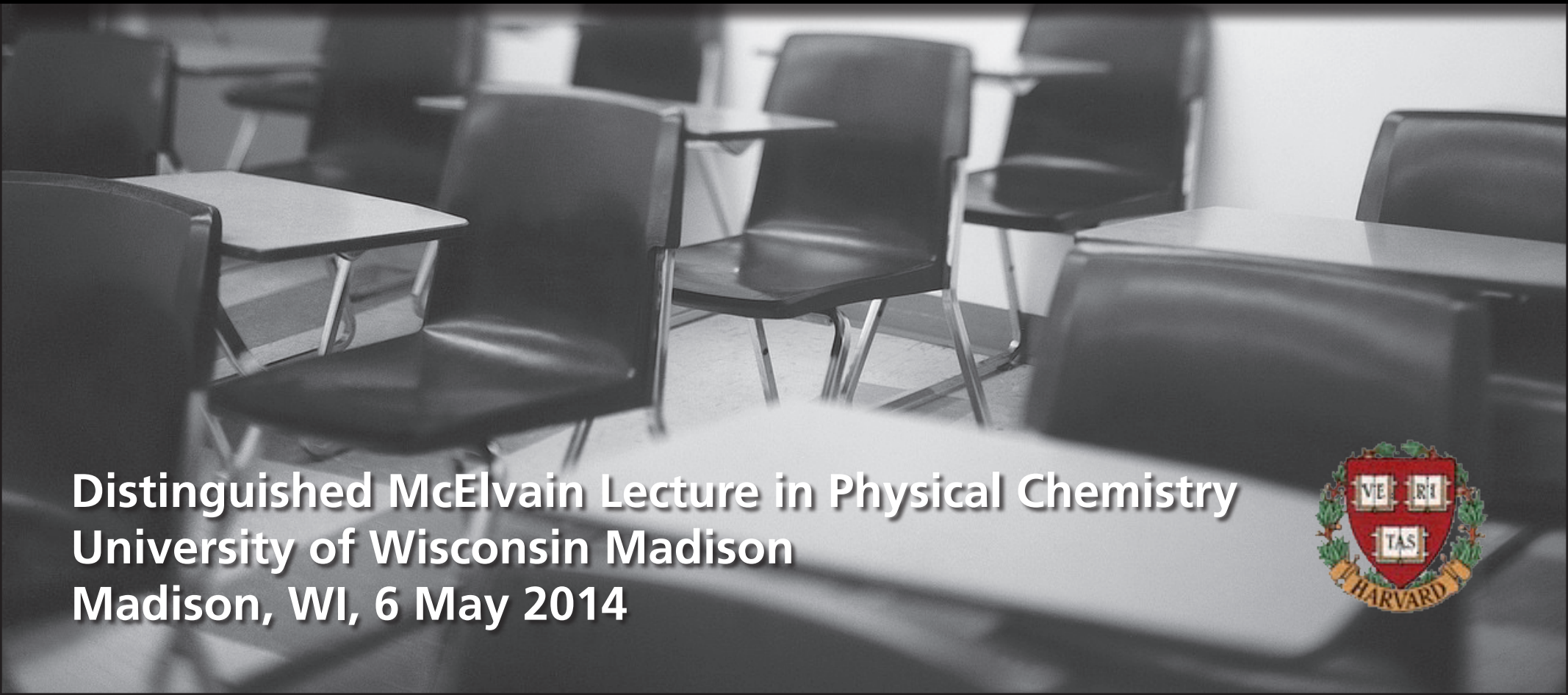
Why you can pass tests and *still* fail in the real world



Distinguished McElvain Lecture in Physical Chemistry
University of Wisconsin Madison
Madison, WI, 6 May 2014

Why you can pass tests and *still* fail in the real world

Distinguished McElvain Lecture in Physica mistry
University of Wisconsin Madison
Madison, WI, 6 May 2014

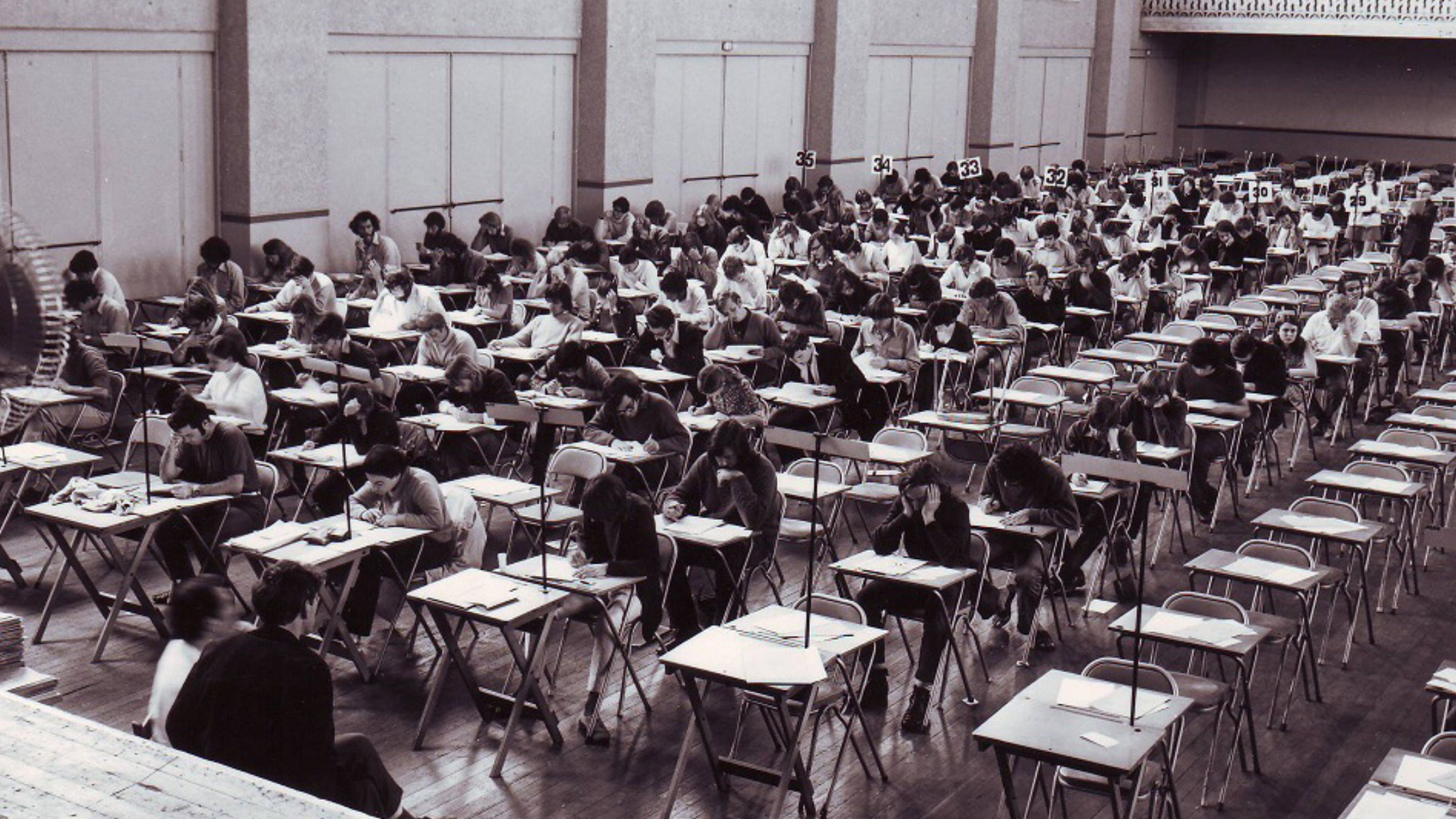

kosten
1. die Kosten (pl.)
2. kostbar
krank
455
1. die Krankheit, —, —en
cow
377
magnificen
glo
1. magnifice
2. master
428
kennen irreg.
kannte-gekannt
1. kennen-lernen
2. erkennen
3. bekan
4.
430
endid
das Kind, —(e)s, —e
1. kindisch
2. kindlich
der Kellner, —s, —
1. der Keller, —s, —
think
poco rit.


kosten
kennen
kannte-gekannt
1. kennen-lernen
2. erkennen
3. bekannt
think
428
Verizon 3G
4:20 PM
Flashcards
Back
23 of 100
pedantic
adj. ostentatious in one's learning
Search
Popular
Subjects
Grade Levels
Standardized


35% retained
after 1 week

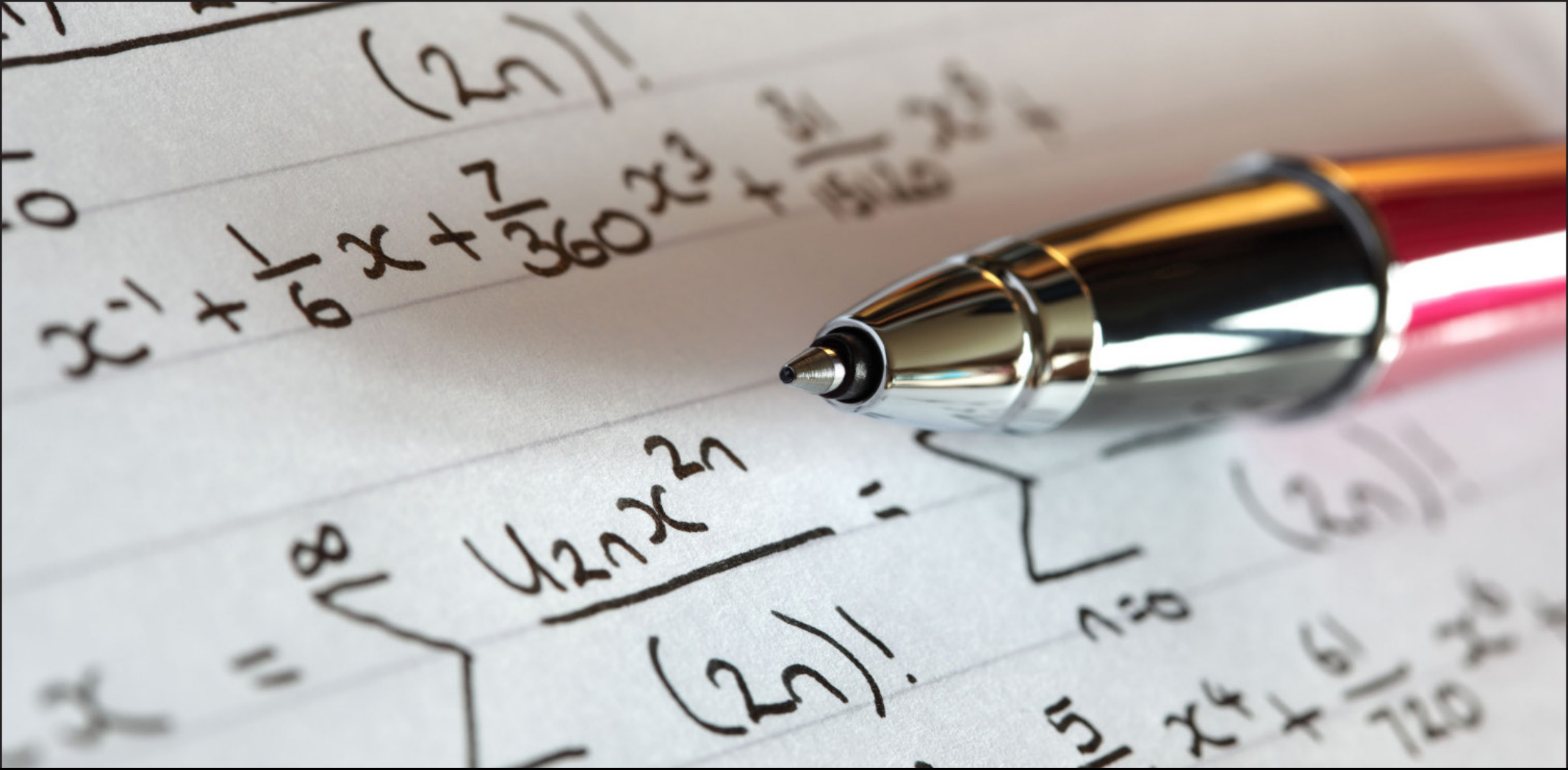
we only guarantee they'll pass the test

5-minute university

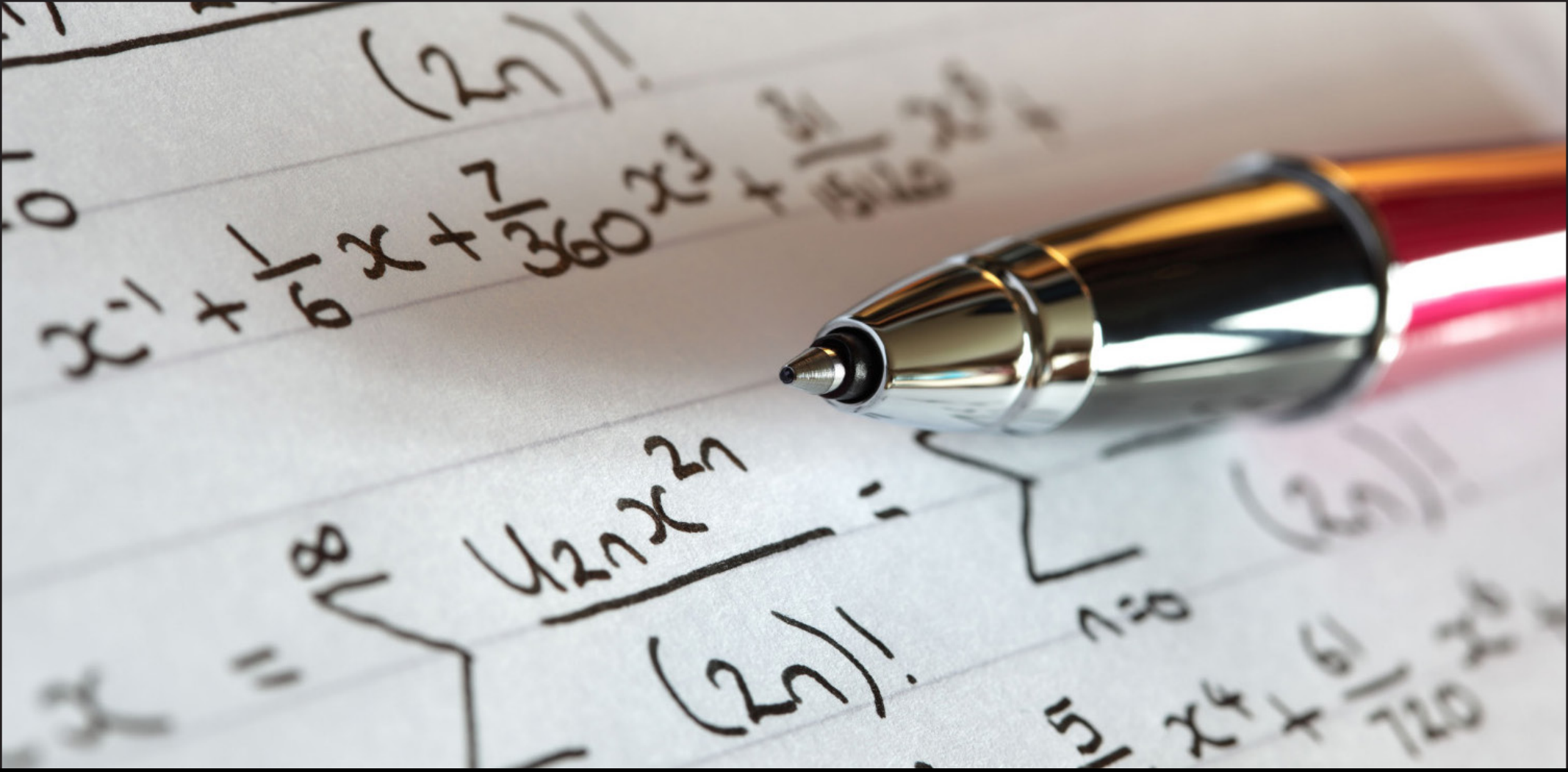

35
34
33
32
31
30
29

assessment focussed on ranking and classifying,

not on developing 21st century skills

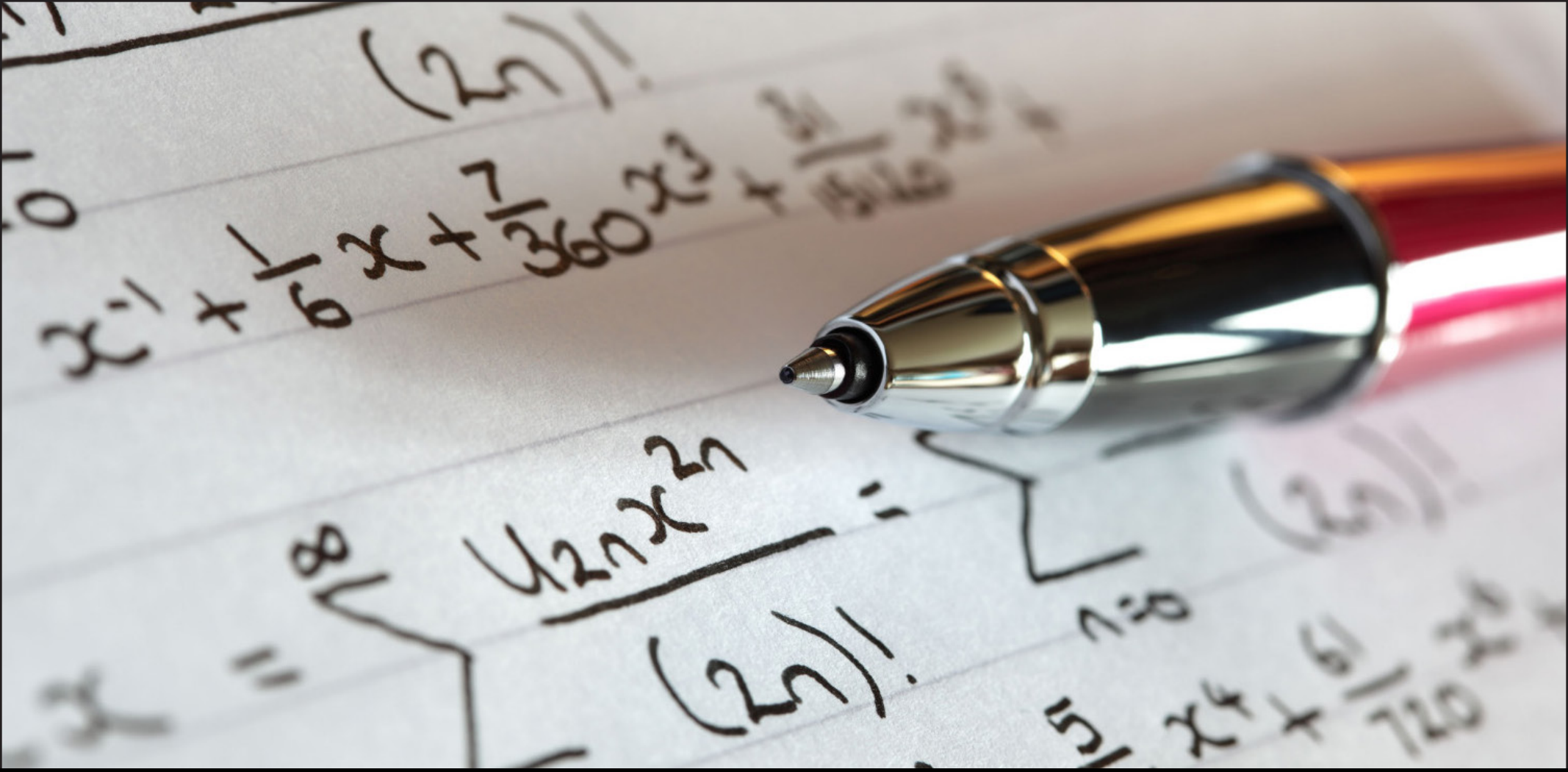


1 purposes



1 purposes

2 problems



1 purposes

2 problems

3 improvements

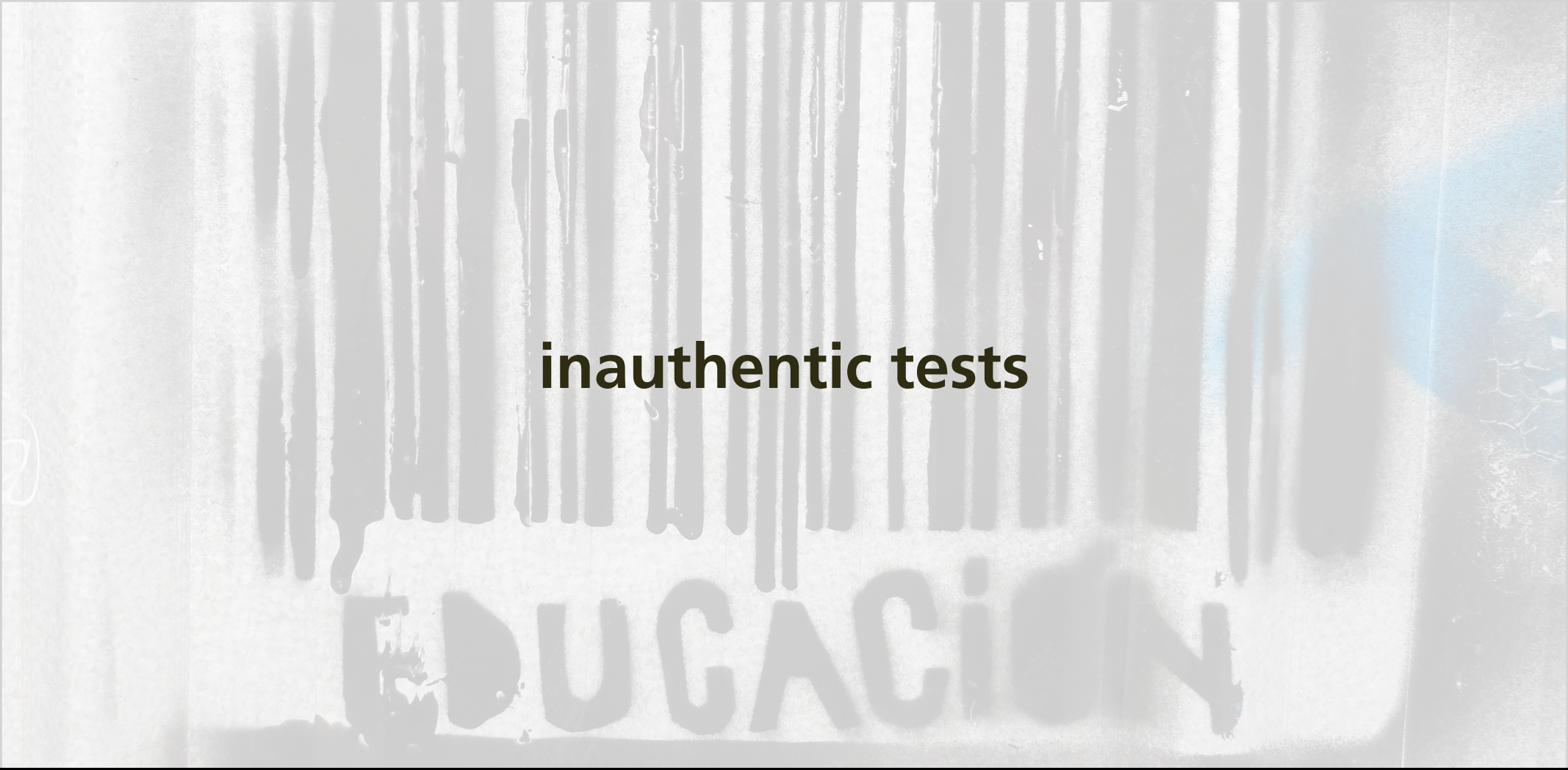
how many different purposes of assessment can you think of?

1. 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

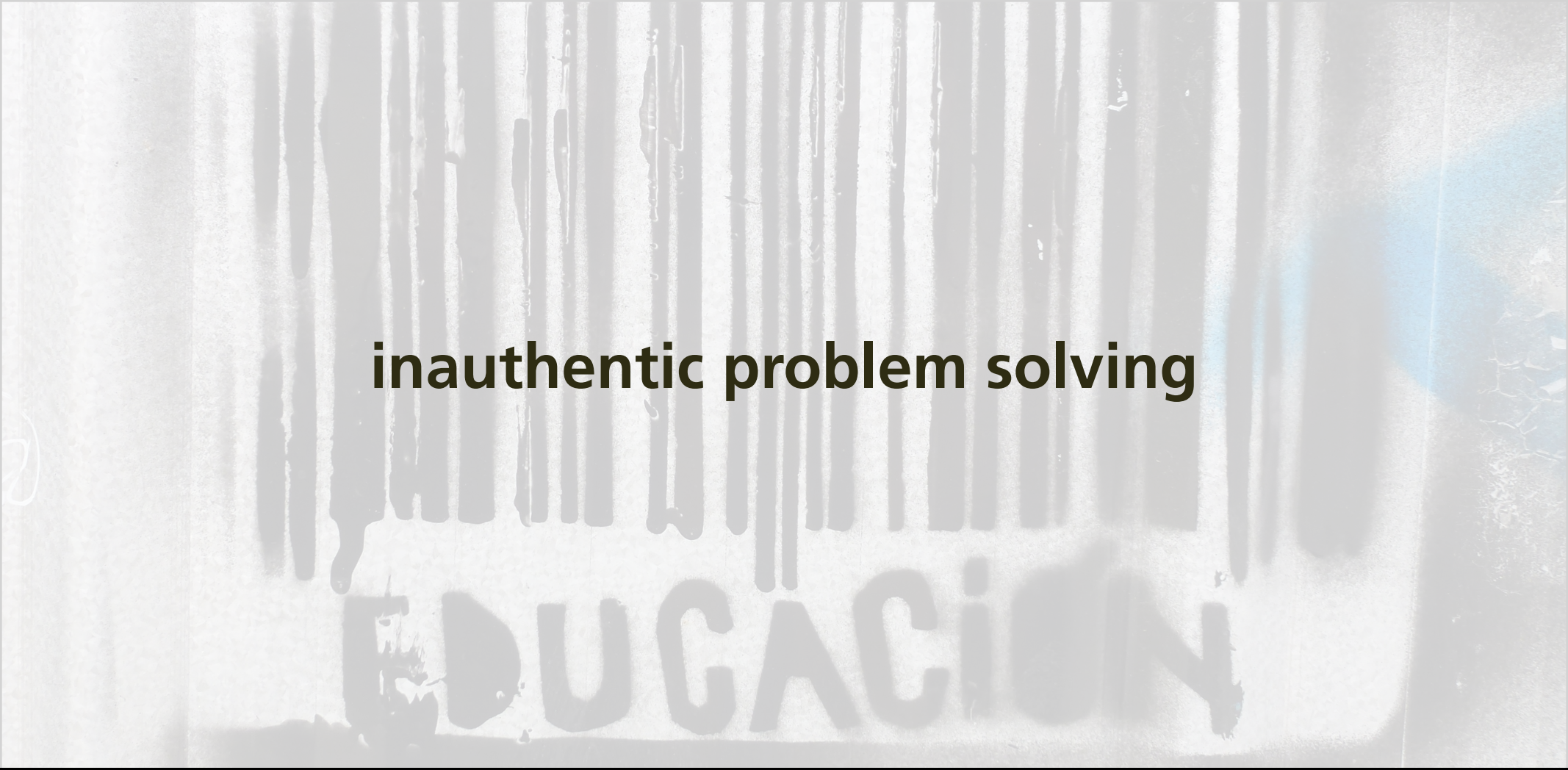
2 problems



inauthentic tests

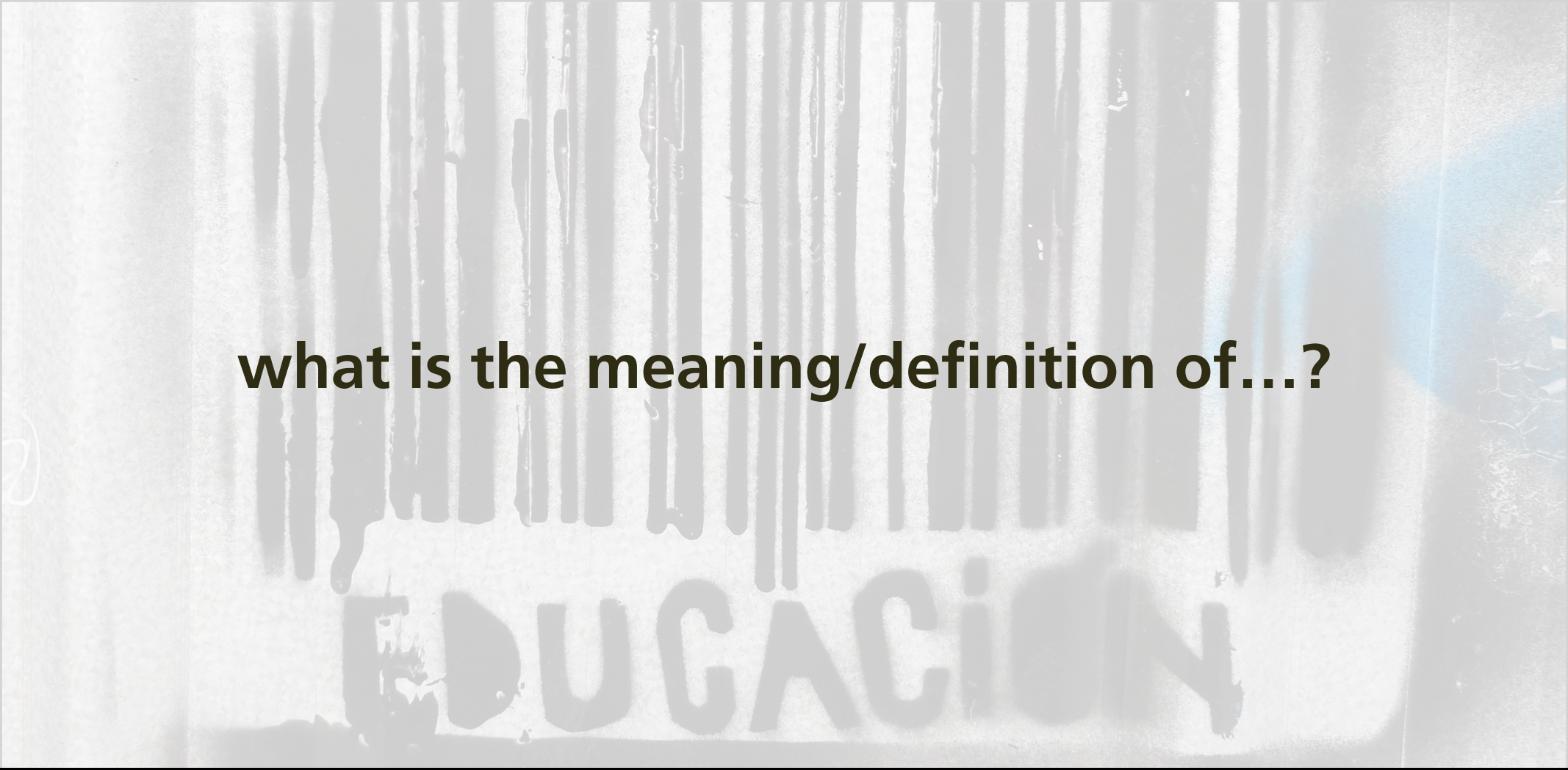
1 purposes

2 problems



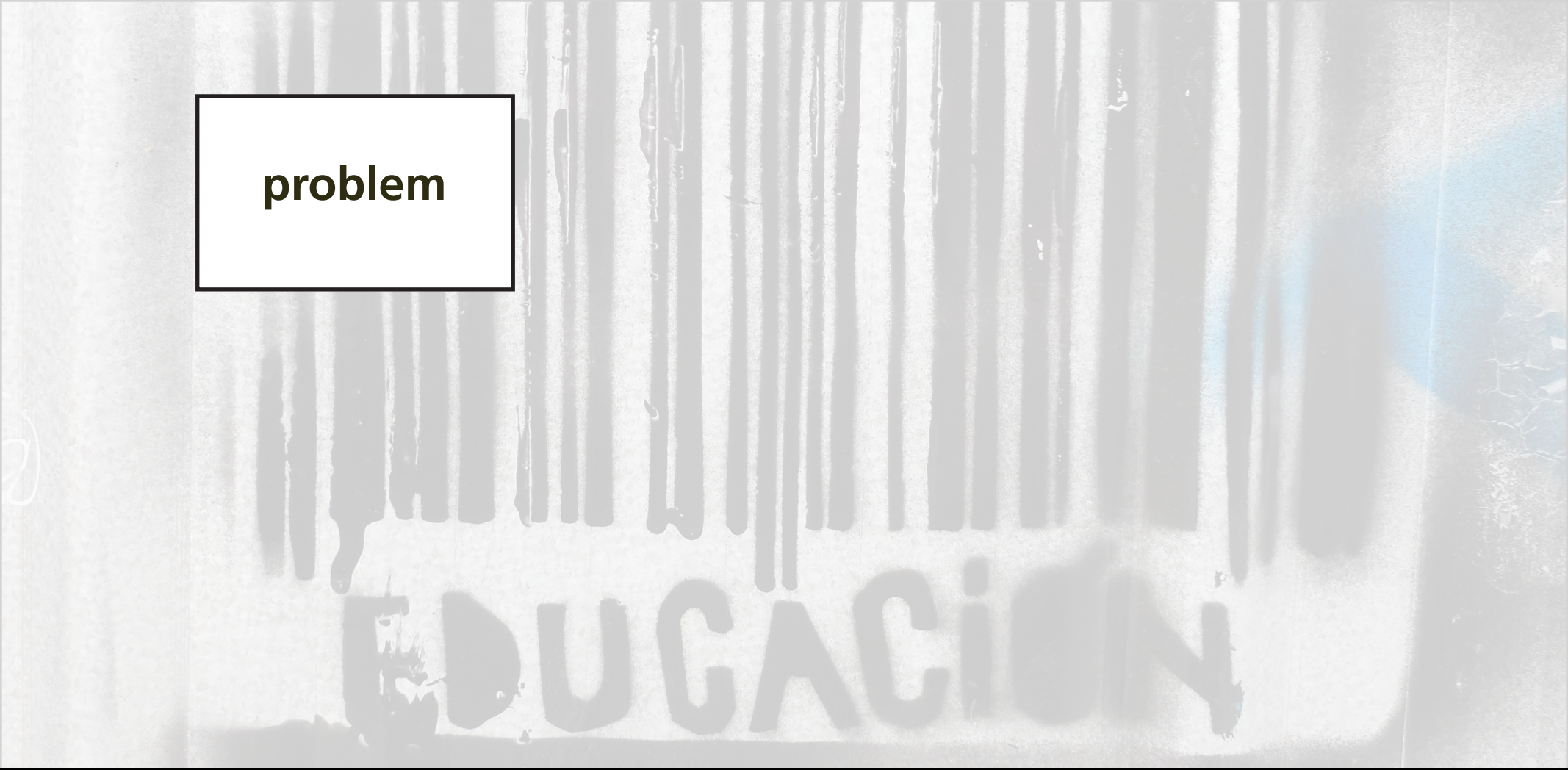
1 purposes

2 problems



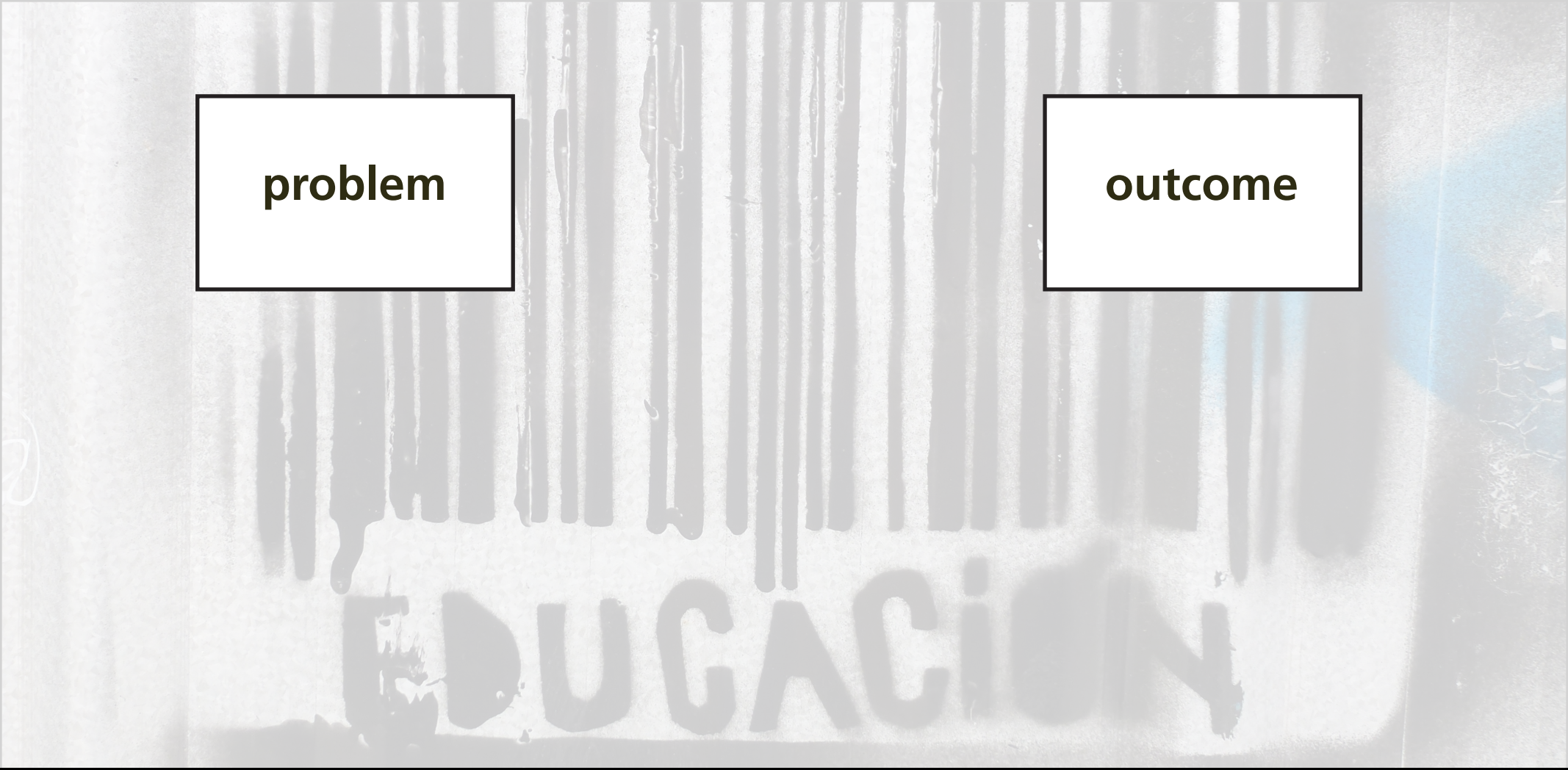
1 purposes

2 problems



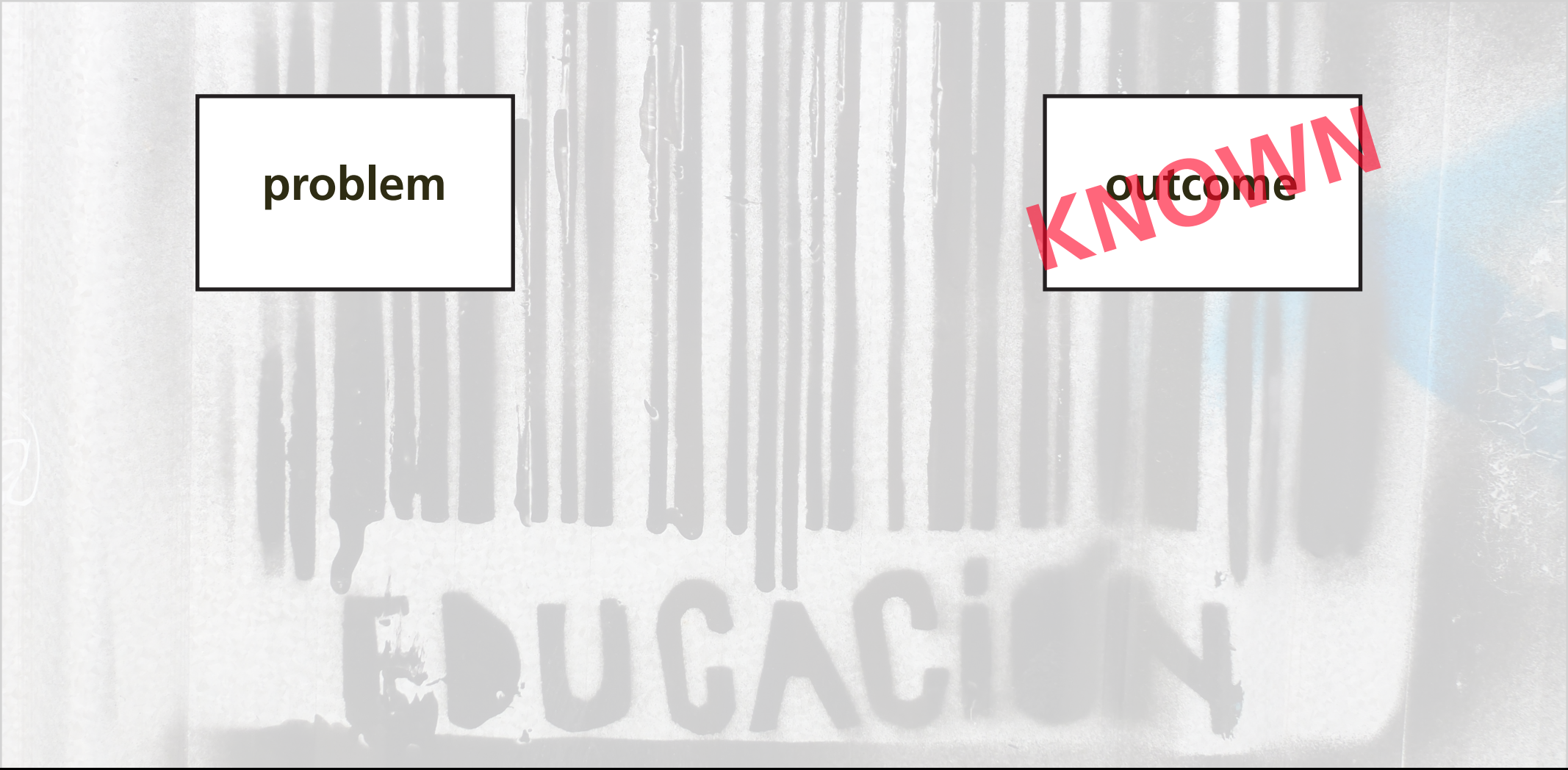
1 purposes

2 problems



1 purposes

2 problems



1 purposes

2 problems

1 purposes

2 problems

1 purposes

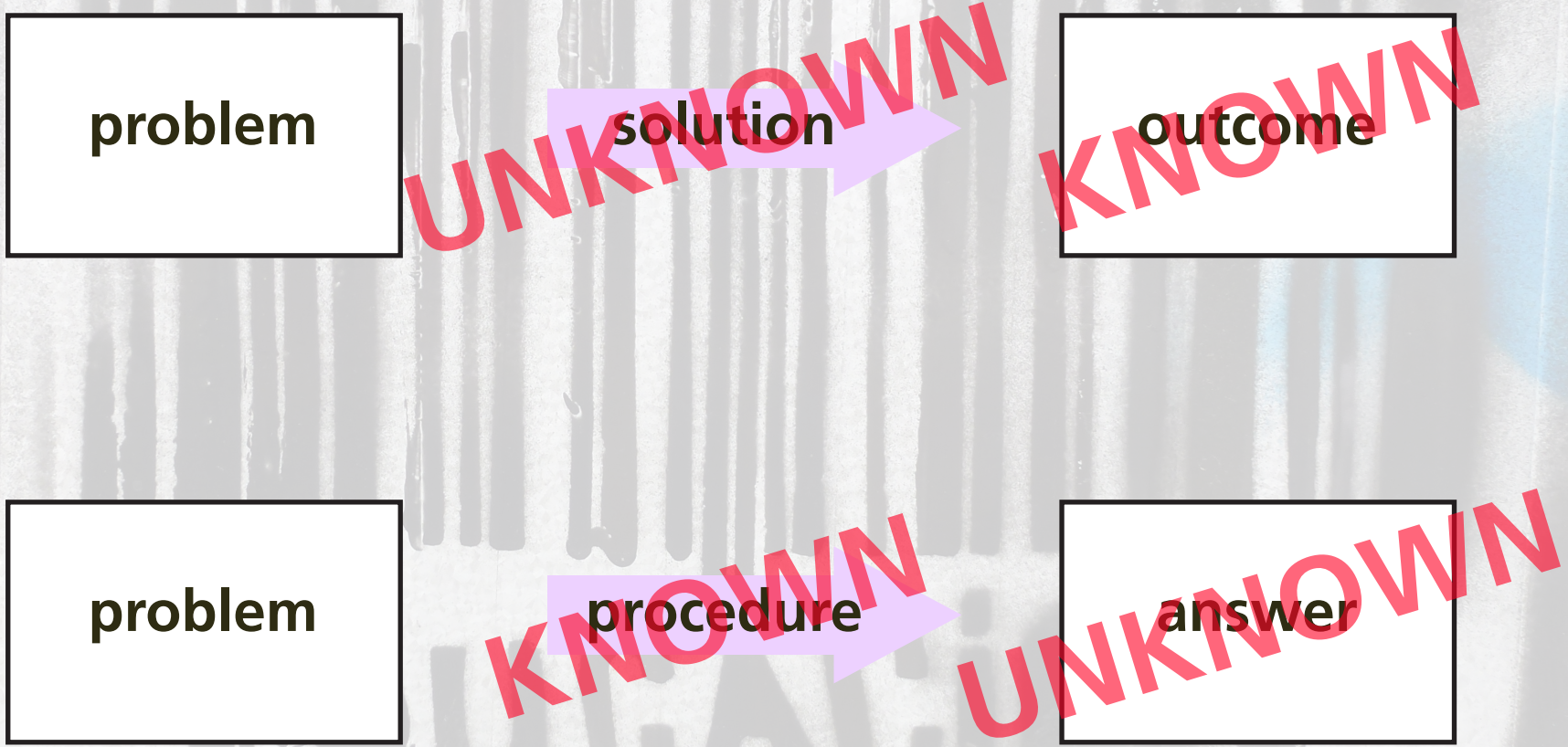
2 problems

1 purposes

2 problems

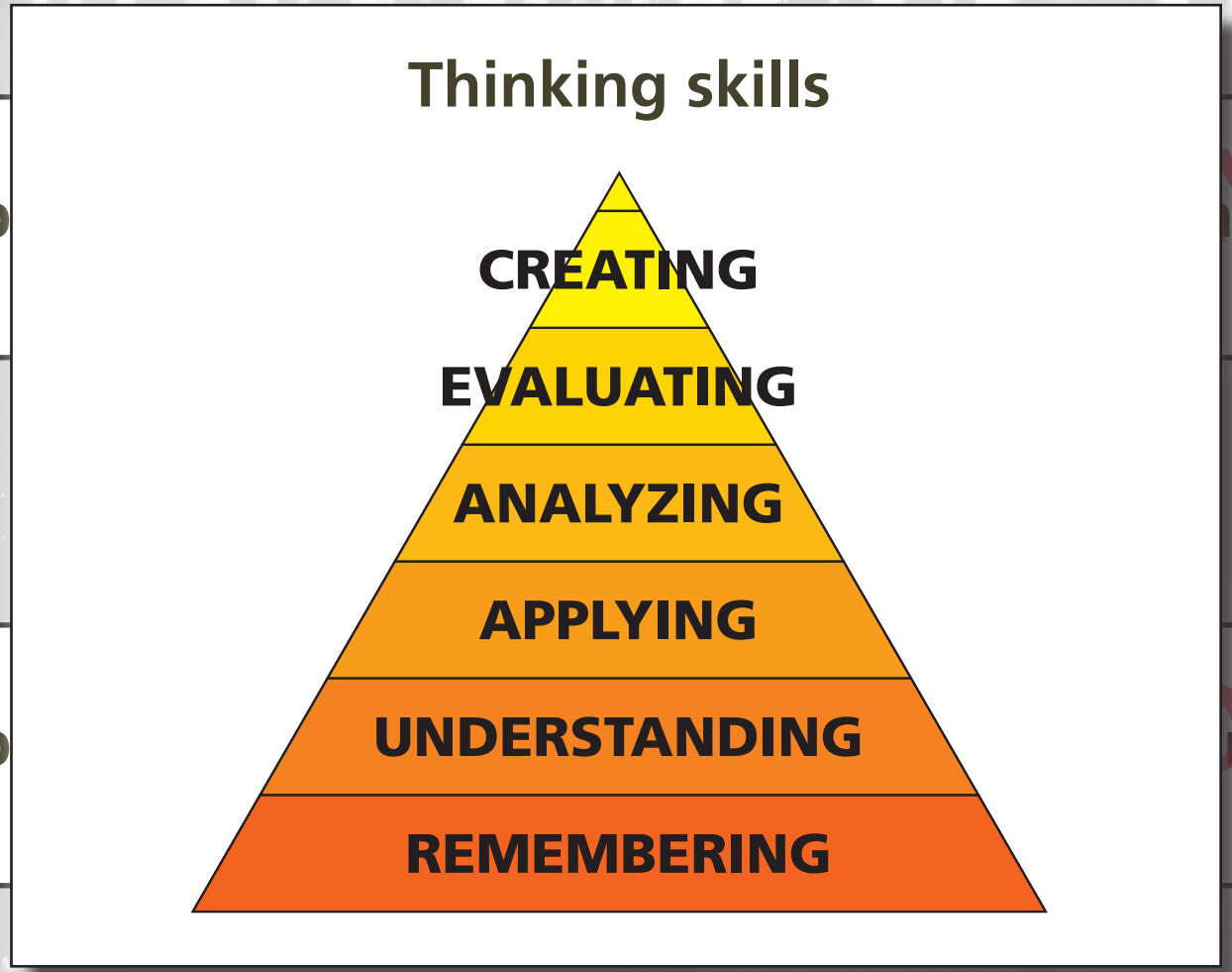
1 purposes

2 problems



1 purposes

2 problems



1 purposes

2 problems

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.

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

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Requires:

Assumptions
Developing a model
Applying that model

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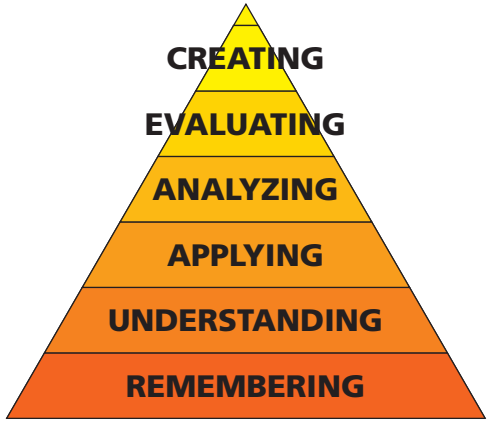

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On average people shop for 2 hours.

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Developing a model
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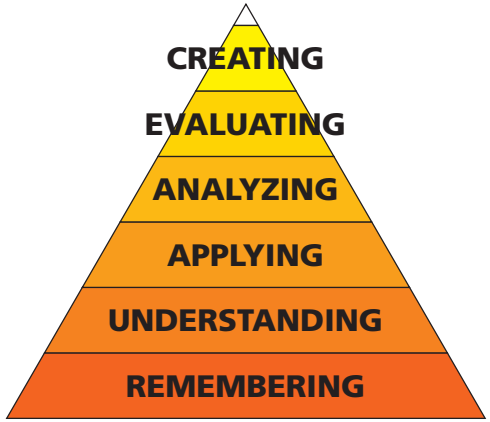

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Assuming people leave at regularly-spaced intervals, how long do you have to wait before someone frees up a space?

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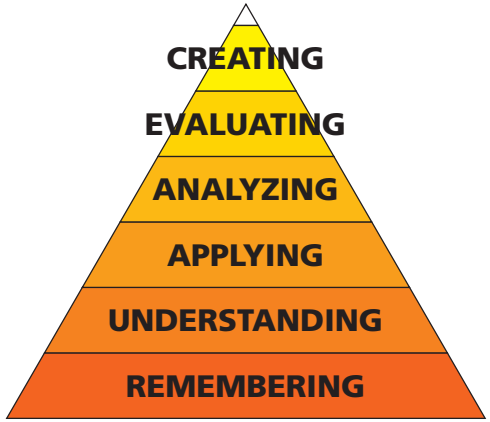
Assumptions
Developing a model
Applying that model



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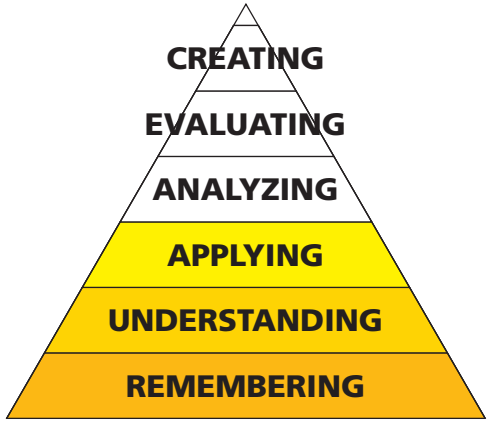

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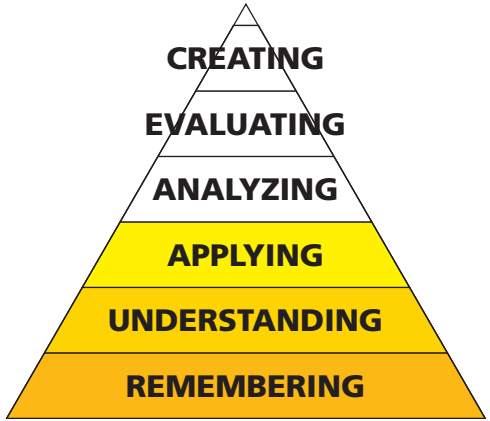
How long do you have to wait before someone frees up a space?



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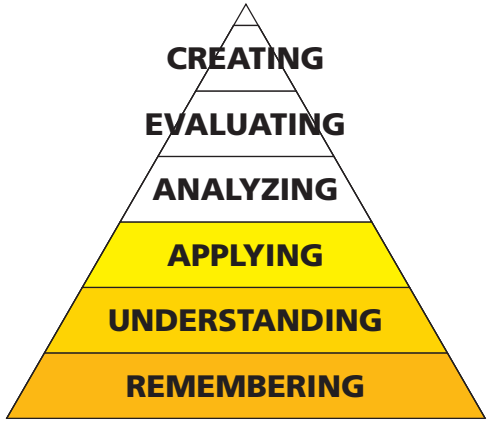
$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$



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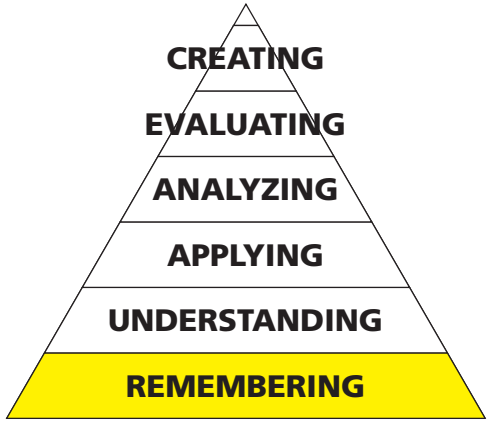
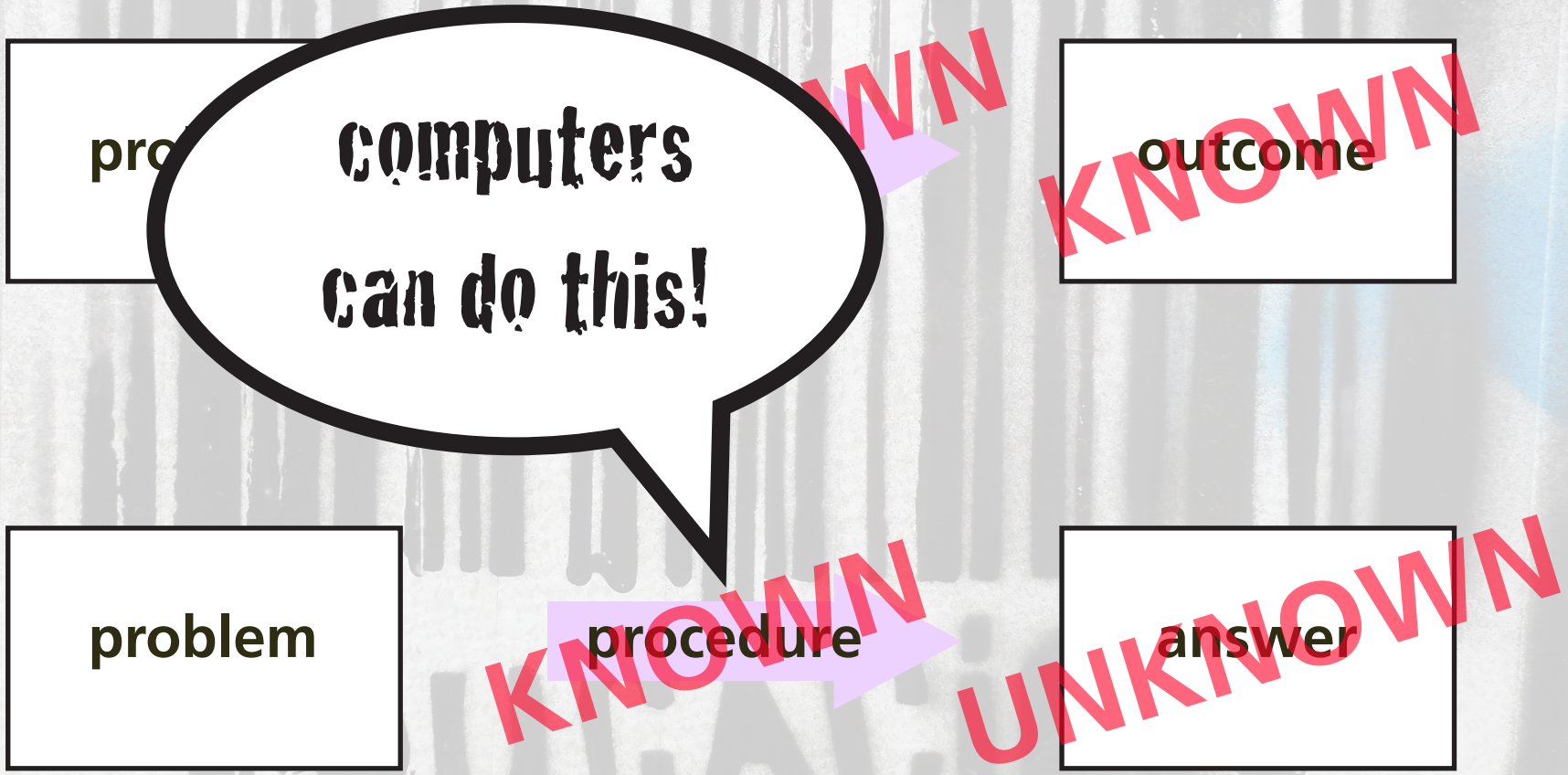




1 purposes

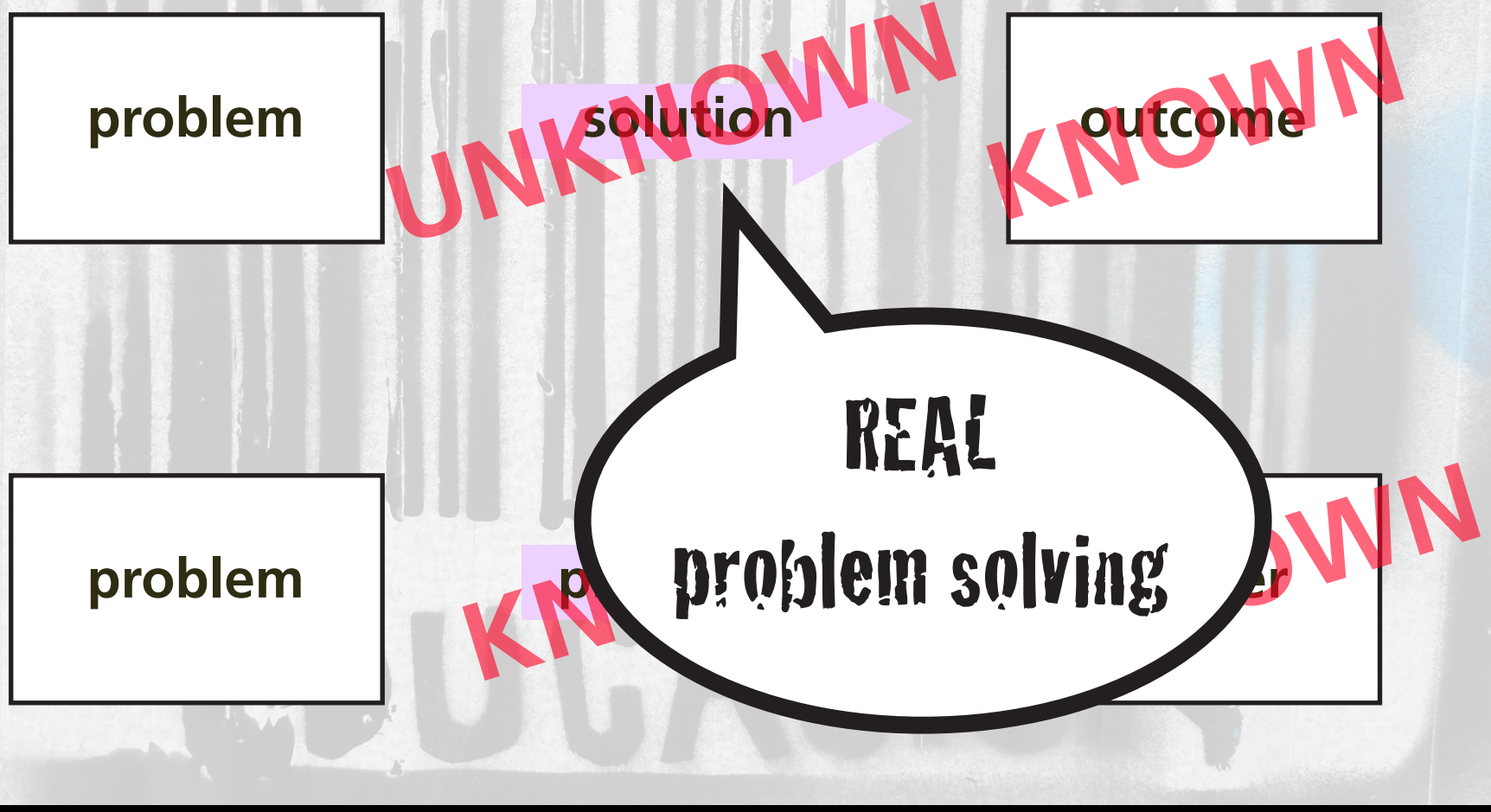
2 problems

1 purposes

2 problems

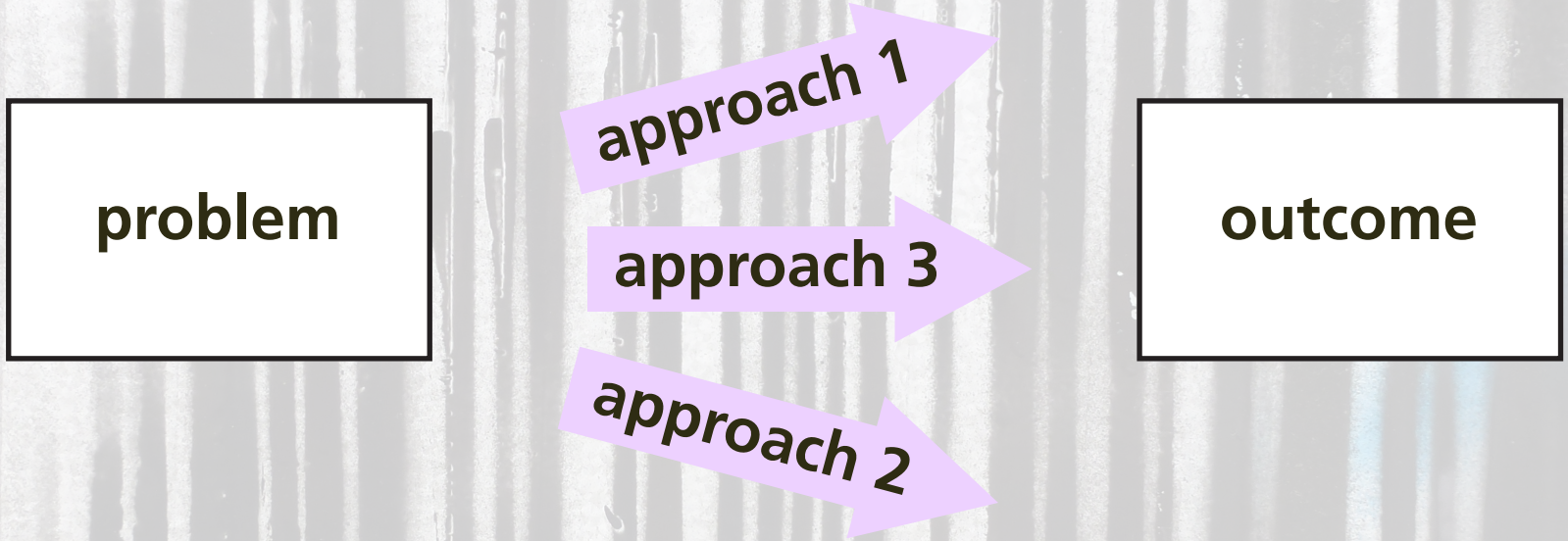
1 purposes

2 problems



1 purposes

2 problems



grading incompatible with real problem solving

1 purposes

2 problems

1 purposes

2 problems

isolation

1 purposes

2 problems

Math. 302-02, Final Exam

(4) We will use spherical coordinates:

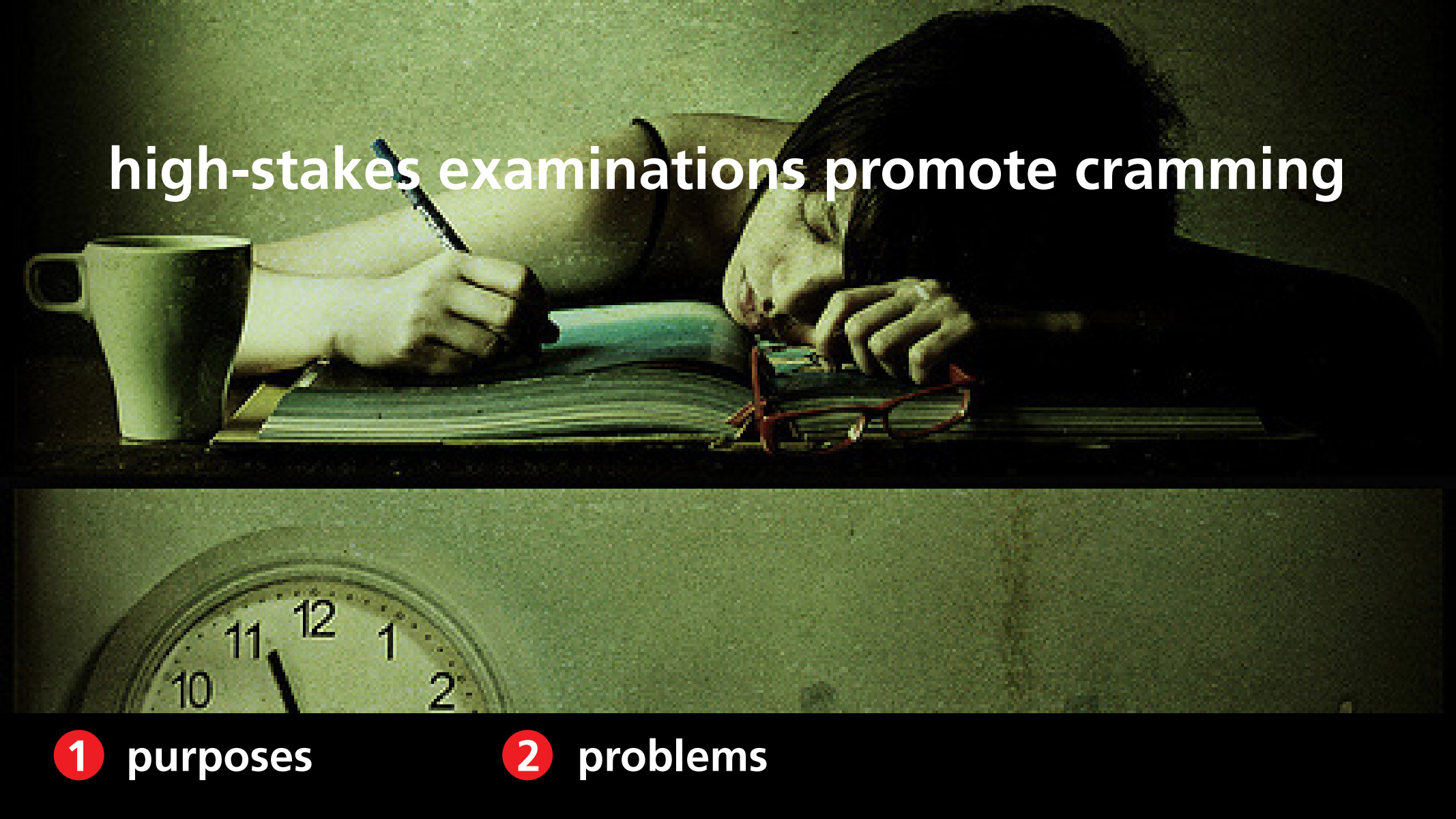
$0 \le \rho \le 4$, $0 \le \theta \le 2\pi$, $0 \le \varphi \le \pi$. The integral is thus:

$$\int_{\rho=0}^{4}\int_{\theta=0}^{2\pi}\int_{\varphi=0}^{\pi}(\rho\cos\varphi)(\rho^2\sin\varphi)\,d\varphi\,d\theta\,d\rho$$

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

Final Exam

1 purposes 2 problems


high-stakes examinations promote cramming
1 purposes
2 problems

information stored in short-term memory

1. purposes
2. problems

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)

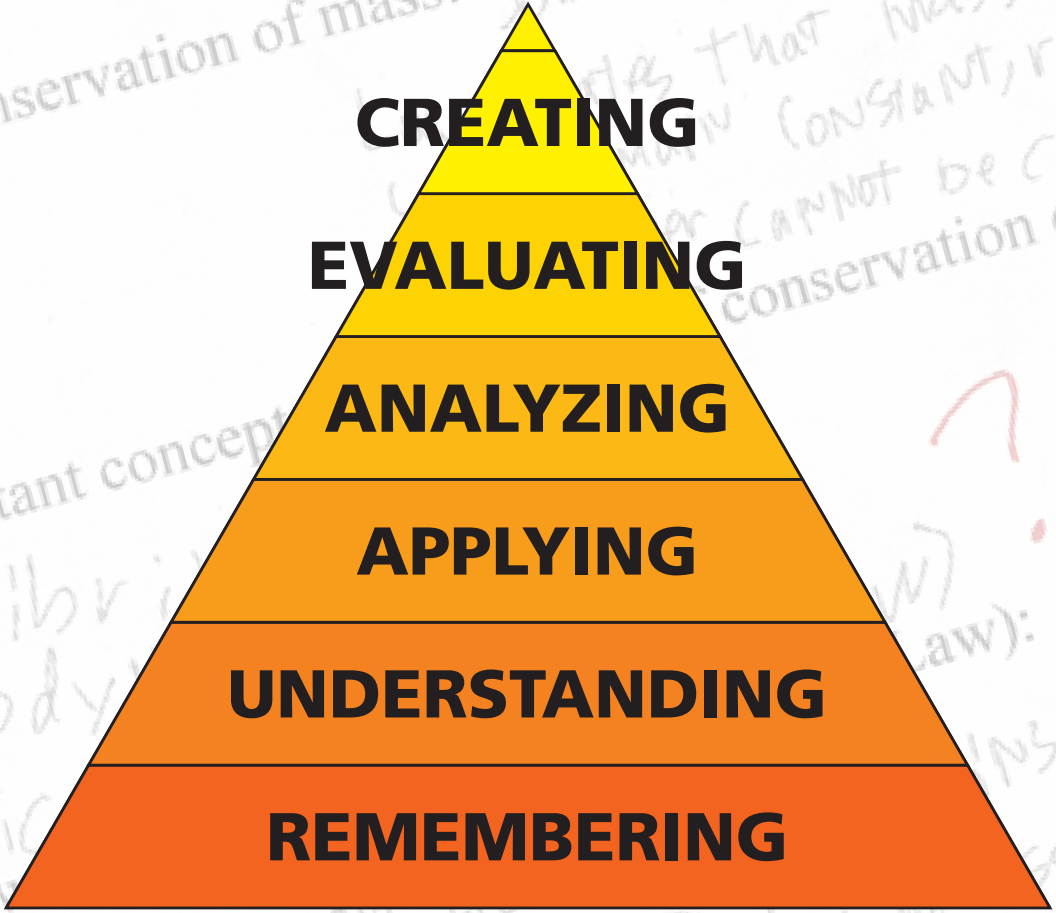
1 purposes

2 problems

… but …

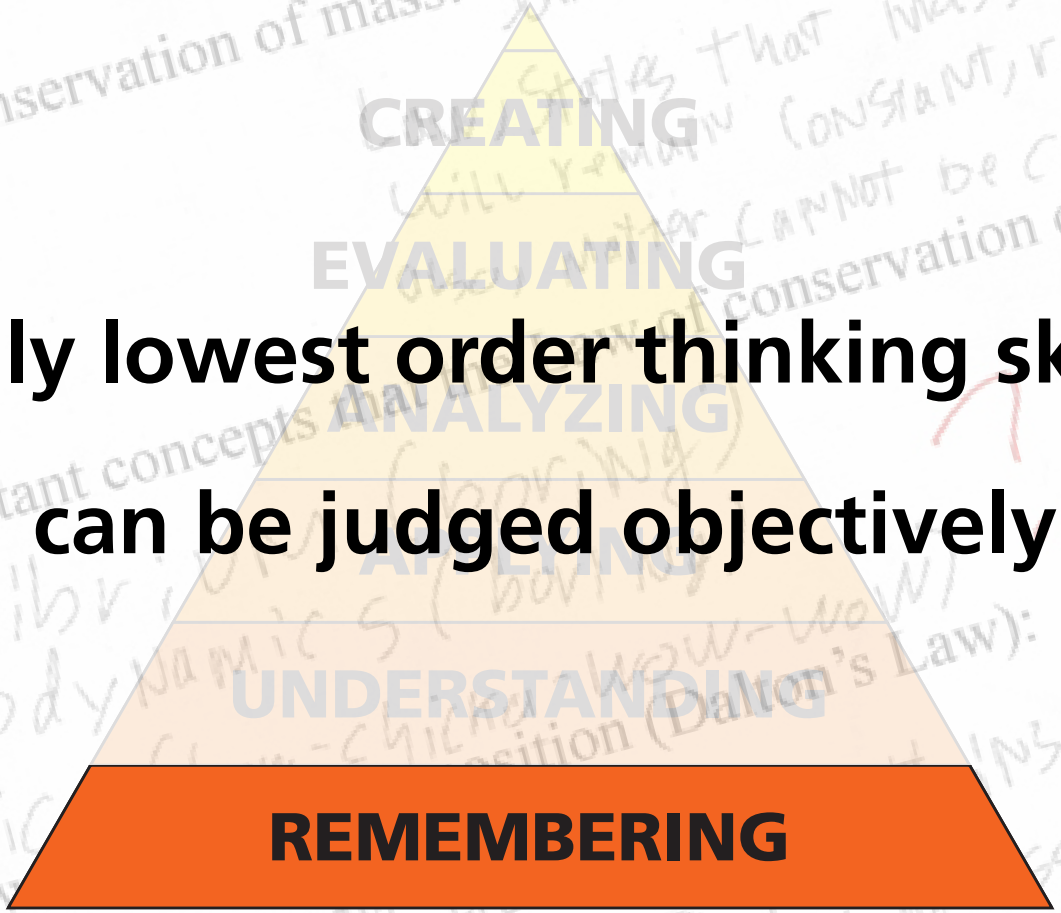
1 purposes

2 problems



1 purposes

2 problems



only lowest order thinking skills

can be judged objectively

1 purposes

2 problems

and then there is…

- grade inflation
- cheating

1 purposes

2 problems

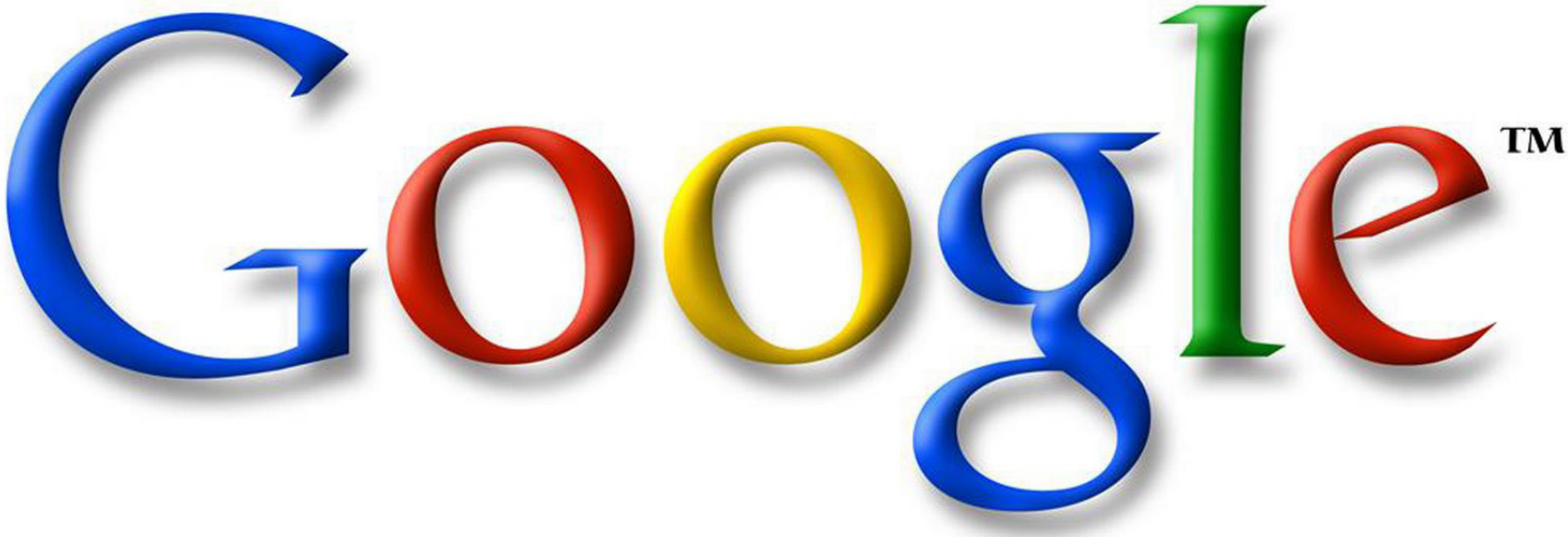
3 improvements

mimic real life

1 purposes 2 problems 3 improvements

open-book exam

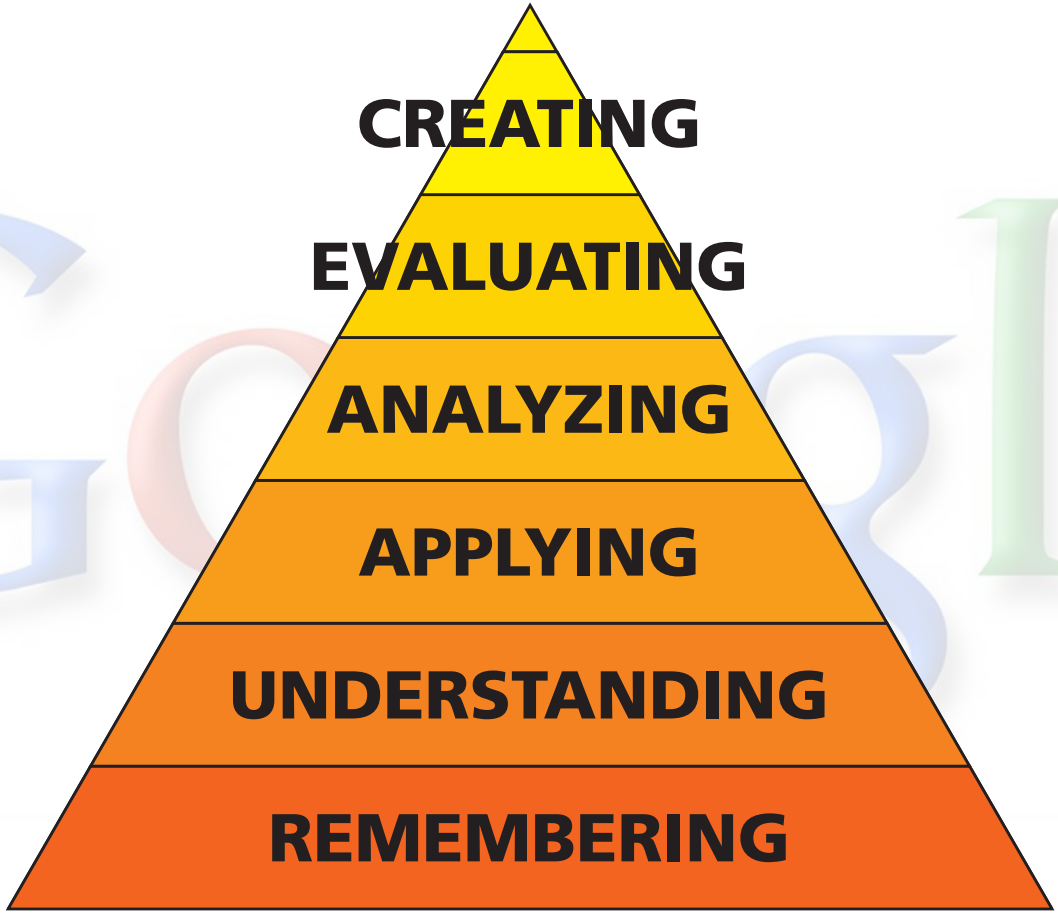
1. purposes
2. problems
3. improvements



1 purposes

2 problems

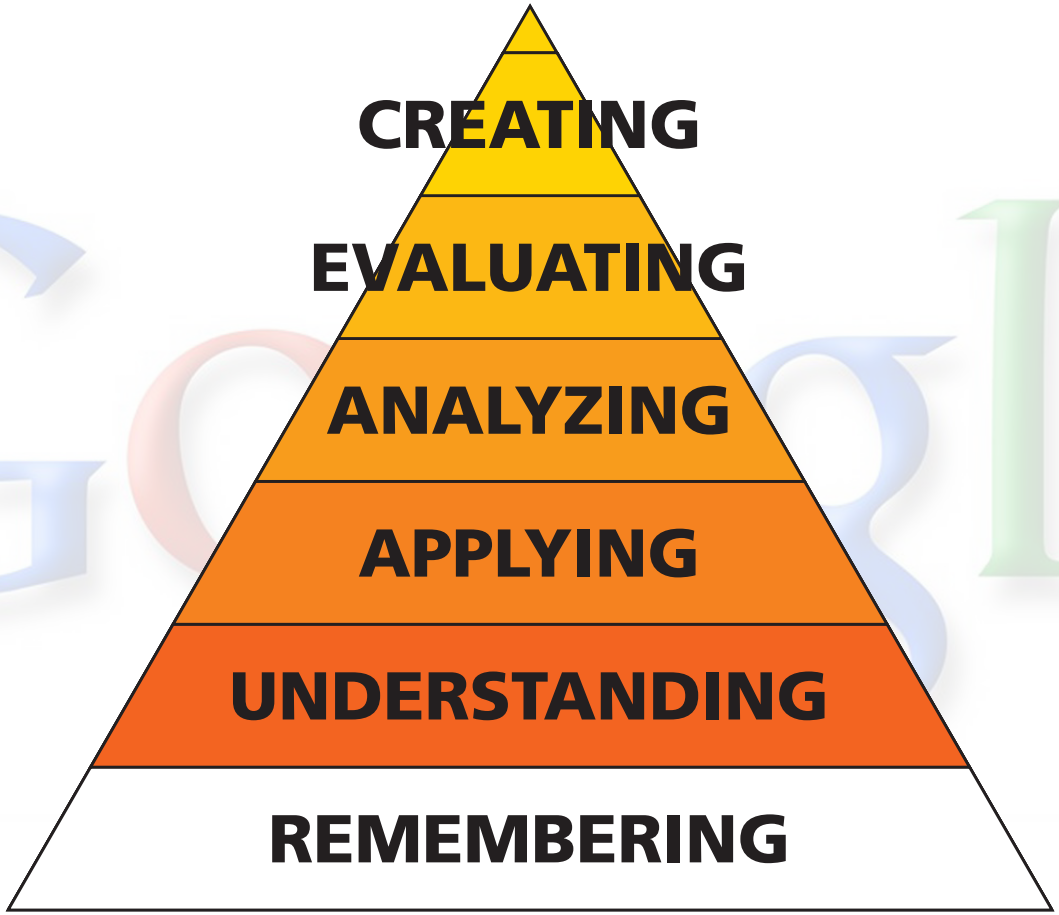
3 improvements



1 purposes

2 problems

3 improvements



1 purposes

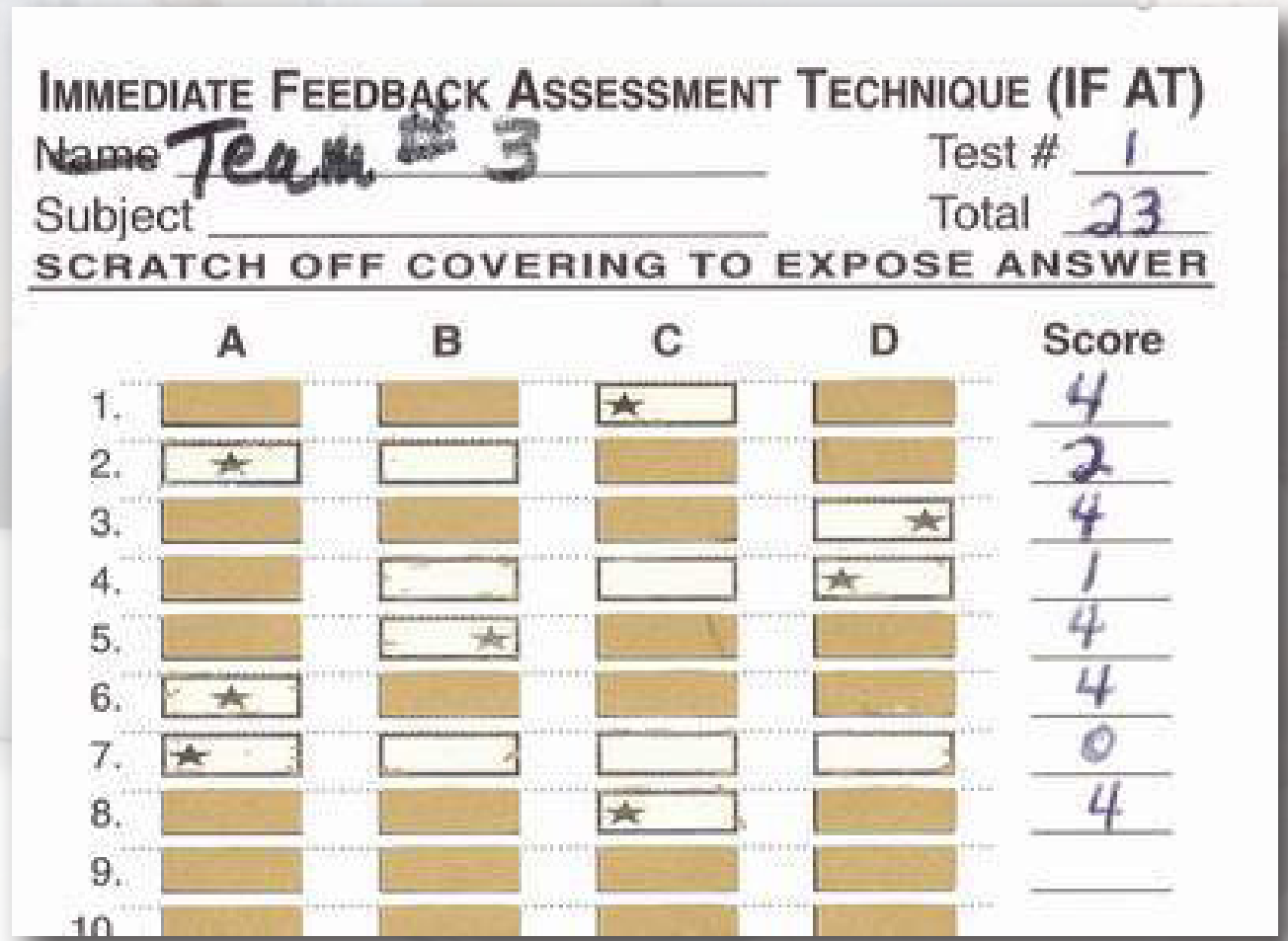
2 problems

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.			★		4
2.	★				2
3.				★	4
4.				★	1
5.		★			4
6.	★				4
7.	★				0
8.			★		4
9.					
10.					

1 purposes 2 problems 3 improvements

1 purposes

2 problems

3 improvements

1 purposes

2 problems

3 improvements

learning | catalytics

Brian Lukoff

Courses Questions Classrooms Tour Help

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 equa

Current team: **Blue team** Change team Change seat Send a message to the instructor Join anothe

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 $\ln y - \sin$

1 purposes 2 problems 3 improvements

This is the individual round;

expression question

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

6x - 6 | Submit response

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

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 $\ln y - \sin$

1 purposes 2 problems 3 improvements

1 purposes

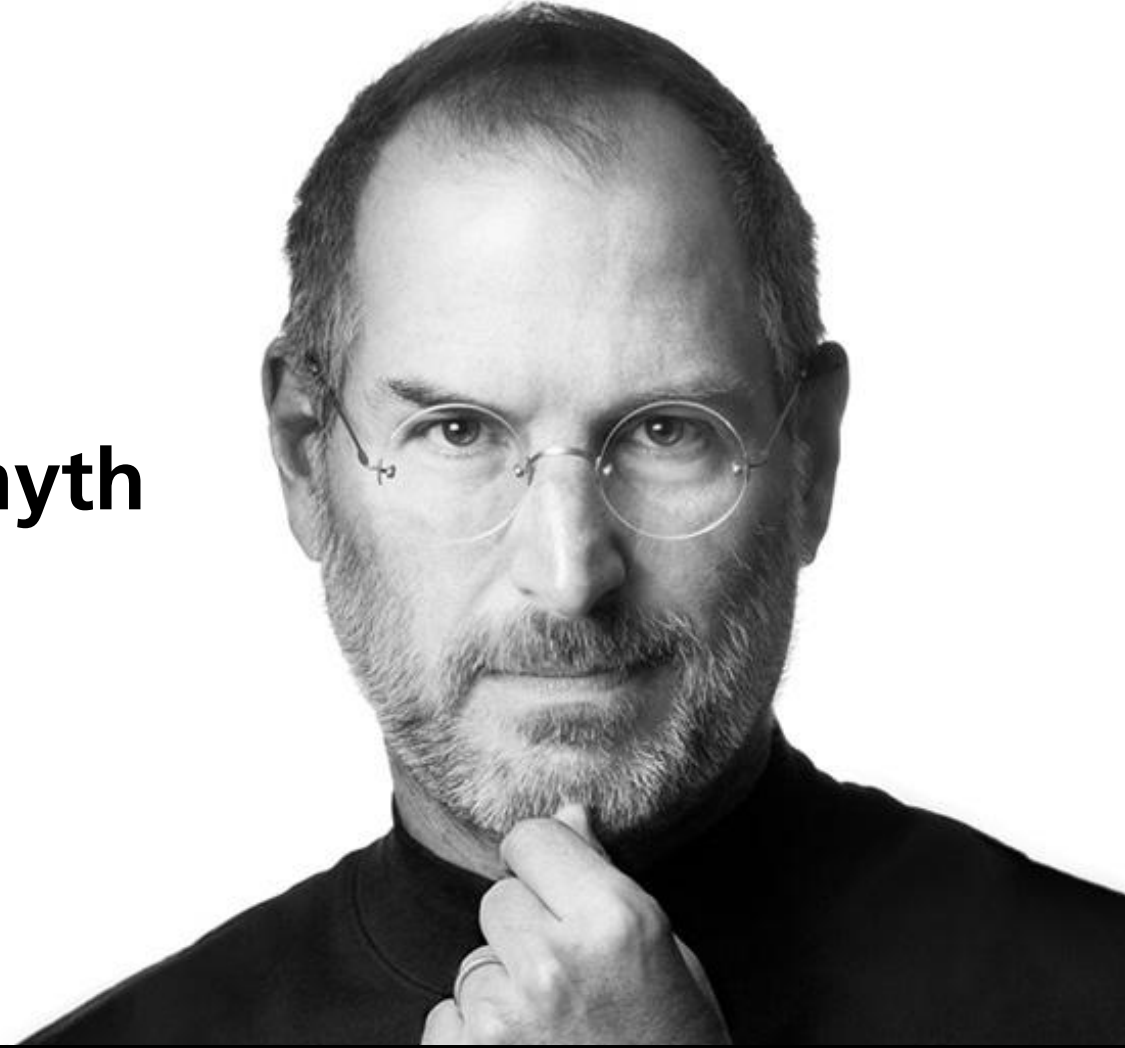
2 problems

3 improvements

focus on feedback, not ranking

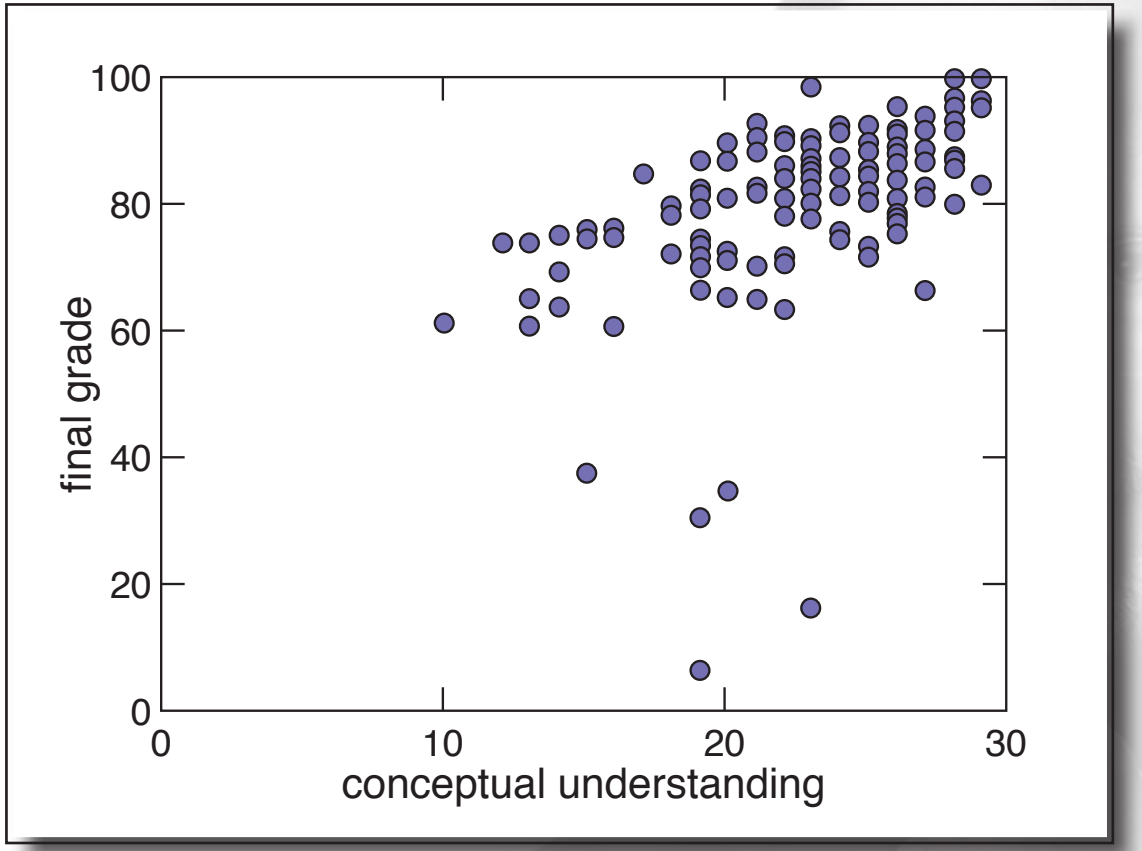
1 purposes 2 problems 3 improvements

objective ranking: a myth



1. purposes
2. problems
3. improvements

2 metrics, 2 results

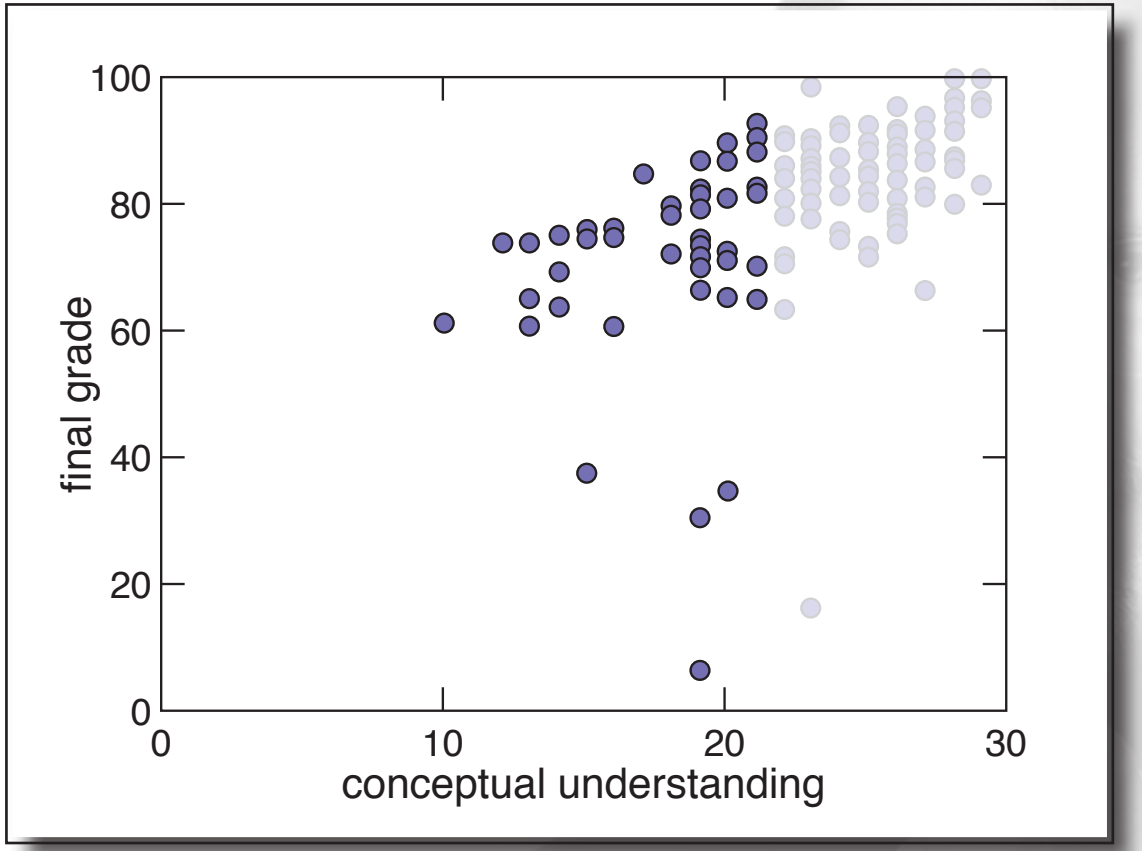


1 purposes

2 problems

3 improvements

Aristotelian thinkers

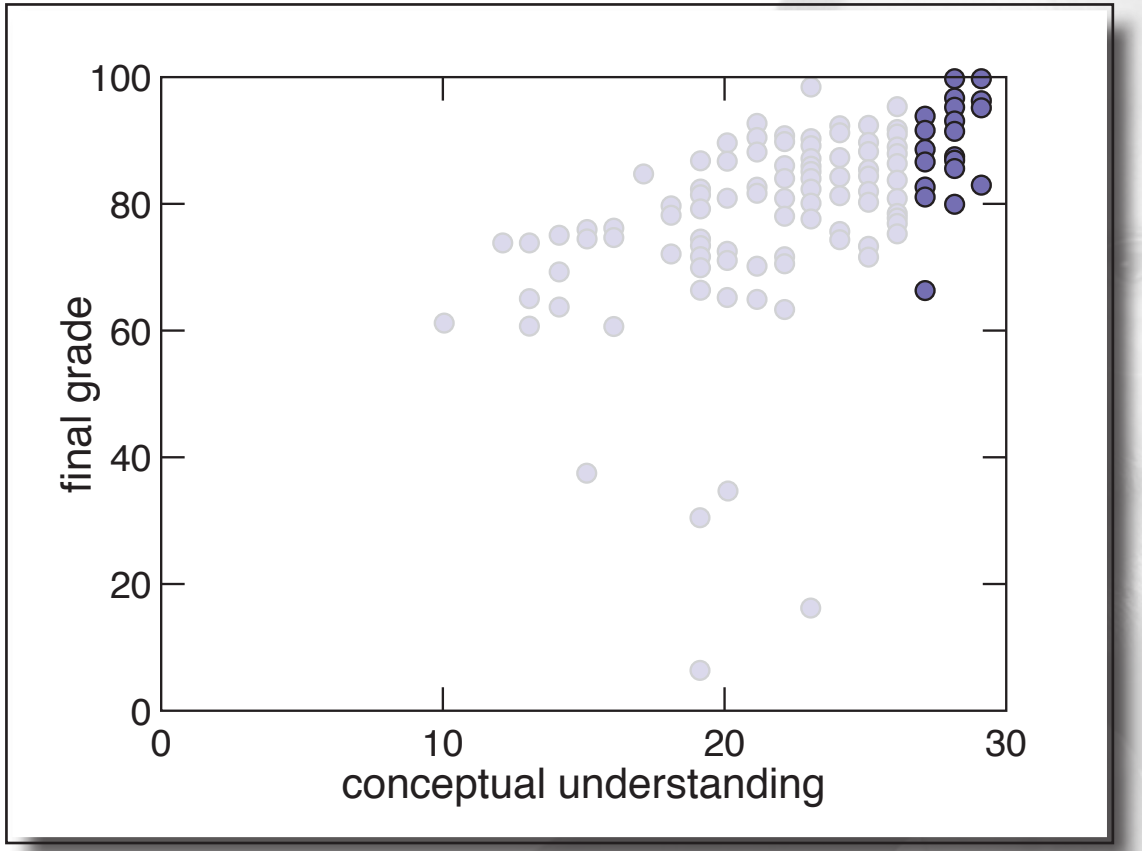


1 purposes

2 problems

3 improvements

top performers, broad grade distribution

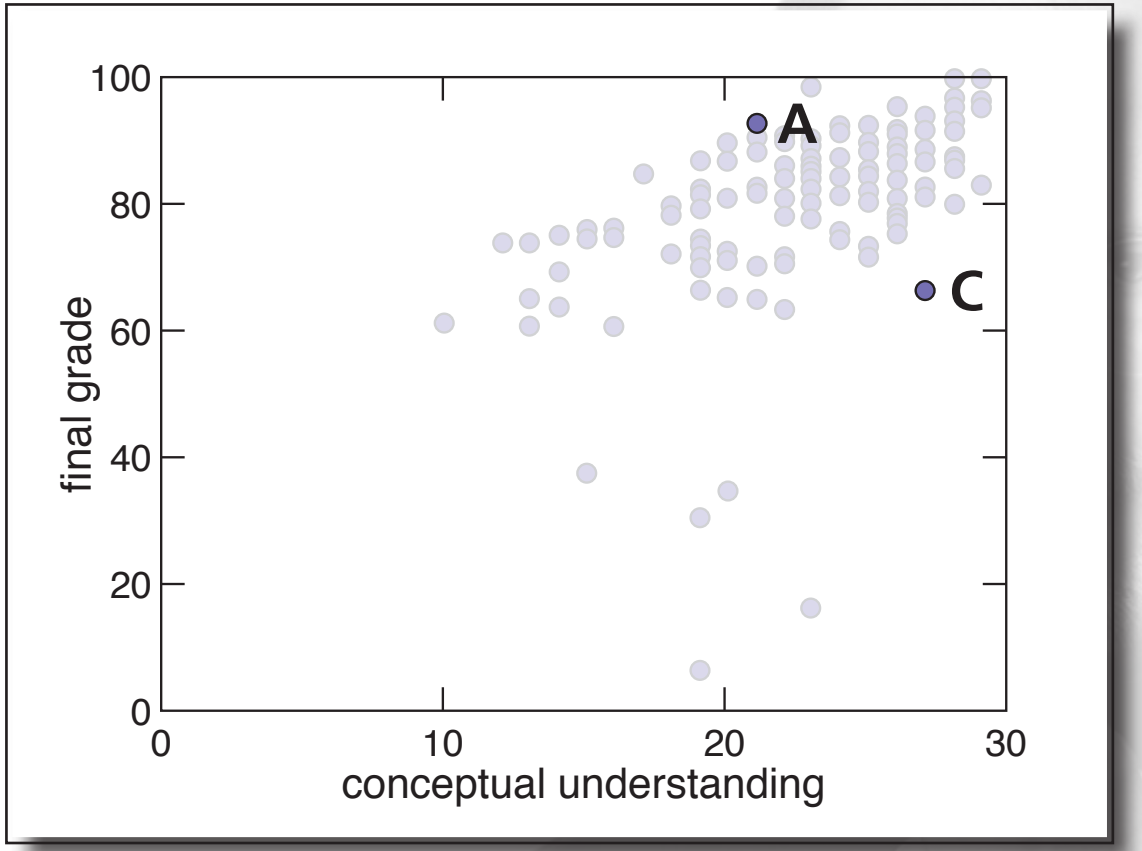


1 purposes

2 problems

3 improvements

objectivity or injustice?

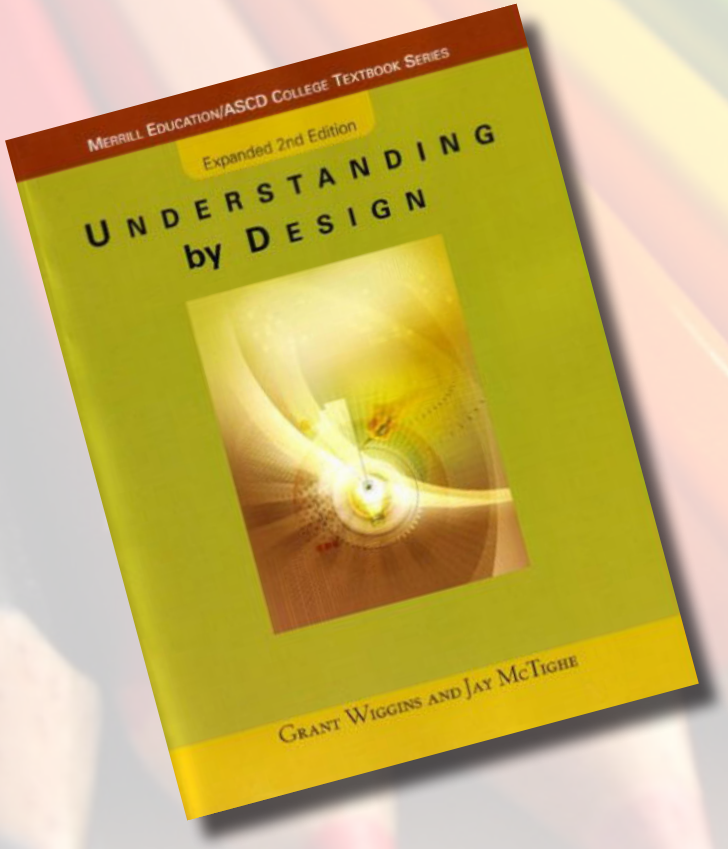


1 purposes

2 problems

3 improvements

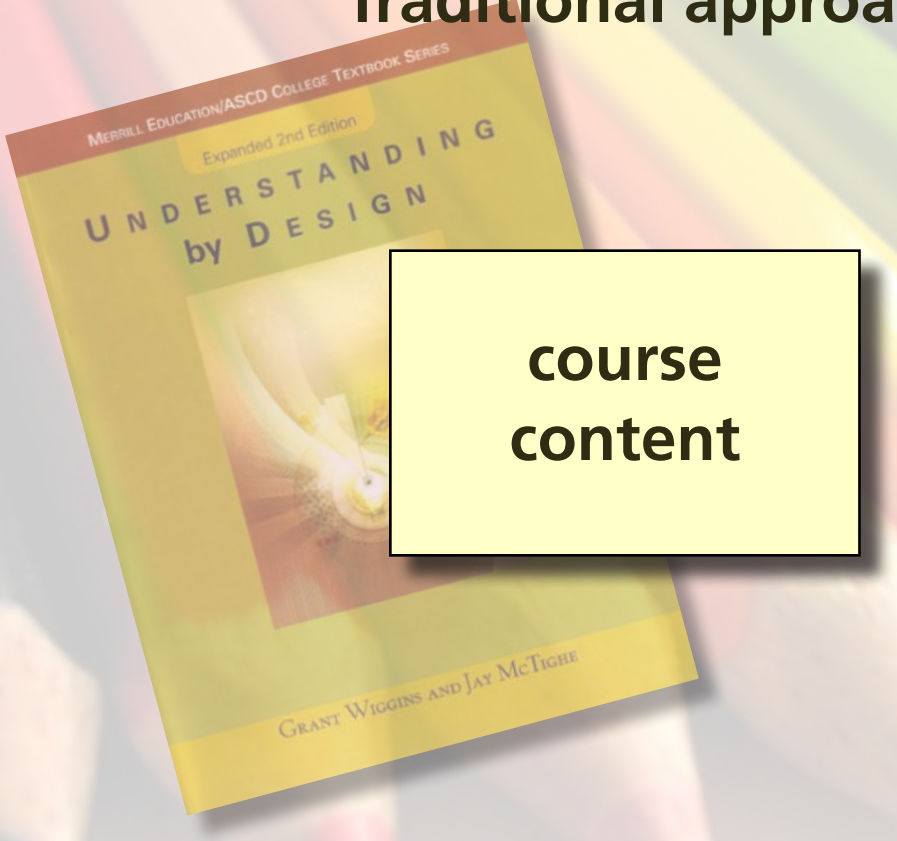
focus on skills, not content



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

1. purposes
2. problems
3. improvements

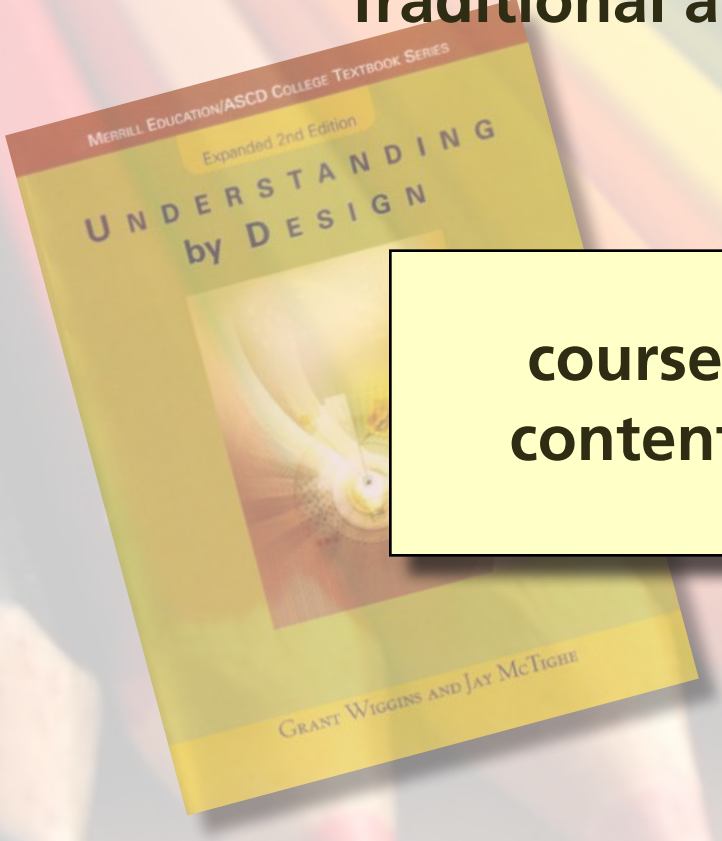
Traditional approach to course planning



course content

1. purposes
2. problems
3. improvements

Traditional approach to course planning

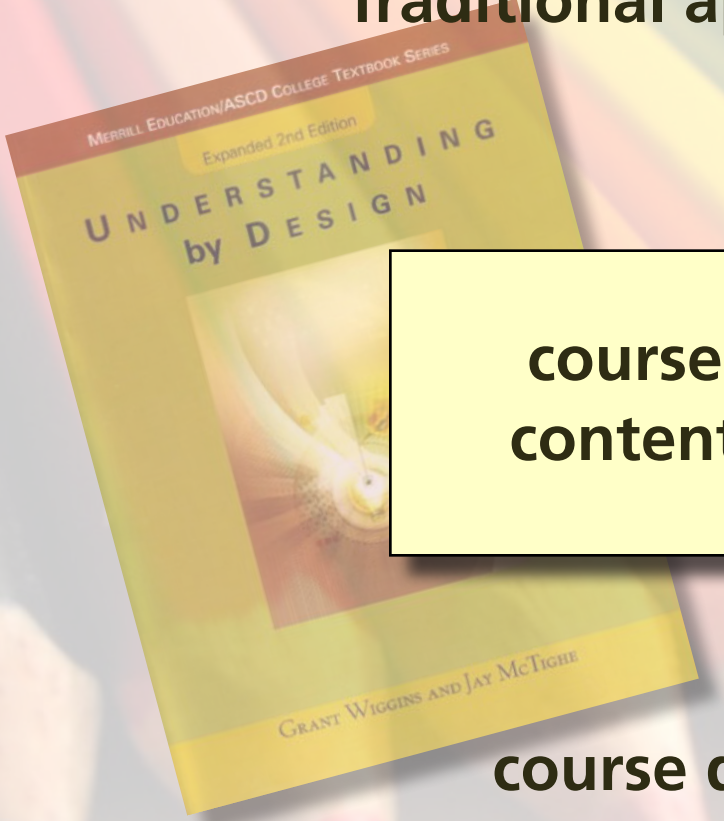


course content

assessment

1. purposes
2. problems
3. improvements

Traditional approach to course planning

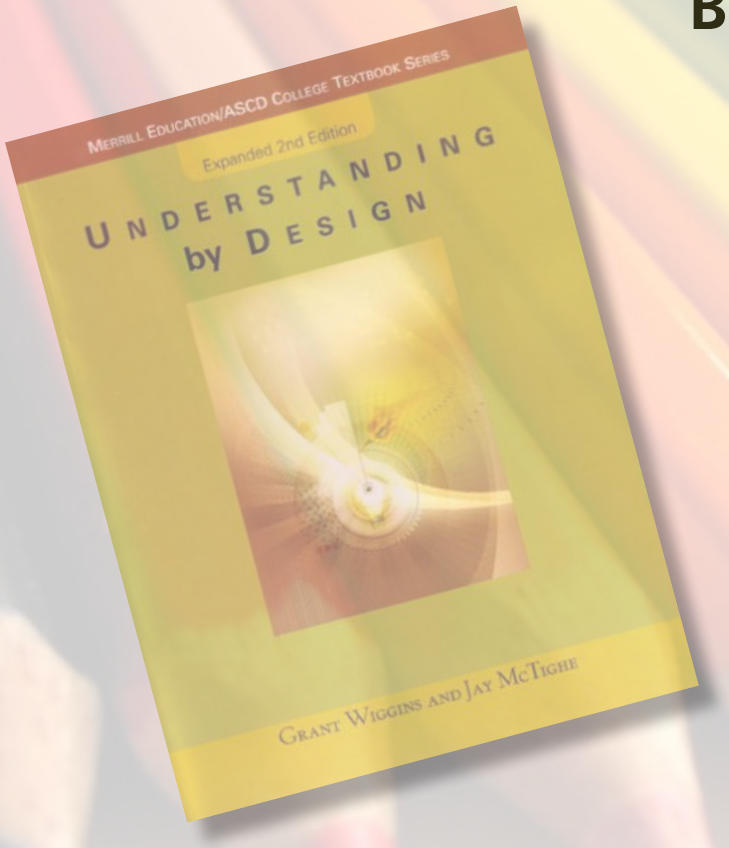


course content → assessment

course determined by content

1. purposes
2. problems
3. improvements

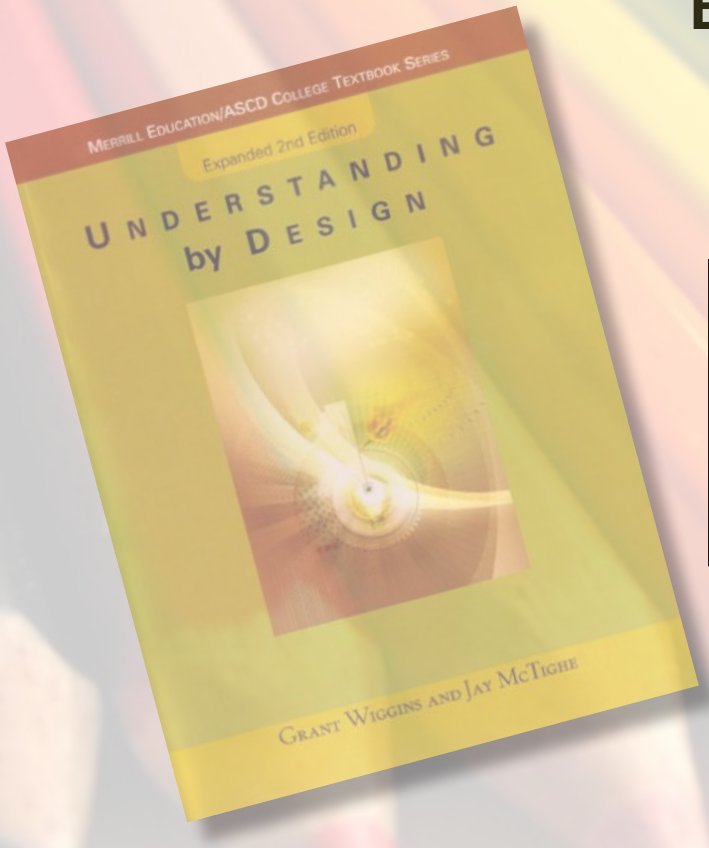
Backward design



desired outcomes

1. purposes
2. problems
3. improvements

Backward design

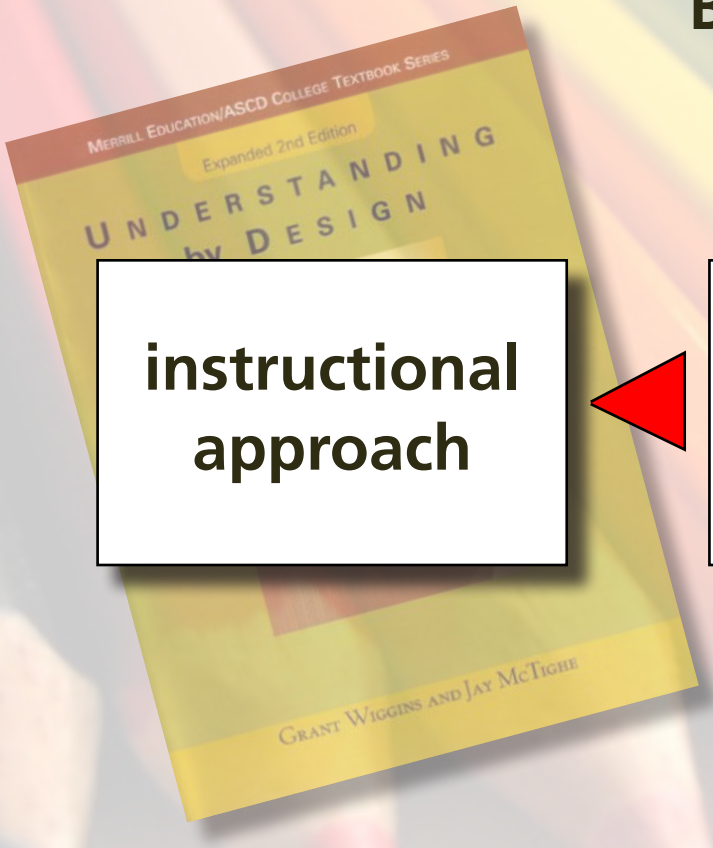


desired outcomes

acceptable evidence

1. purposes
2. problems
3. improvements

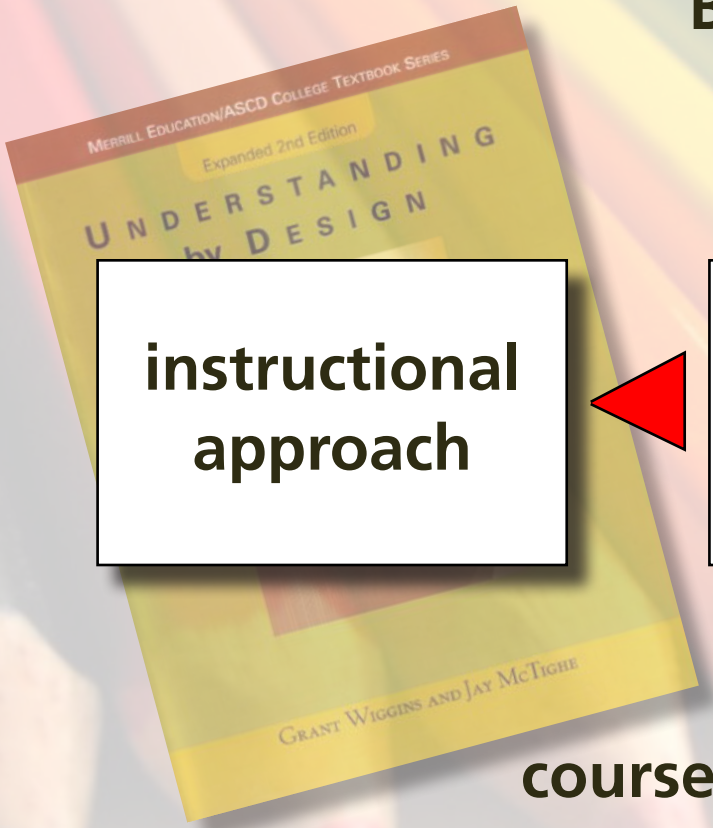
Backward design



instructional approach ◀ acceptable evidence ◀ desired outcomes

1. purposes
2. problems
3. improvements

Backward design

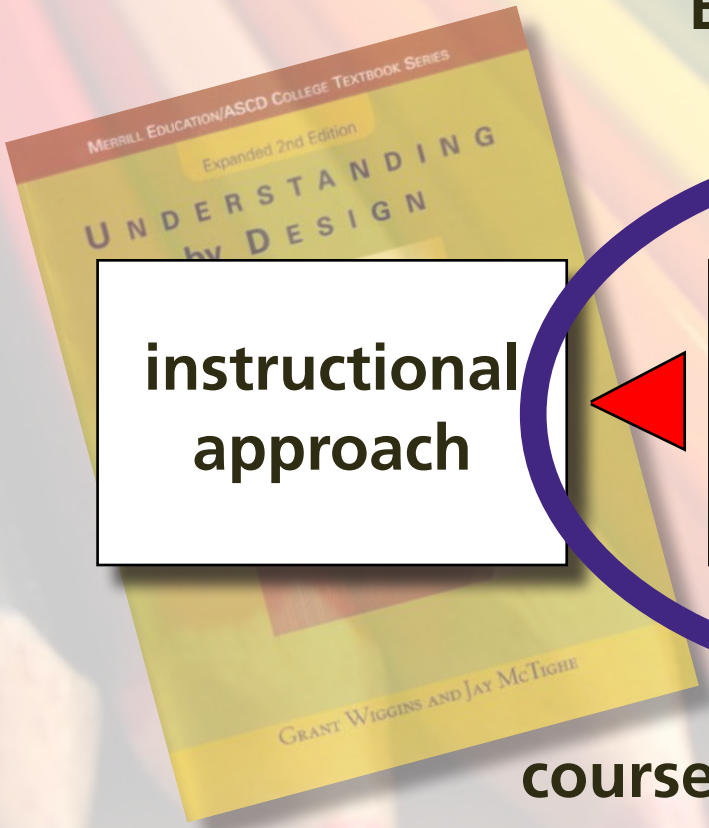


instructional approach ← **acceptable evidence** ← **desired outcomes**

course defined by outcomes

1. purposes
2. problems
3. improvements

Backward design



instructional approach ← **acceptable evidence** ← **desired outcomes**

course defined by outcomes

1. purposes
2. problems
3. improvements

resolve coach/judge conflict

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

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

WRITING RUBRIC

Rubric for Calibrated Peer Review

		1 = needs improvement does not meet expectations entirely	2 = satisfactory meets expectations **(what you should aim for)**	3 = admi… exceeds expectations (**rarely** selected)
Structure	Title	Wordy, long, unimaginative, or inappropriate title	Basic title	Catchy title drawing audience into article
	Opening	Missing a "hook" or a lead in the first paragraphs AND does not orient reader to subject	Hook or lead present OR first few paragraphs orient reader to subject	Compelling audience appropriate hook or lead present AND first few paragraphs orient lay reader to subject
	Paragraph length	Many paragraphs are long (6 or more sentences)	Some paragraphs are long (6 or more sentences), most are short (1-5 sentences)	All paragraphs are short (1-5 sentences)
	Organization	Lacks organization, no logical headings, no transitions between paragraphs	A few headings OR most paragraphs linked by transitions	Headings structure paper in organized, logical way AND paragraphs linked by transitions
	Closing	Does not end compellingly or with an important idea AND does not tie back to opening	Summary-like closing, but does not tie back to title or opening hook	Ends compellingly with an important idea or though provoking question AND ties back to title and opening hook
Content/Ideas	Scientific facts	Contains incorrect, misstated, irrelevant, or unnecessary facts	All facts are 100% correct, relevant, and necessary	Includes fact-checked expert and/or lay testimony (newspaper article only)
	Sources/evidence	Does not back up facts with proper, convincing, or interesting sources or evidence	Most, but not all, facts backed up with proper, convincing, or interesting sources or evidence	
		Mostly predictable based on available	Some originality apparent	Original presentation of material; uses the unexpected to capture attention
		OR not aimed at	Material appropriate and aimed at target audience AND mostly avoids scientific contains no colloquialisms or tly uses clearly	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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MEDIUM
HIGH
LOW
UPLOAD
The New York Times
January 20, 2009
OBSERVATORY
Spectacular Supernova Obse
By John Glenn
New York, N.Y. – People around the world witnessed th
in recorded history this morning. The supernova, nam
Eastern Time, appearing as bright as the full moon. Af
continued to shine for several hours.
Traffic was interrupted in New York City, as early-ri
at the amazing sight. As of press ti
Galileo
20 January 2008
Yesterday at about 4 p.m., I observed a pec
appeared in the sky. A glowing flash emitted
seconds, accompanied its appearance. The o
it even in broad daylight. How did this unprece
its consequences for Earth? In order to unders
on Earth will most likely ever see again, we hav
galaxie. To fully appreciate it and not be alarme
understand the life cycle of stars and how the
classified as consisting of eight
nt new addition to night sky
pires fear and awe – Mona Lisa
By now everyone has noticed the
mistakable new addition to our sky, which
utshines 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
and powerful cosmic events that occur in
what often appears to be a
new and glaring addition that
so many fears is in
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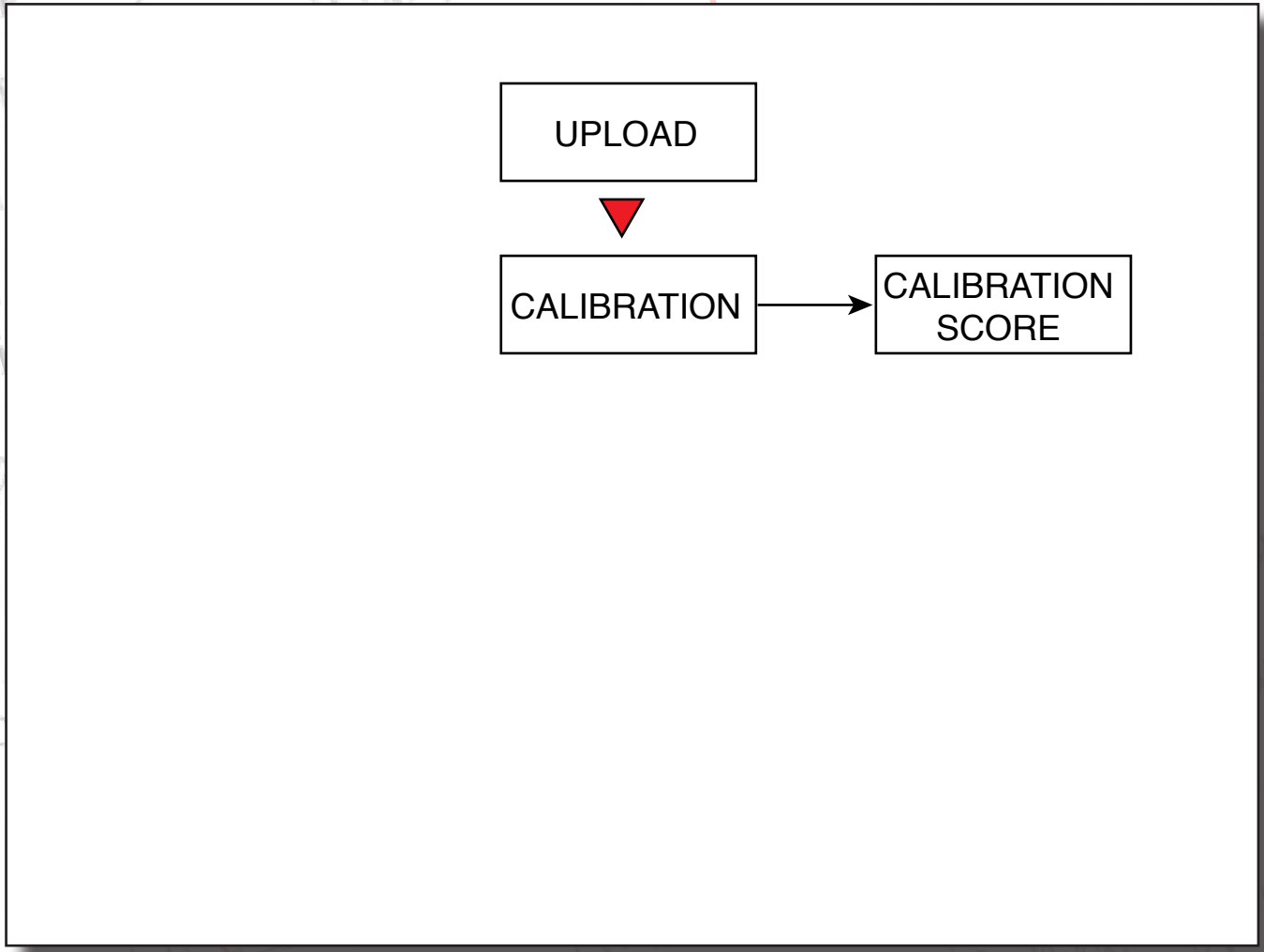
1 purposes
2 problems
3 improvements



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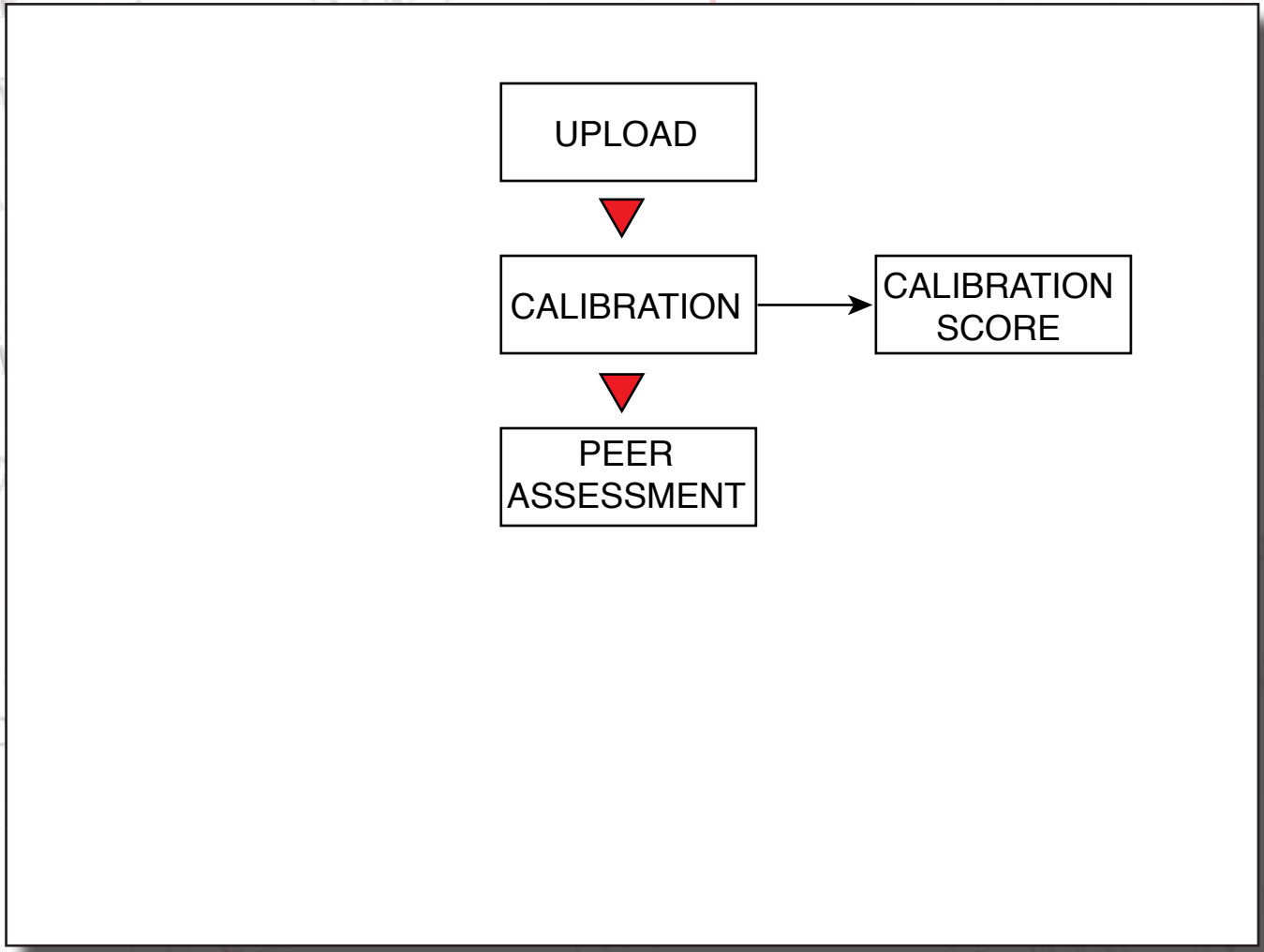
3 improvements



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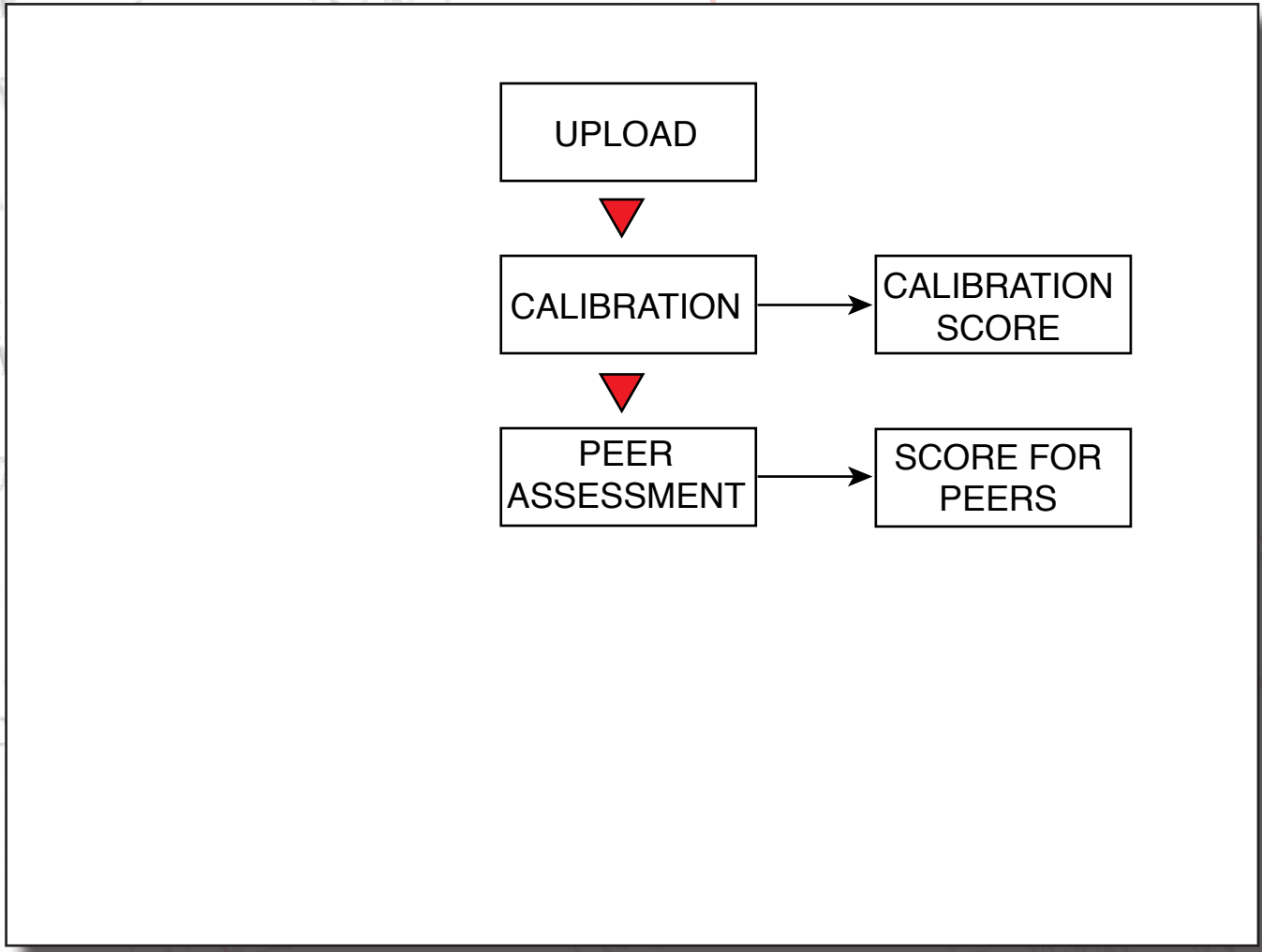
1 purposes

2 problems

3 improvements



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1 purposes

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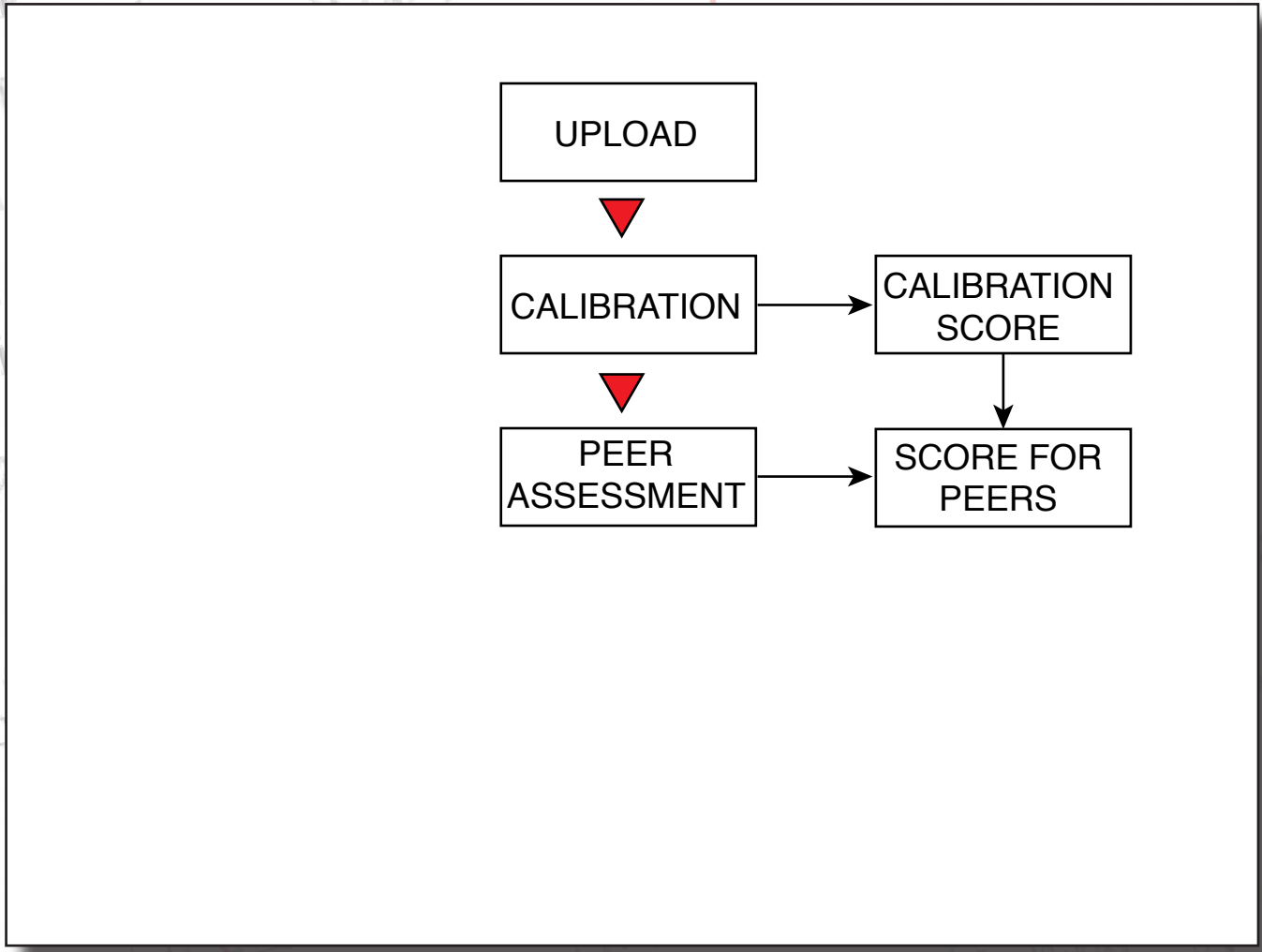
3 improvements



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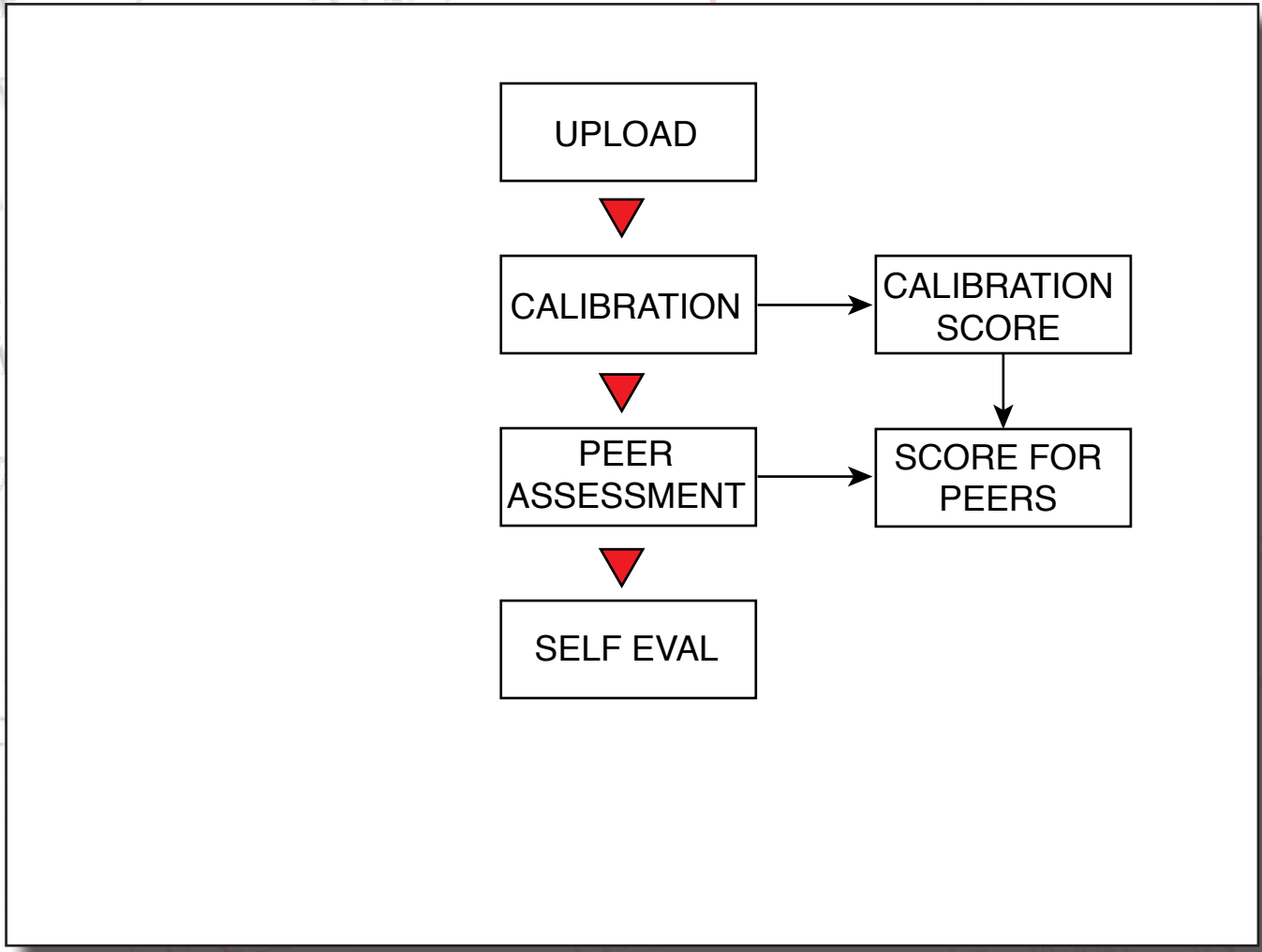
1 purposes

2 problems

3 improvements



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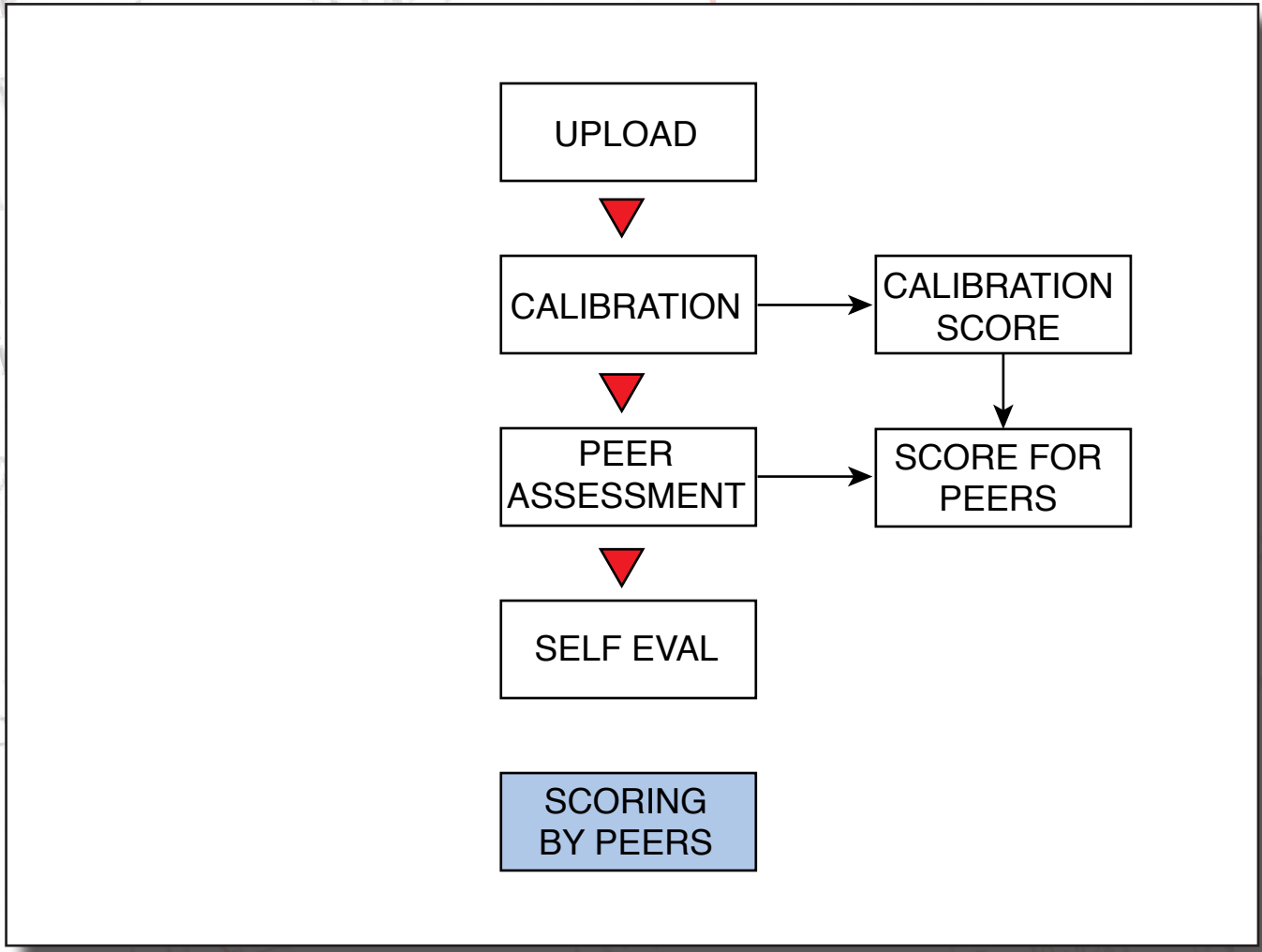
1 purposes

2 problems

3 improvements



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1 purposes

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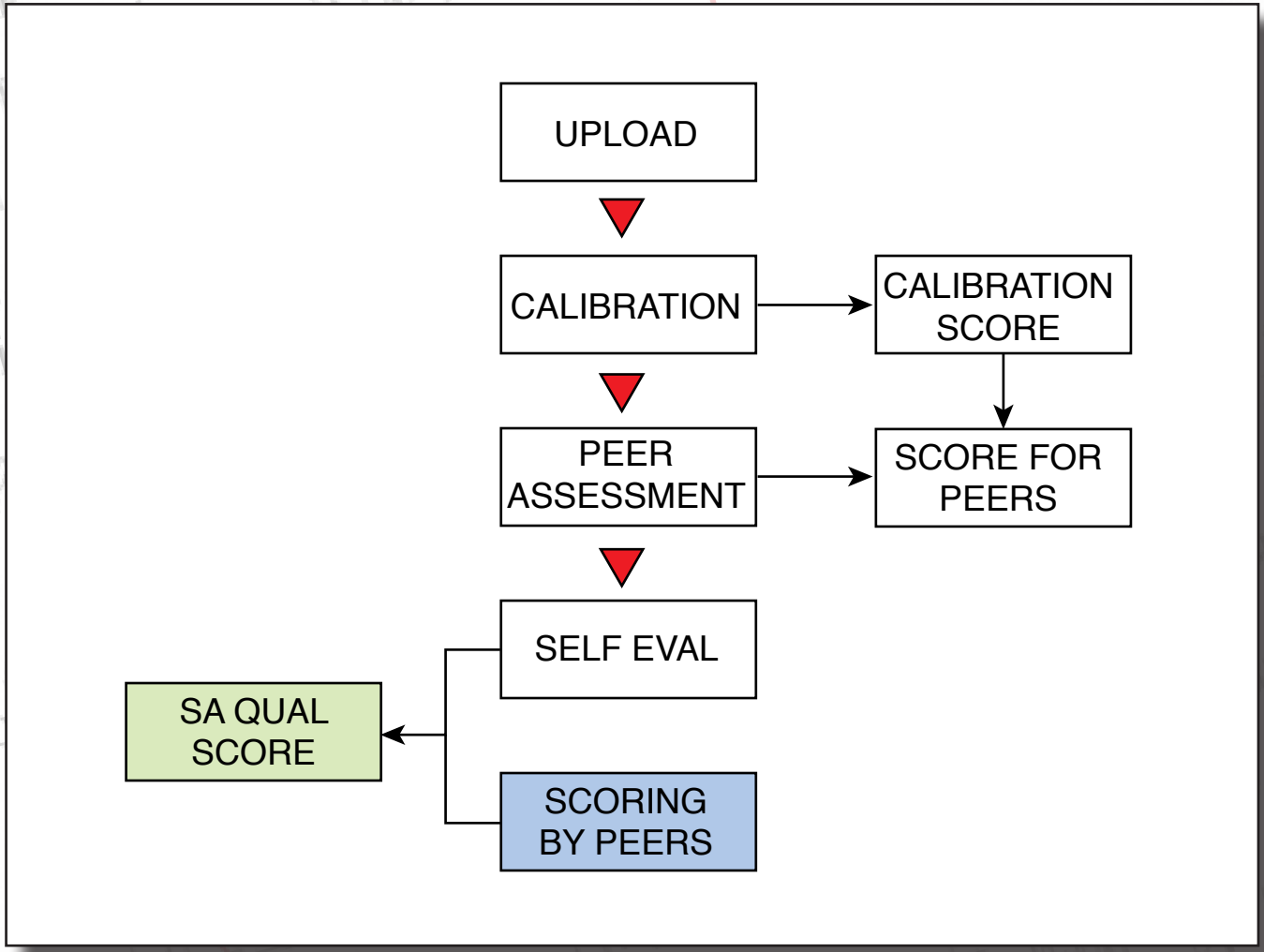

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1 purposes

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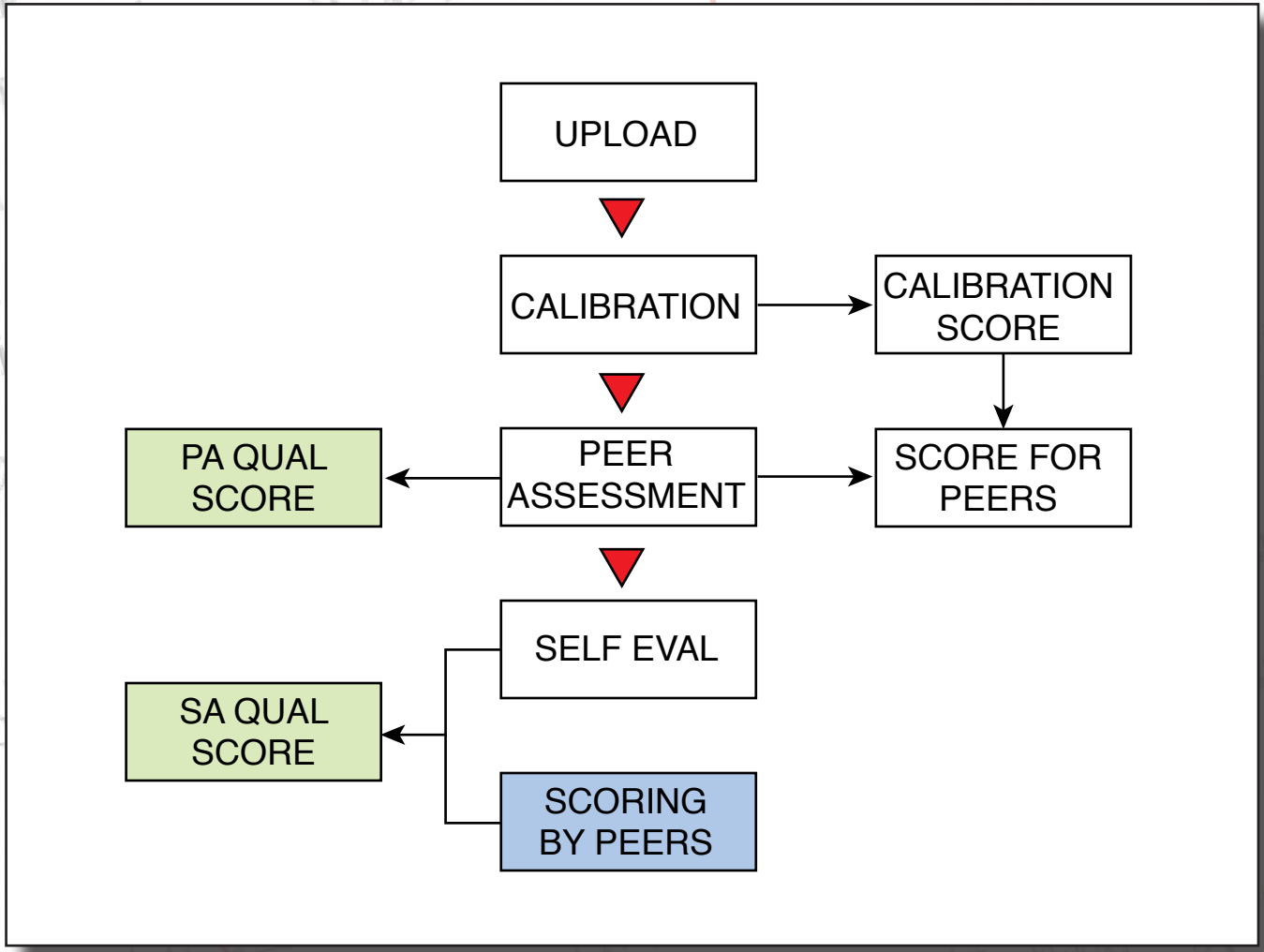

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1 purposes

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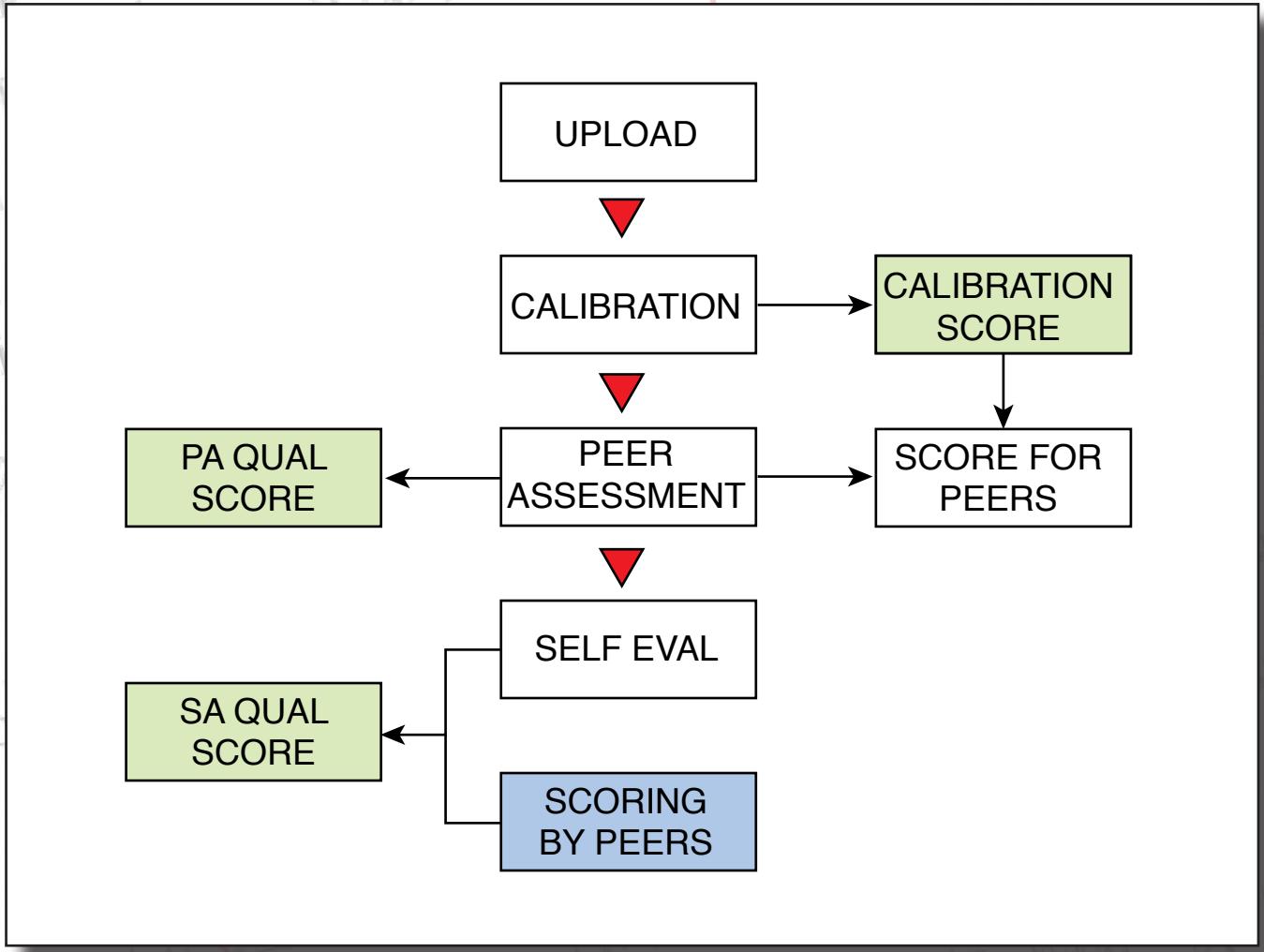

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1 purposes

2 problems

3 improvements


rethink
assessment

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