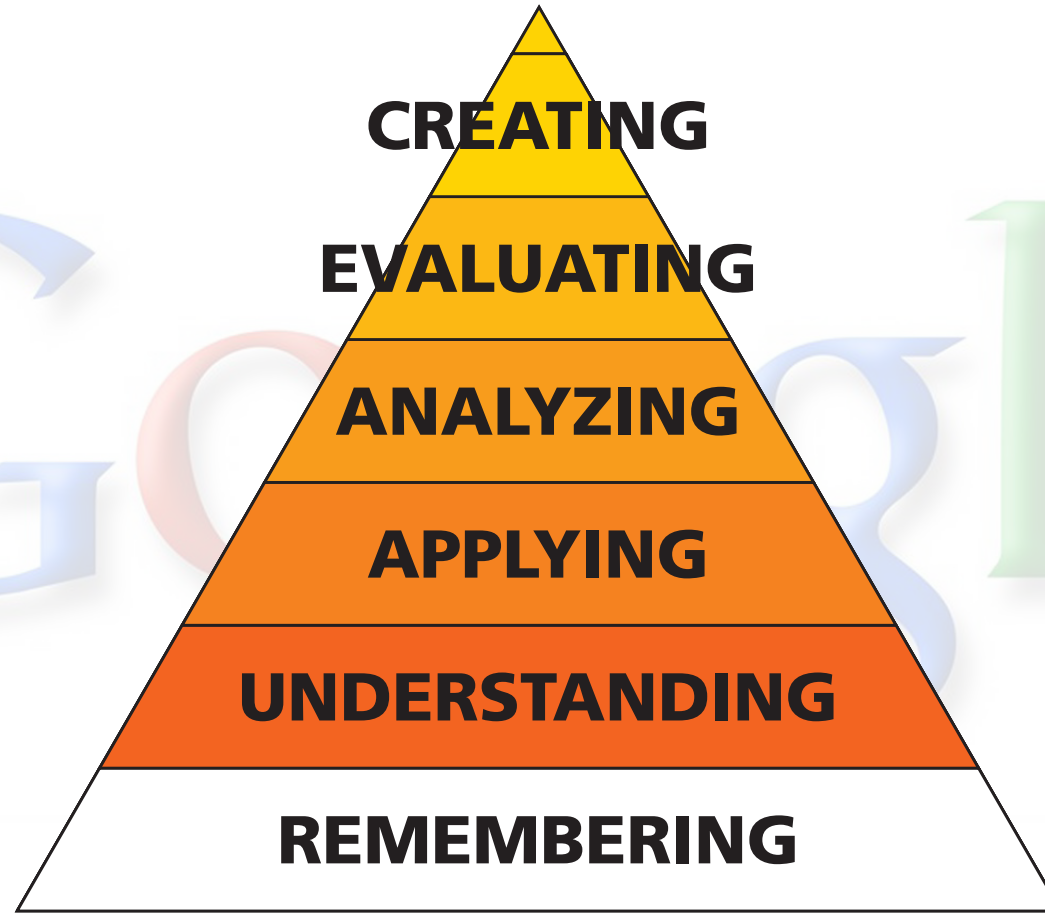
3 improvements



1 purposes

2 problems

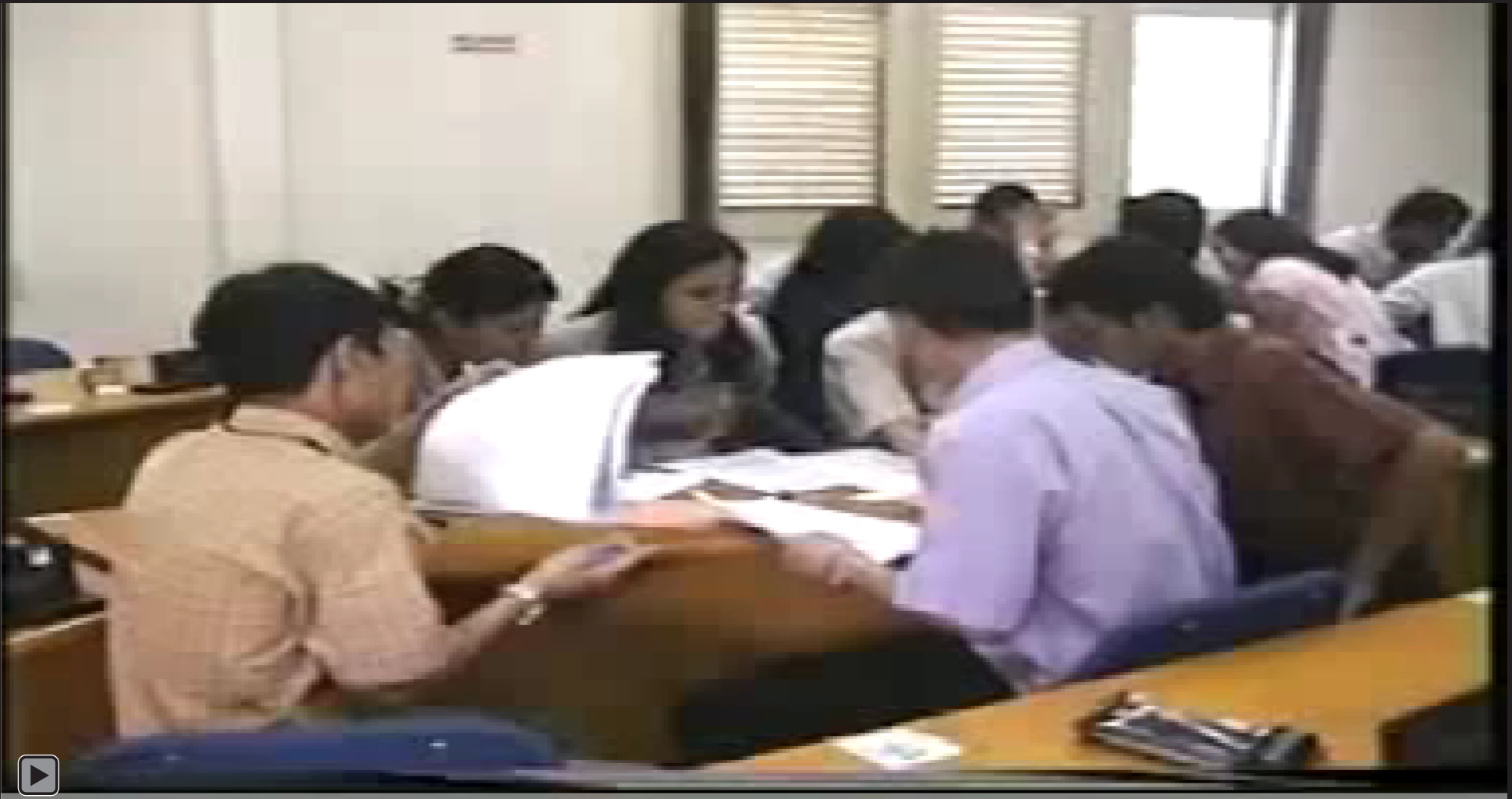
3 improvements



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 $f(x) = 3x^2 - 6x$?

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1 purposes

2 problems

3 improvements

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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



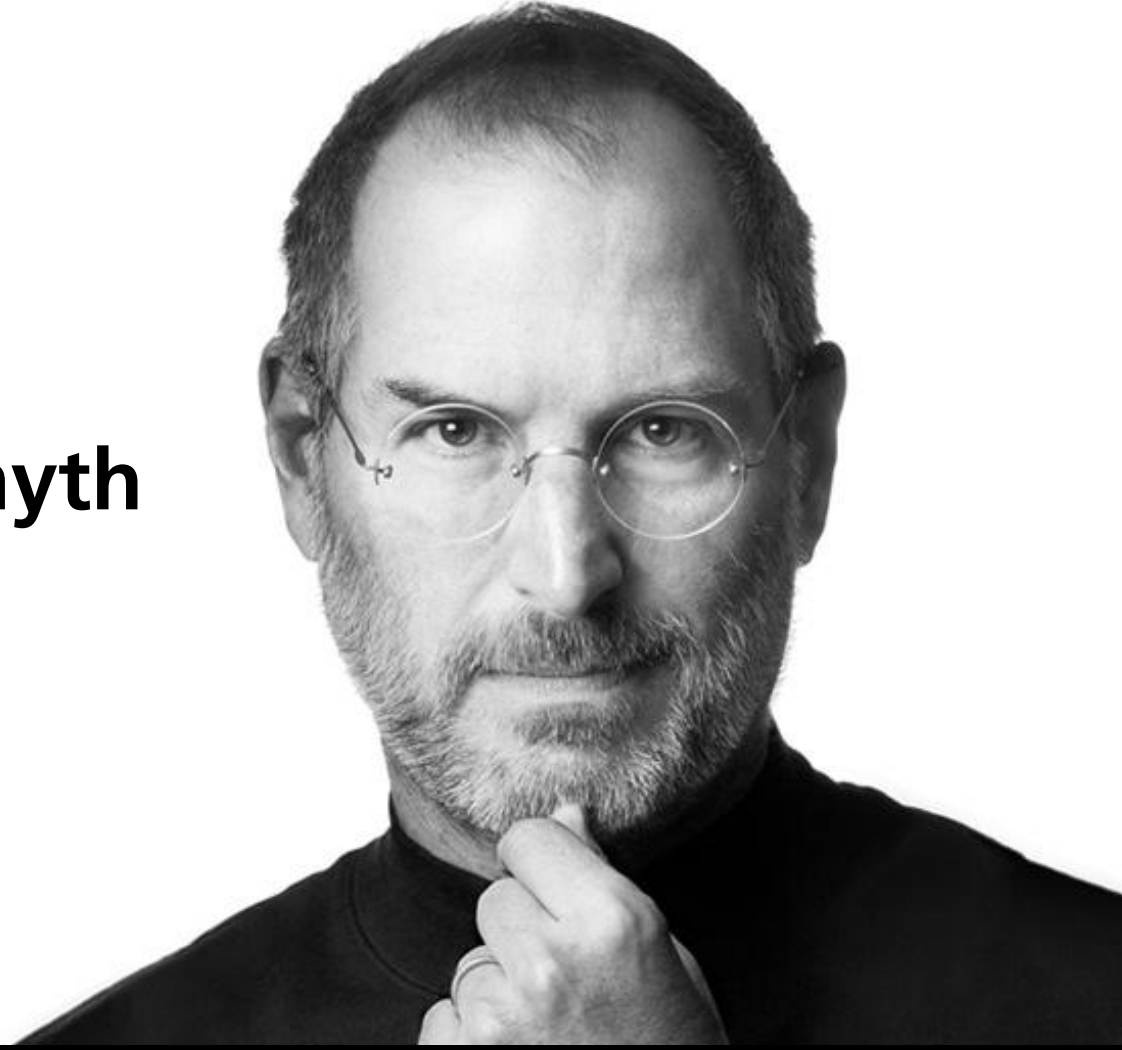
focus on feedback, not ranking

1 purposes

2 problems

3 improvements

objective ranking: a myth

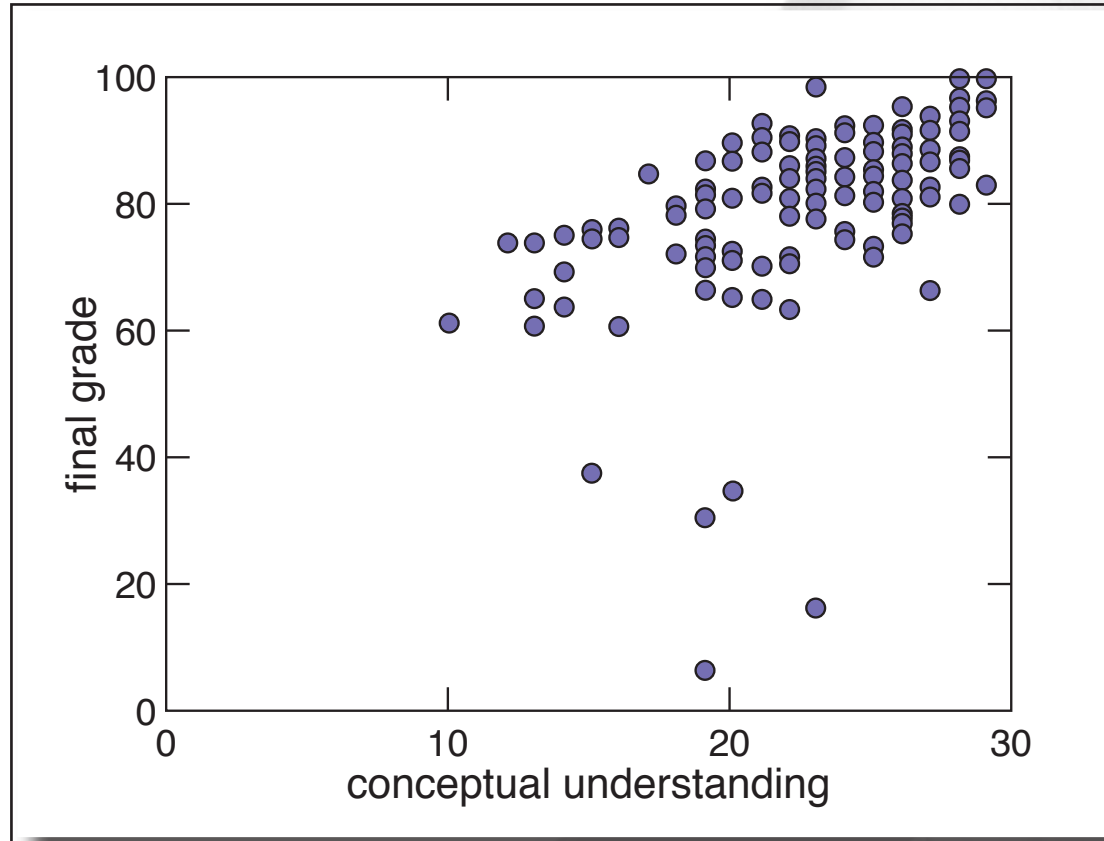


1 purposes

2 problems

3 improvements

2 metrics, 2 results

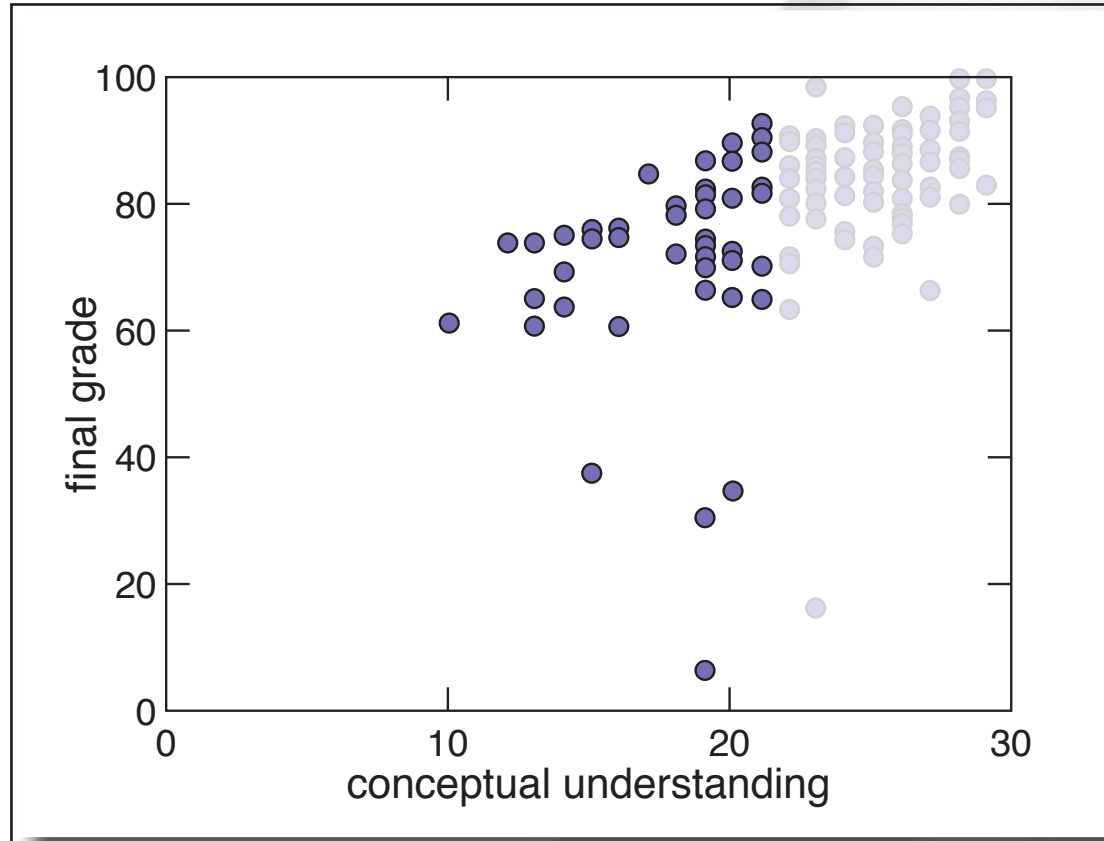


1 purposes

2 problems

3 improvements

Aristotelian thinkers

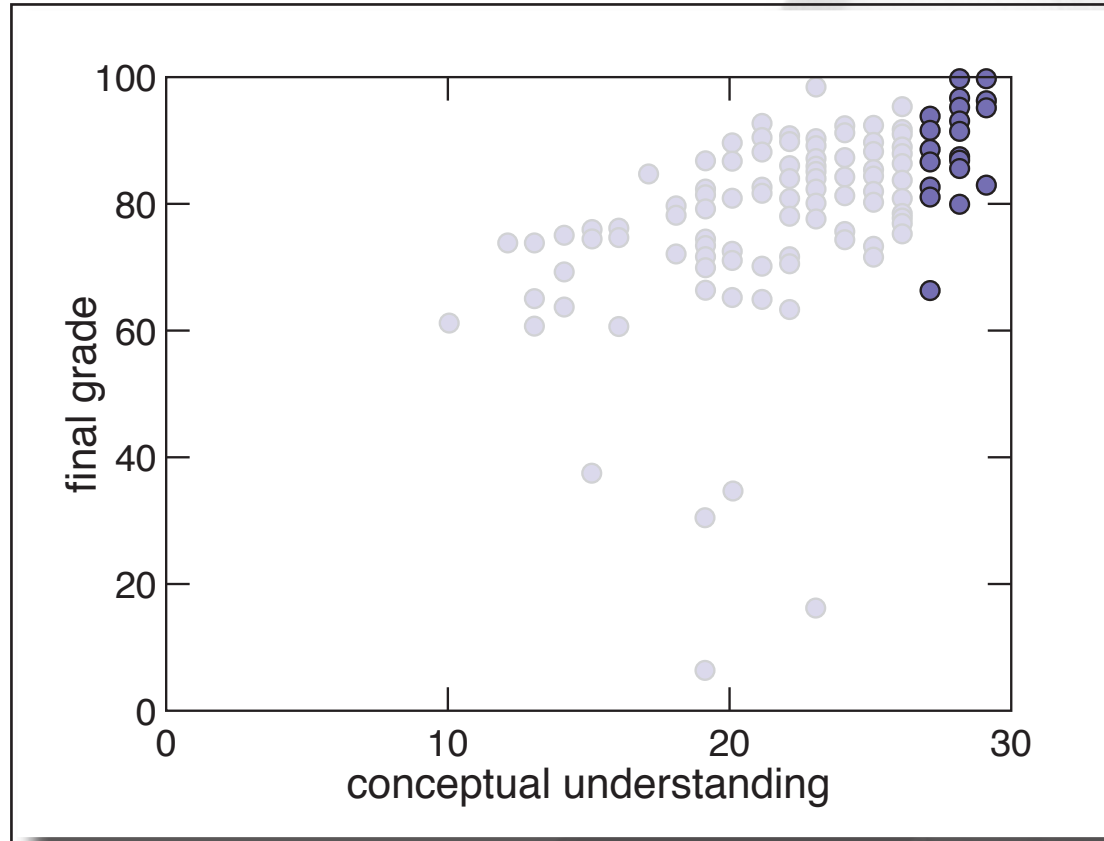


1 purposes

2 problems

3 improvements

top performers, broad grade distribution

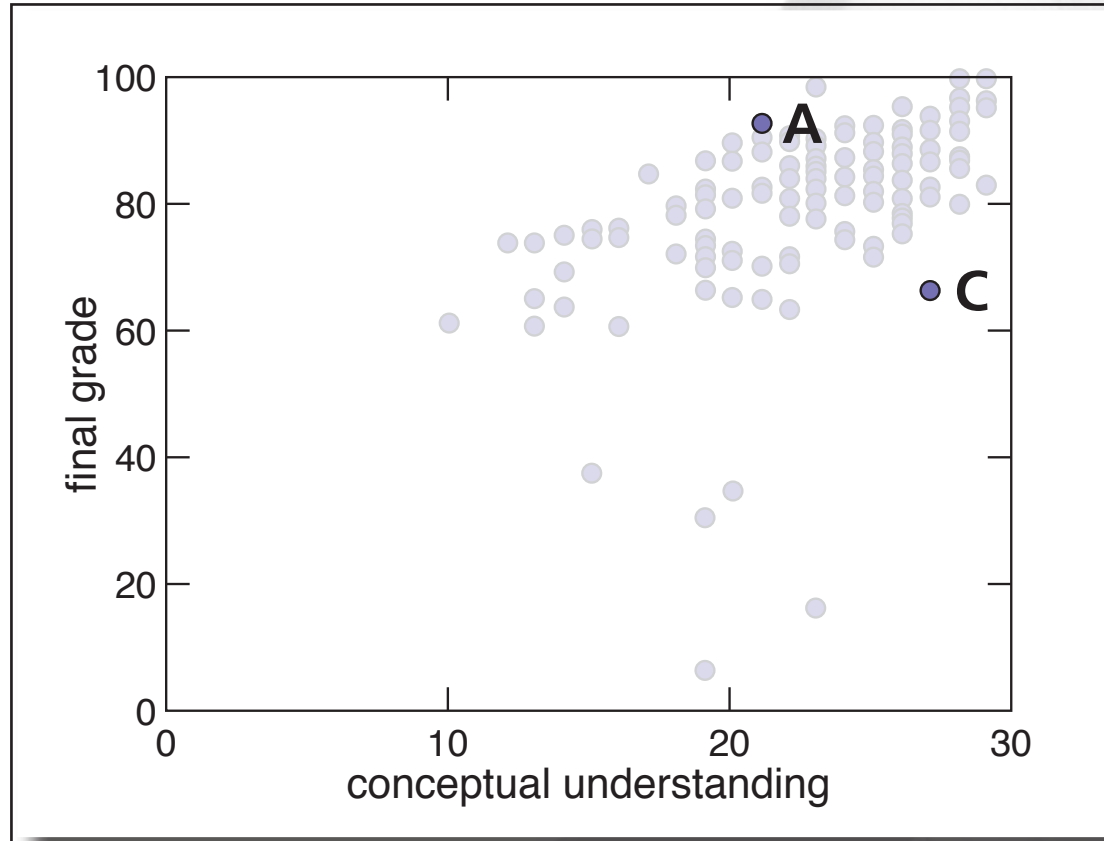


① purposes

② problems

③ improvements

objectivity or injustice?



① purposes

② problems

③ improvements

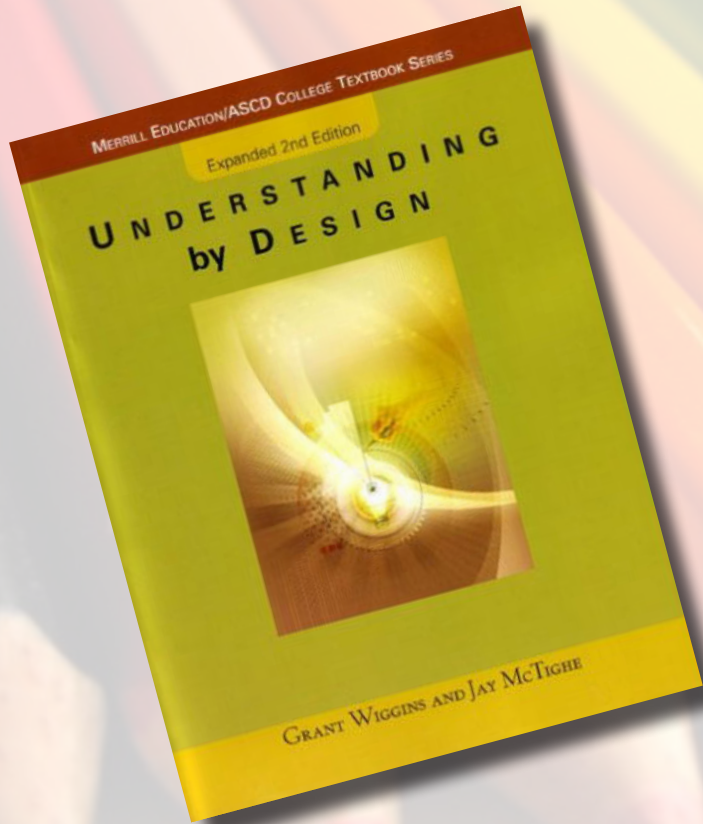


focus on skills, not content

1 purposes

2 problems

3 improvements



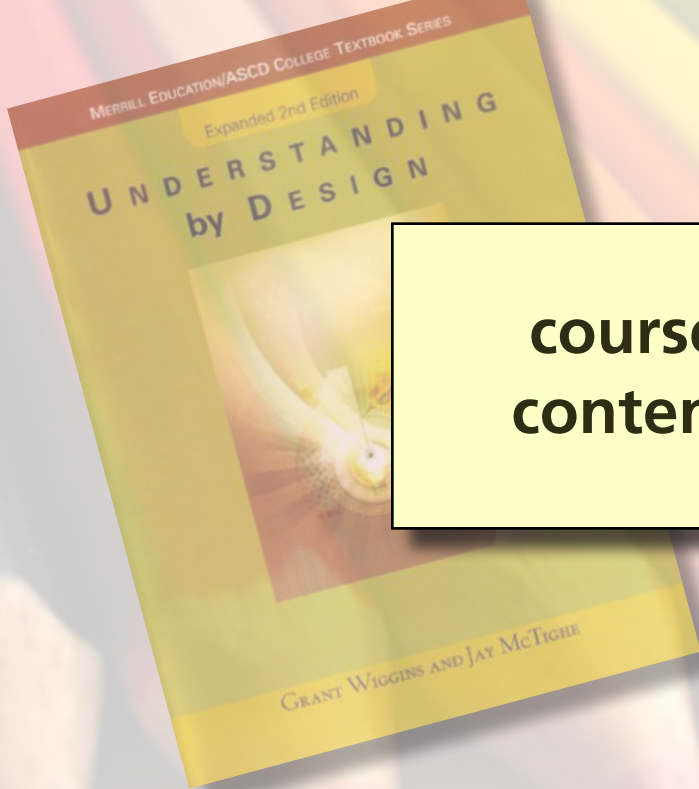
Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)

1 purposes

2 problems

3 improvements

Traditional approach to course planning



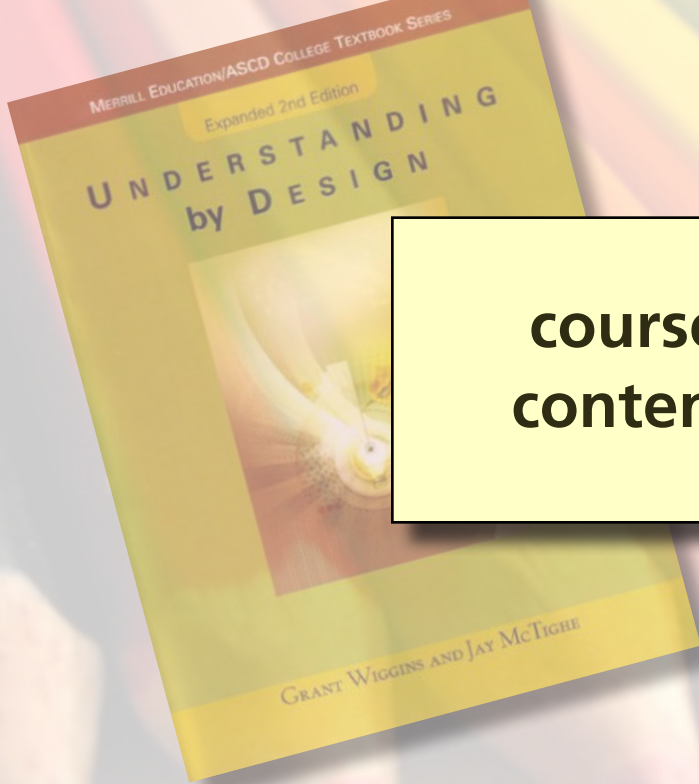
**course
content**

1 purposes

2 problems

3 improvements

Traditional approach to course planning



**course
content**



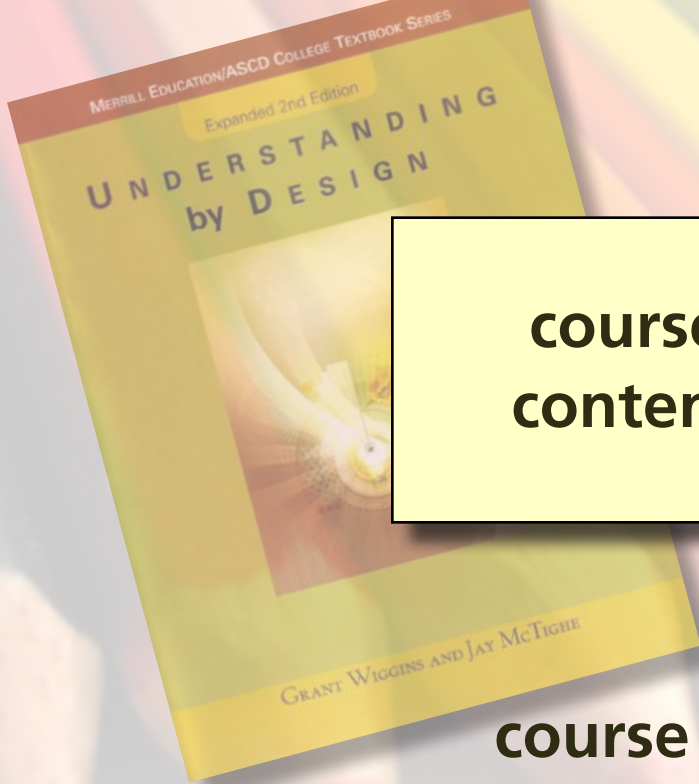
assessment

1 purposes

2 problems

3 improvements

Traditional approach to course planning



**course
content**



assessment

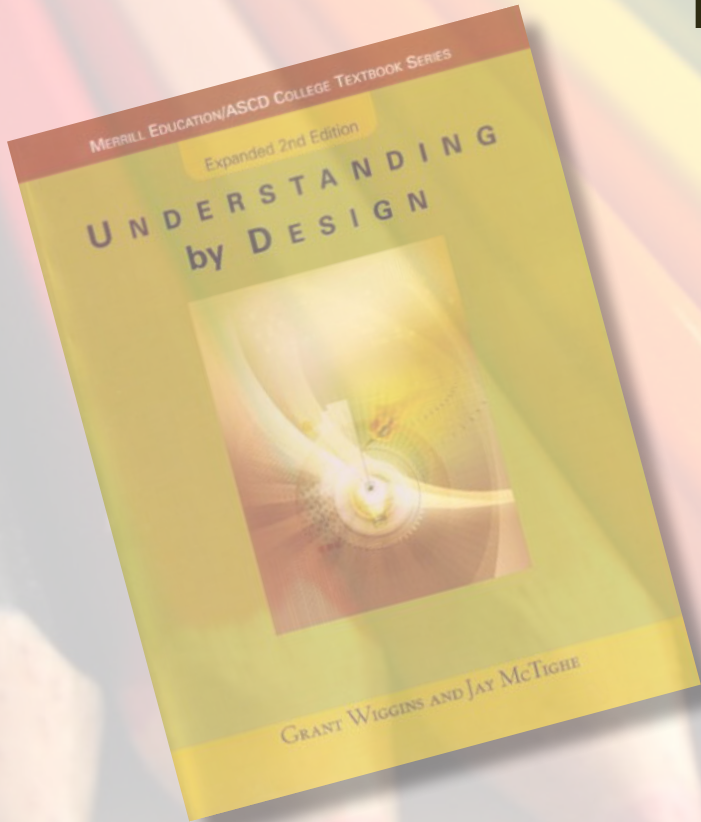
course determined by content

1 purposes

2 problems

3 improvements

Backward design



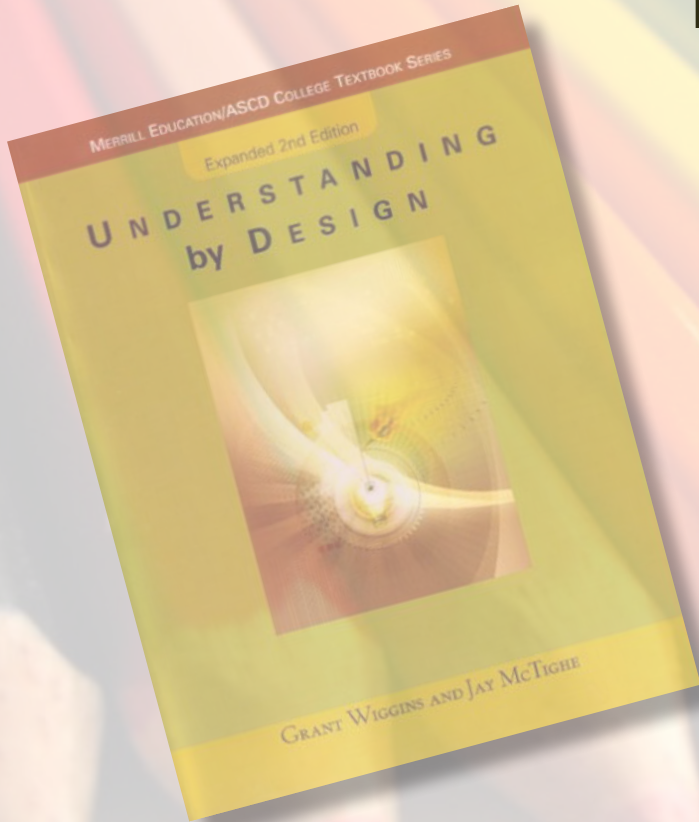
**desired
outcomes**

1 purposes

2 problems

3 improvements

Backward design



**acceptable
evidence**



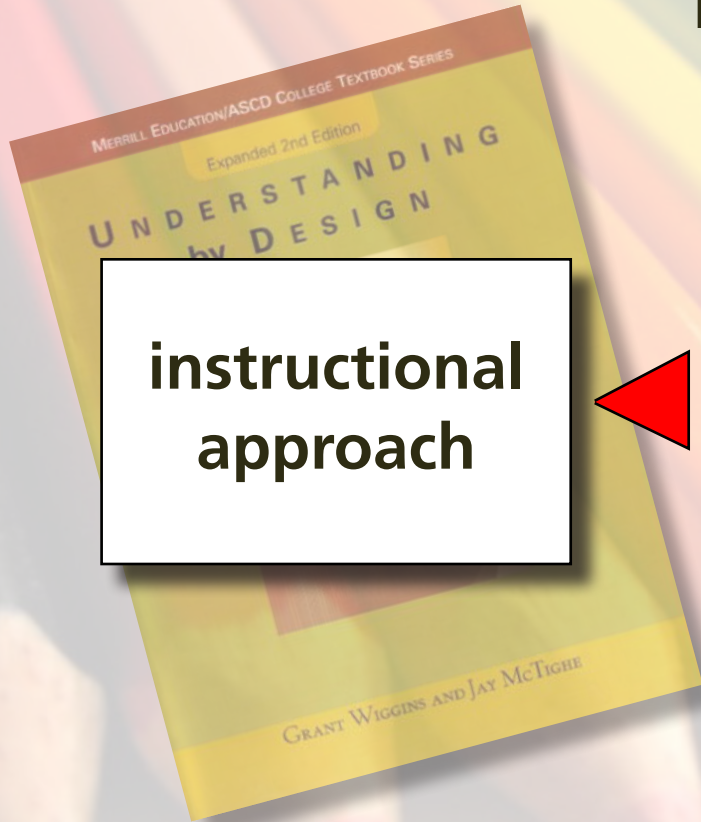
**desired
outcomes**

1 purposes

2 problems

3 improvements

Backward design



**instructional
approach**



**acceptable
evidence**



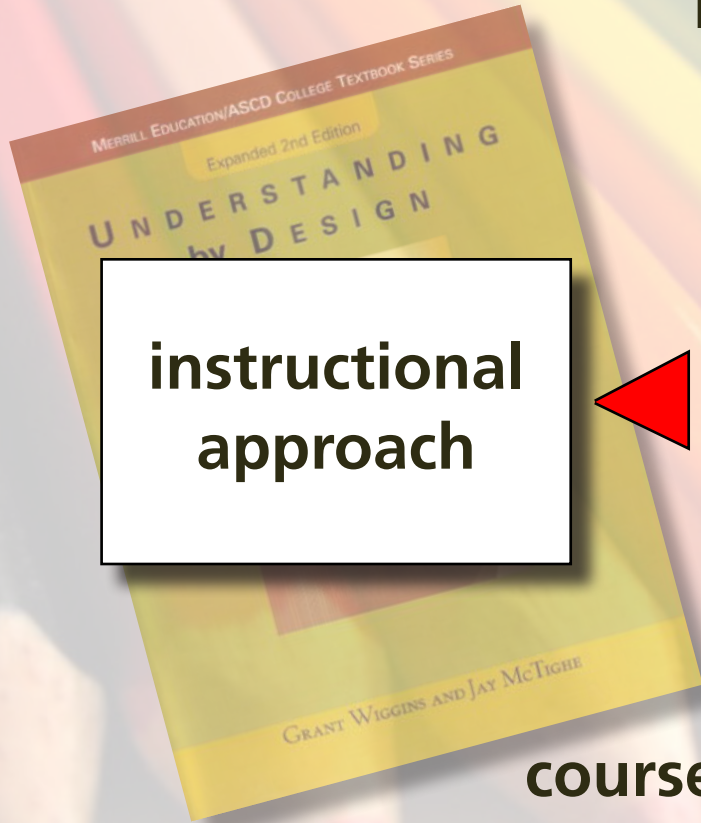
**desired
outcomes**

1 purposes

2 problems

3 improvements

Backward design



**instructional
approach**



**acceptable
evidence**



**desired
outcomes**

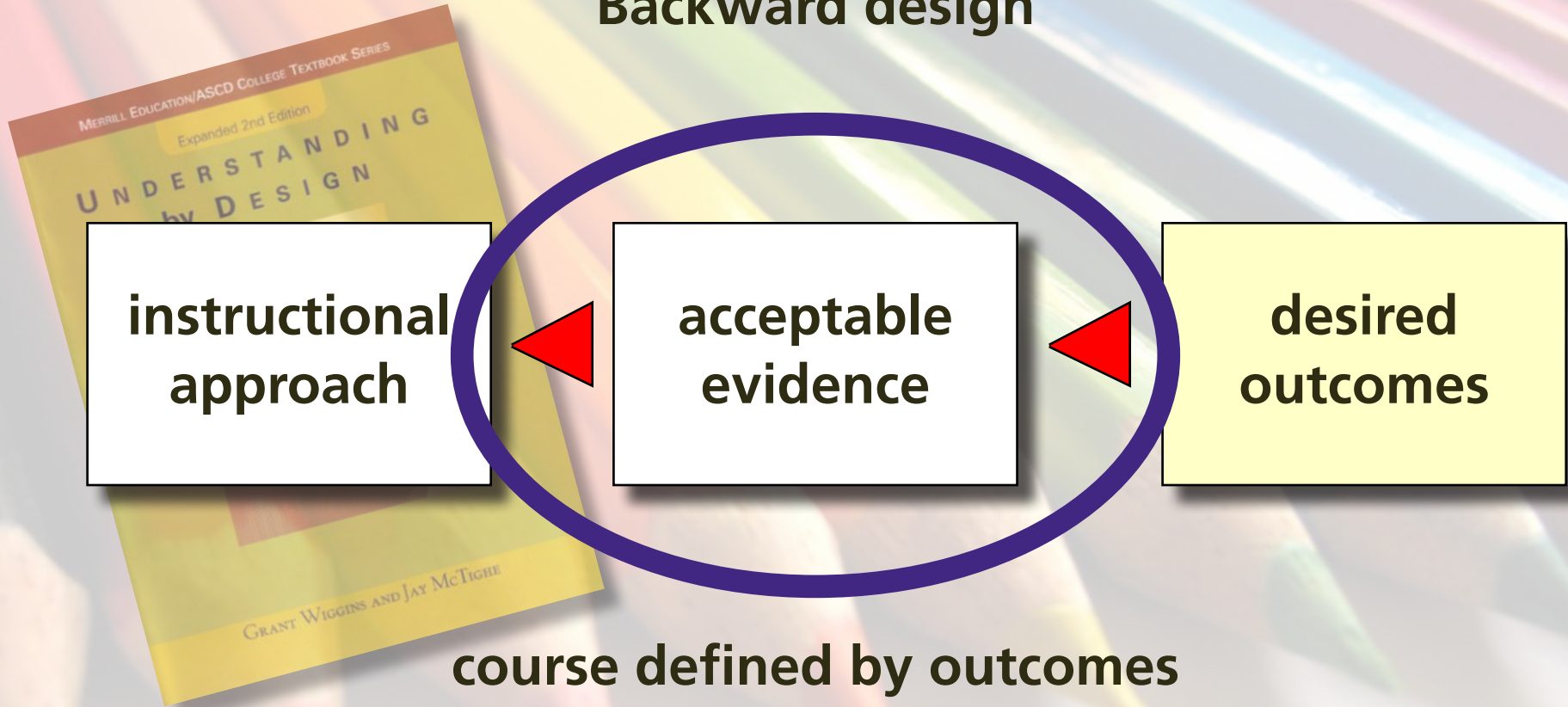
course defined by outcomes

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

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1 purposes

2 problems

3 improvements

Step 1: assignment & rubric

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1 purposes

2 problems

3 improvements

the three important concepts

Rubric for Calibrated Peer Review

Structure

Title

Opening

Paragraph length

Organization

Closing

WRITING RUBRIC

1 = needs improvement
does not meet expectations entirely

2 = satisfactory
meets expectations
(what you should aim for)

3 = admirable
exceeds expectations
(rarely selected)

Wordy, long, unimaginative, or inappropriate title

Missing a "hook" or a lead in the first paragraphs AND does not orient reader to subject

Many paragraphs are long (6 or more sentences)

Lacks organization, no logical headings, no transitions between paragraphs

Does not end compellingly or with an important idea AND does not tie back to opening

Contains incorrect, misstated, irrelevant, or unnecessary facts

Does not back up facts with proper, convincing, or interesting sources or evidence

Mostly predictable based on available information

Basic title

Hook or lead present OR first few paragraphs orient reader to subject

Some paragraphs are long (6 or more sentences), most are short (1-5 sentences)

A few headings OR most paragraphs linked by transitions

Summary-like closing, but does not tie back to title or opening hook

All facts are 100% correct, relevant, and necessary

Most, but not all, facts backed up with proper, convincing, or interesting sources or evidence

Some originality apparent

Material appropriate and aimed at target audience AND mostly avoids scientific jargon, colloquialisms or acronyms

Catchy title drawing audience into article

Compelling audience appropriate hook or lead present AND first few paragraphs orient lay reader to subject

All paragraphs are short (1-5 sentences)

Headings structure paper in organized, logical way AND paragraphs linked by transitions

Ends compellingly with an important idea or thought provoking question AND ties back to title and opening hook

Includes fact-checked expert and/or lay testimony (newspaper article only)

Original presentation of material; uses the unexpected to capture attention

Material appropriate and aimed at target audience AND relates to practical/everyday concerns AND uses analogies or other techniques to relate unfamiliar content to familiar concepts; no jargon, colloquialisms, or acronyms

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1 purposes

2 problems

3 improvements

Step 2: upload

Step 3: review

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1 purposes

2 problems

3 improvements

MEDIUM



HIGH

LOW

...t new addition to night sky
...ires fear and awe – Mona Lisa
...one has noticed
...ur sky

By now everyone has noticed the unmistakable new addition to our sky, which outshines the brightest star at night and continues to shine alongside the sun during the day. None of us have seen such a sight in the course of our lives and for many it has served as a jarring reminder of the violent and powerful cosmic events that occur in what often appears to be a calm and constant sky and glaring addition that many fears is in

The New York Times

January 20, 2009

OBSERVATORY

OBSERVATORY

Spectacular Supernova Observed

By John Glenn

New York, N.Y. — People around the world witnessed the supernova, named 1987A, in recorded history this morning. The supernova, named 1987A, appeared as bright as the full moon. At Eastern Time, appearing as bright as the full moon. At continued to shine for several hours.

Traffic was interrupted in New York City, as early-risers were drawn to the amazing sight. As of press time, the Associated Press reported that the plane was still on the ground.

Galileo
20 January 2008

Yesterday at about 4 p.m., I observed a peculiar object appear in the sky. A glowing flash emitted a few seconds, accompanied its appearance. The object disappeared even in broad daylight. How did this unprecendented event and its consequences for Earth? In order to understand the consequences of this event, we have to look at the life cycle of stars and how they evolve. To fully appreciate it and not be alarmed by it, we must understand the life cycle of stars and how they evolve. (Pluto, etc.)

1

1 purposes

2

2 problems

3

3 improvements

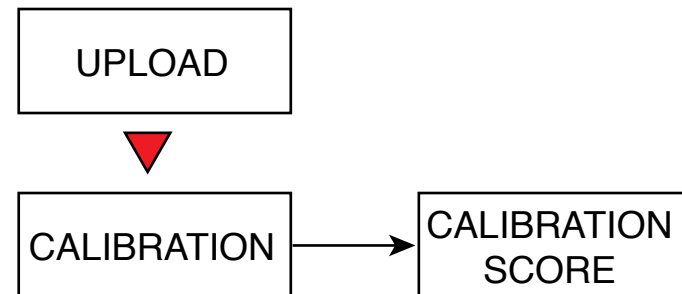
st the three important concepts

Equilibrium
Thermodynamics
Kinetics (both)

Describe the Law of definite proportions

A chemical compound
Same proportion
Unrelated, I saw
chemical reaction do

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1 purposes

2 problems

3 improvements

st the three important concepts

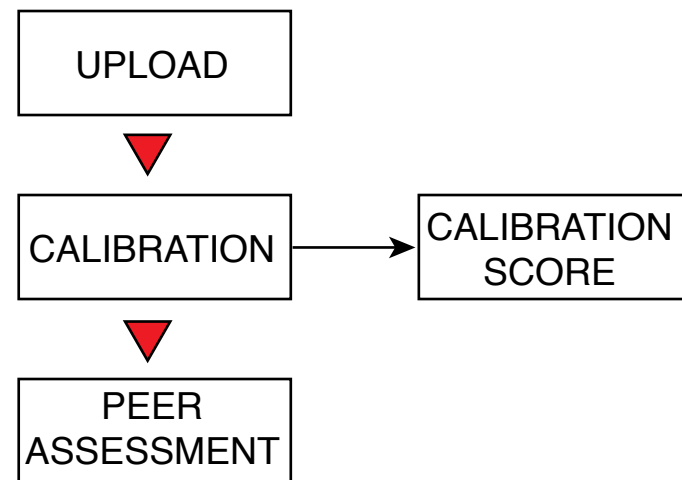
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Unrelated, I saw
A chemical reaction does

5 pts) A chemical reaction does

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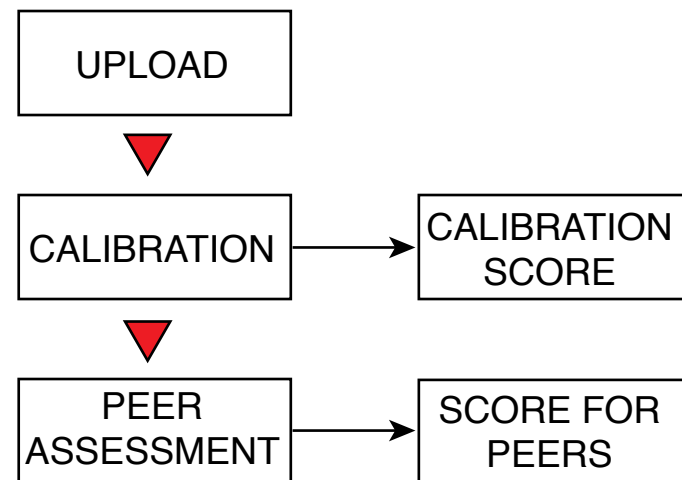
1 purposes

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1 purposes

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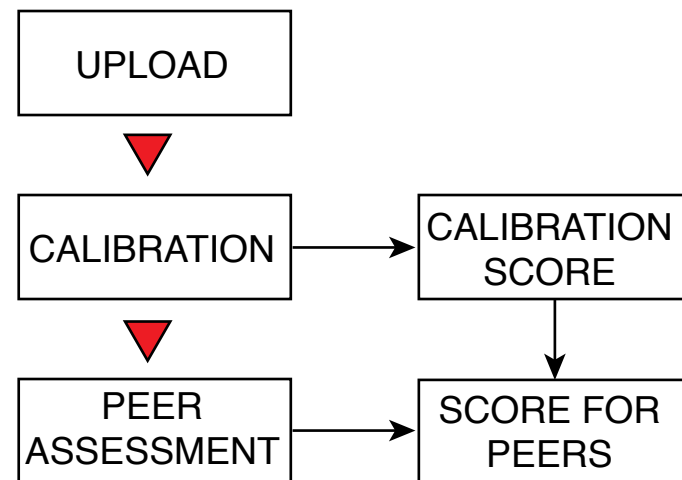
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Thermodynamics
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Describe the Law of definite proportions

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1 purposes

2 problems

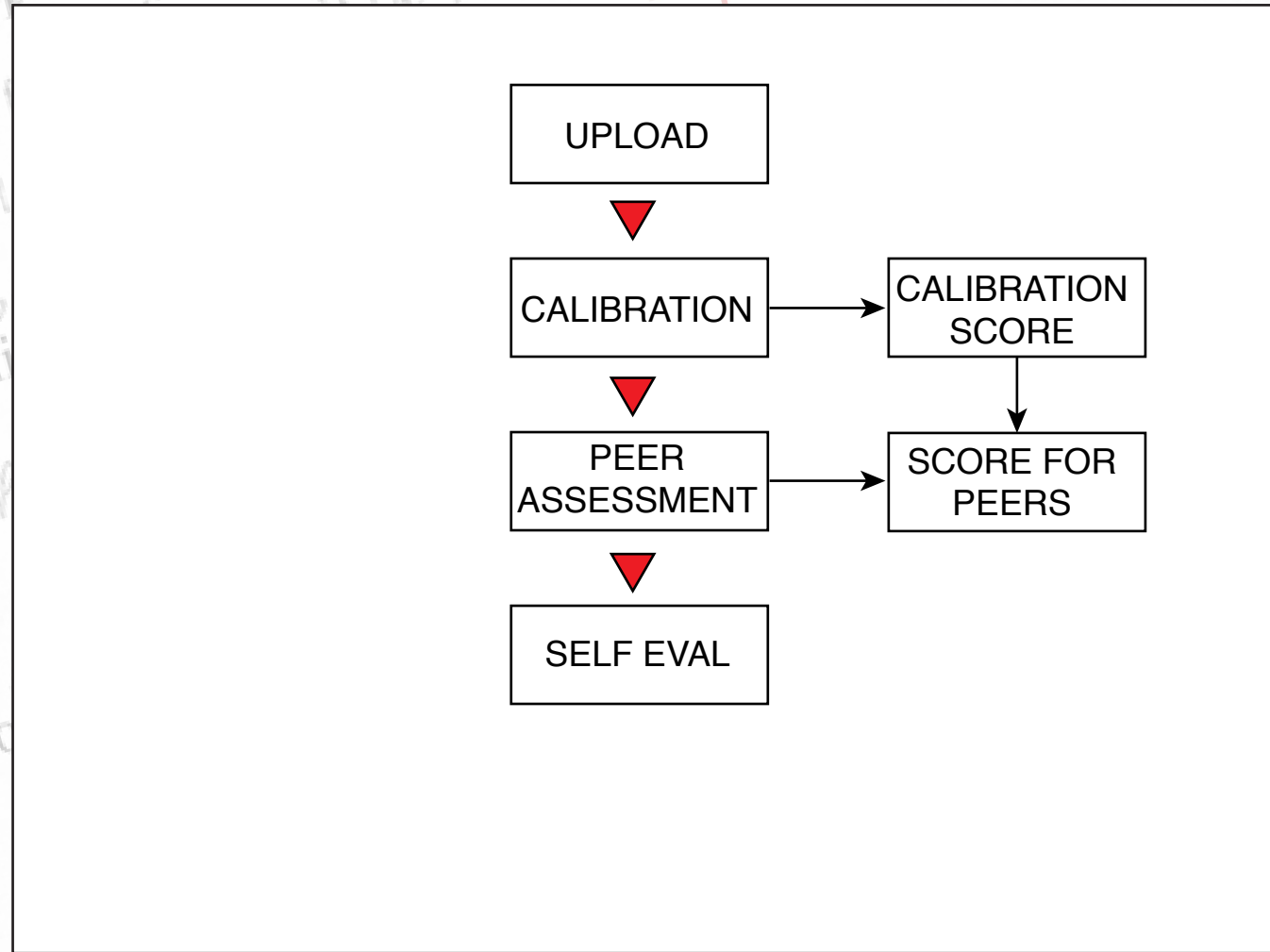
3 improvements

st the three important concepts

Equilibrium
Thermodynamics
Kinetics (both)

Describe the Law of definite proportions

A chemical compound
Same proportion
Unrelated, I saw
A chemical reaction does



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- 1 purposes
- 2 problems
- 3 improvements

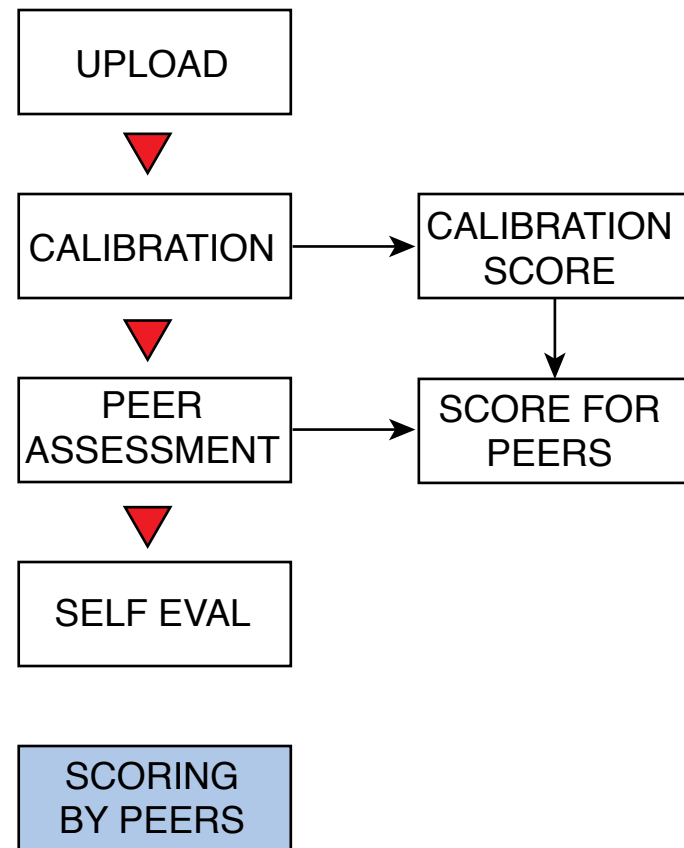
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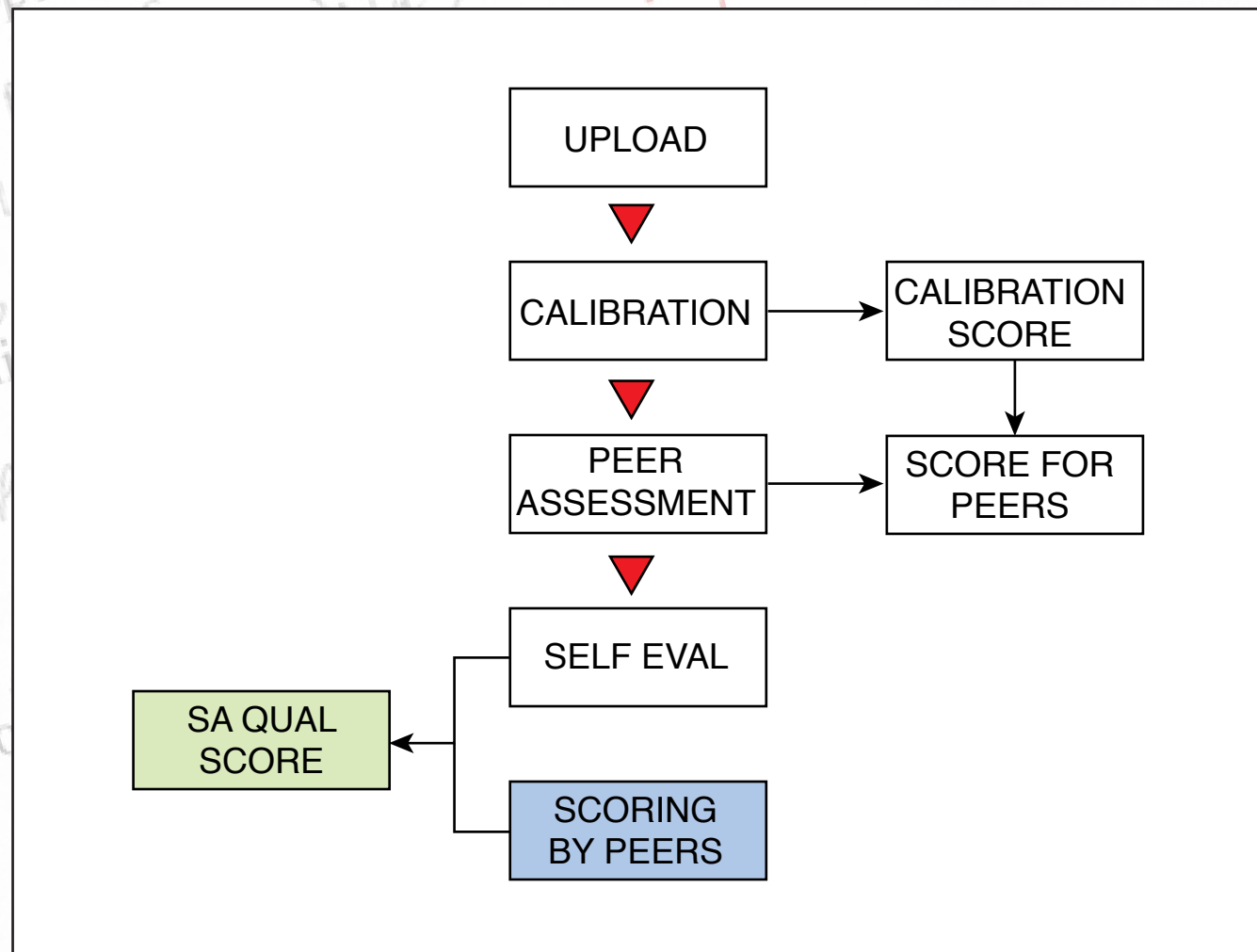
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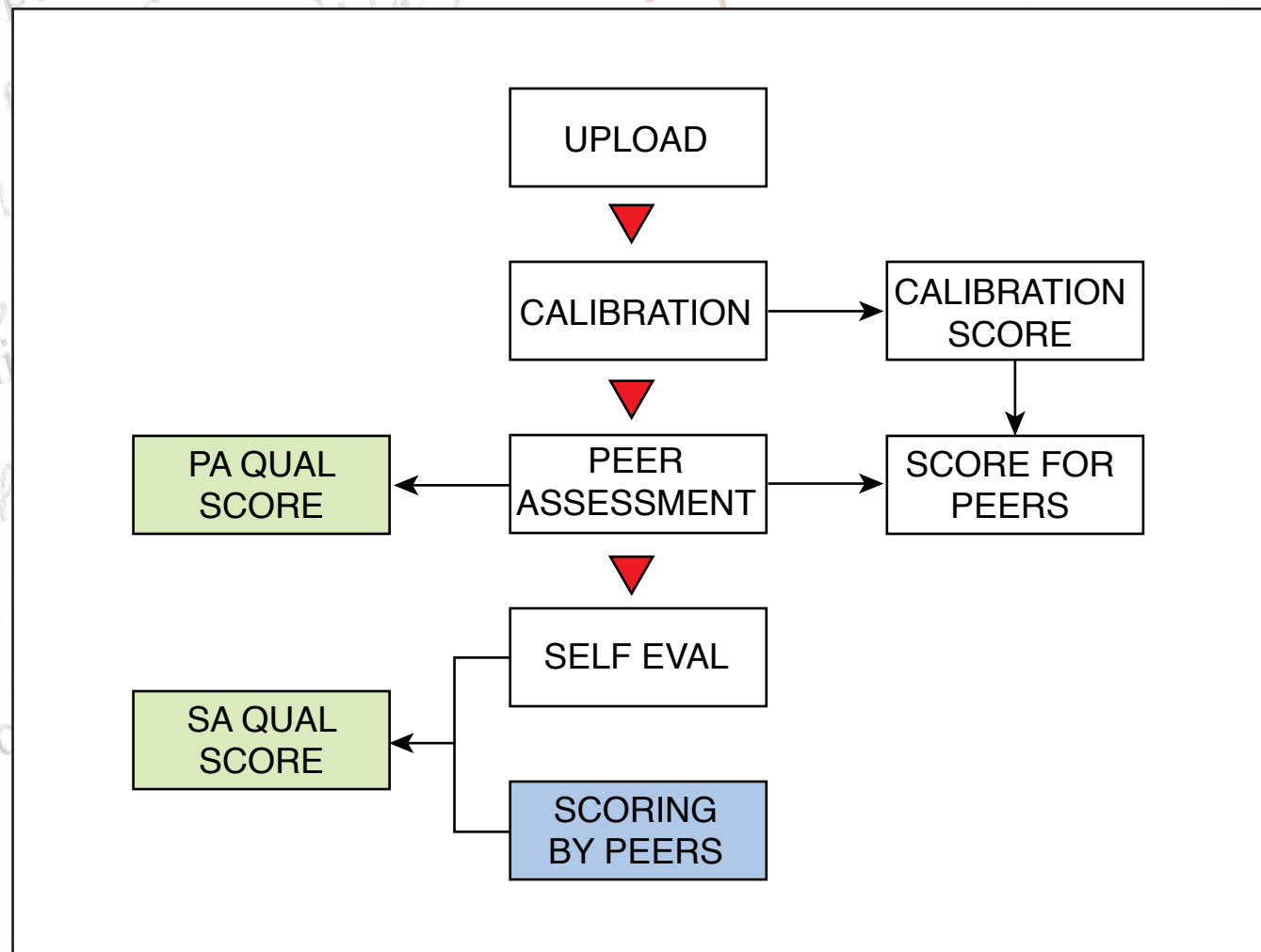
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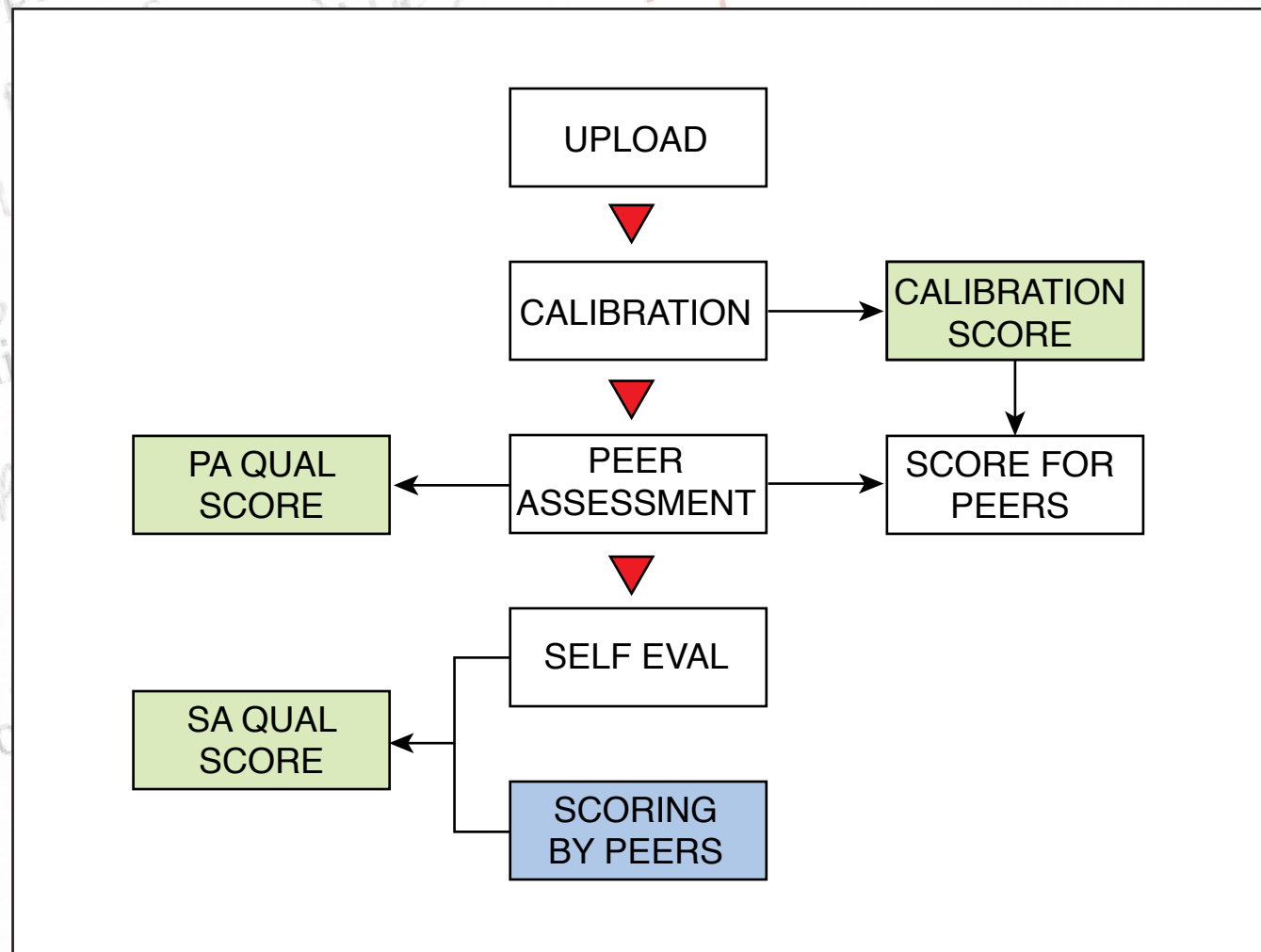
Equilibrium
Thermodynamics
Kinetics (both)

Describe the Law of definite proportions

A chemical compound has the same proportion of elements by mass

Unrelated, I saw

chemical reaction does not change the mass of the system



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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 light blue with yellow and red lines marking the aisles. The walls are light-colored, and there are 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**



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