Assessment: The Silent Killer of Learning

Stanford University
Stanford, CA, 12 May 2017
Assessment: The Silent Killer of Learning

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

krank
1. die Krankheit, —, en

cow

das Kind, — (e)s, —en
1. kindisch
2. kindlich

der Kellner, —s, —
1. der Keller, —s

magnificent

splendid

glory

das Kind, — (e)s, —en

kennen
1. kennen-gekannt
2. kennenlernen
3. kennen
4. erkennen
5. bekannt

think of
35% retained after 1 week
we only guarantee they’ll pass the test
assessment focused on ranking and classifying, not on developing 21st century skills
1 purposes
2 problems
purposes

problems

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
purposes

problems
inauthentic tests

1 purposes

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

problems
1 purposes
2 problems
1 purposes
2 problems

**problem**

**outcome**

KNOWN
problem → solution → outcome

1. purposes
2. problems
purposes

1. problem

2. problems

solution

outcome

KNOWN

UNKNOWN

EDUCACION
1. purposes

2. problems

problem

solution

outcome

UNKNOWN

KNOWN
purposes

problems

1. problem
2. solution

outcome

unknown

unknown

known

problem

procedure

answer

unknown
1. purposes
2. problems

Thinking skills:
- Creating
- Evaluating
- Analyzing
- Applying
- Understanding
- Remembering
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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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
problems
purposes

problems
REAL
problem solving

problem

solution

outcome

purposes

problems
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:

\[ 0 \leq \phi \leq \frac{\pi}{2}, \quad 0 \leq \theta \leq 2\pi, \quad \leq \varphi \leq \pi. \]

The integral is thus:

\[
\int_{0}^{\pi/2} \int_{0}^{2\pi} \int_{0}^{\pi} f(\rho \cos \theta \sin \varphi, \rho \sin \theta \sin \varphi, \rho \cos \varphi) \rho^2 \sin \theta \, d\rho \, d\theta \, d\varphi
\]

\[
= \left\{ \int_{0}^{\pi/2} \sin(2\varphi) \, d\varphi \right\} \left\{ \frac{1}{2} \right\}
\]

\[
= 0
\]

2 problems
high-stakes examinations promote cramming

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

Information stored in short-term memory

No retention
No transfer
assessment produces a conflict
assessment produces a conflict

do you need a coach or a judge?

1 purposes
2 problems
conflict resolved by:

objectivity (fairness, reliability)

1 purposes
2 problems
List the three important concepts that the Law of conservation of Energy leads to:

1. Equilibrium (stating)
2. Thermodynamics (boring)
3. Kinetics (bow-chicka-wow-wow)

The Law of definite composition (Dalton’s Law):

- Substance always contains exactly the
- composer by mass.

1 purposes
2 problems
REMEMBERING
UNDERSTANDING
APPLYING
ANALYZING
EVALUATING
CREATING

1 purposes
2 problems
only lowest order thinking skills can be judged objectively
and then there is…

- grade inflation
- cheating

1 purposes
2 problems
1 purposes
2 problems
3 improvements
1. mimic real life
open-book exam

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

REMEMBERING
UNDERSTANDING
APPLYING
ANALYZING
EVALUATING
CREATING
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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

- final grade vs conceptual understanding
top performers, broad grade distribution

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

1. purposes
2. problems
3. improvements
objectivity or injustice?

final grade vs conceptual understanding

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

1 purposes
2 problems
3 improvements

course content
Traditional approach to course planning

- **purposes**
- **problems**
- **improvements**

Course content → assessment
Traditional approach to course planning

1 purposes
2 problems
3 improvements

course content
assessment

course determined by content

Understanding by Design
Grant Wiggins and Jay McTighe
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

instructional approach -> acceptable evidence -> desired outcomes

course defined by outcomes

1 purposes  2 problems  3 improvements
Backward design

Course defined by outcomes

1. Purposes
2. Problems
3. Improvements

Instructional approach

Acceptable evidence

Desired outcomes
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

cpr.molsci.ucla.edu

1. purposes
2. problems
3. improvements
rethink assessment
For a copy of these slides:

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