Assessment: The silent killer of learning

Faculty Retreat
ETH Zurich
Zurich, Switzerland, 16 January 2017
Assessment: The silent killer of learning

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kosten
1. die Kosten (pl.)
2. kostbar
3. überreichlich

krank
1. die Krankheit, –, en

cow

das Kind, –es, –en
1. der Kellner, –s, –

kennen
1. kennen-gekann
2. kennen-lern
3. kennenlernen
4. erkennen

magnificent
1. magnificenter

splendid
1. splendider

glorious
1. glorious

think
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

2 problems
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
2 problems
inauthentic tests
what is the meaning/definition of...?
inauthentic problem solving
purposes

problems
purposes

problem

outcome

1 purposes

2 problems
1 purposes

2 problems
1 purposes
2 problems
1 purposes
2 problems

problem \[\text{UNKNOWN}\] solution \[\text{KNOWING}\] outcome
1 purposes
2 problems
1 purposes
2 problems
problem solution outcome

problem procedure answer

1 purposes 2 problems
1 purposes
2 problems

1. REMEMBERING
2. UNDERSTANDING
3. APPLYING
4. ANALYZING
5. EVALUATING
6. CREATING

Thinking skills
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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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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Assumptions
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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
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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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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?

\[ t_{\text{wait}} = \frac{T_{\text{shop}}}{N_{\text{spaces}}} \]
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How long do you have to wait before someone frees up a space?

\[ t_{\text{wait}} = \frac{T_{\text{shop}}}{N_{\text{spaces}}} \]
computers can do this!
purposes 2 problems
REAL problem solving

1 purposes
2 problems
grading incompatible with real problem solving

1 purposes
2 problems
1 purposes 2 problems
isolation

1 purposes
2 problems
We will use spherical coordinates:

\[ 0 \leq \varphi \leq \frac{\pi}{4}, \quad 0 \leq \theta \leq 2\pi, \quad 0 \leq \rho \leq 1. \]

The integral is thus:

\[
\int_{\varphi=0}^{\frac{\pi}{4}} \int_{\theta=0}^{2\pi} \int_{\rho=0}^{1} \rho^2 \sin \varphi \, d\rho \, d\theta \, d\varphi
\]

\[
= \left\{ \int_{\theta=0}^{2\pi} \right\} \left\{ \int_{\rho=0}^{1} \right\} \left\{ \frac{\pi}{4} \sin (2\varphi) \, d\varphi \right\} = 0
\]
high-stakes examinations promote cramming

1 purposes
2 problems
information stored in short-term memory
information stored in short-term memory

no retention

no transfer
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 ...

List the three important concepts that the Law of conservation of Energy leads to: Equilibrium (boring), Thermodynamics (boring), Kinetics (bow-chicka-wow-wow).
1. purposes
2. problems
only lowest order thinking skills can be judged objectively
and then there is…

• grade inflation
• cheating
1 purposes
2 problems
3 improvements
1 mimic real life

① purposes  ② problems  ③ improvements
open-book exam

1 purposes
2 problems
3 improvements
1. purposes
2. problems
3. improvements

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating
Remembering
Understanding
Applying
Analyzing
Evaluating
Creating

1. purposes
2. problems
3. improvements
focus on feedback, not ranking
objective ranking: a myth

1 purposes
2 problems
3 improvements
2 metrics, 2 results

![Graph showing the relationship between conceptual understanding and final grade.](image-url)
Aristotelian thinkers

[Graph showing a scatter plot with axes labeled 'conceptual understanding' and 'final grade']

1 purposes
2 problems
3 improvements
top performers, broad grade distribution

1 purposes
2 problems
3 improvements
objectivity or injustice?

![Graph showing the relationship between conceptual understanding and final grade.](image)

1 purposes

2 problems

3 improvements
focus on skills, not content
Grant Wiggins and Jay McTighe, *Understanding by Design* (Prentice Hall, 2001)
Traditional approach to course planning

1. purposes
2. problems
3. improvements
Traditional approach to course planning

1 purposes
2 problems
3 improvements

- course content
- assessment
Traditional approach to course planning

course determined by content

course content

assessment

1 purposes
2 problems
3 improvements
Backward design

1. purposes
2. problems
3. improvements

desired outcomes
Backward design

1 purposes
2 problems
3 improvements

acceptable evidence

desired outcomes
Backward design

1. purposes
2. problems
3. improvements

- instructional approach
- acceptable evidence
- desired outcomes
Backward design

1. purposes
2. problems
3. improvements

course defined by outcomes

- instructional approach
- acceptable evidence
- desired outcomes
Backward design

1. purposes
2. problems
3. improvements

course defined by outcomes

instructional approach
acceptable evidence
desired outcomes
4 resolve coach/judge conflict

1 purposes  2 problems  3 improvements
use external evaluators
peer- and self-assessment
Calibrated Peer Review

cpr.molsci.ucla.edu

1 purposes
2 problems
3 improvements
rethink assessment
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