

Carnegie Mellon University

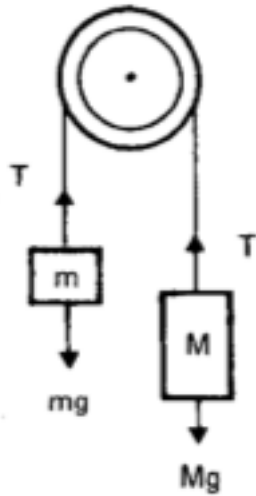


Learning Science & Pedagogical Innovation In the Humanities and Social Sciences

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Disciplinary Differences



Calculate the rope's tension in terms of...



Analyze this political cartoon in terms of ...

Fundamentals of educational innovation

Learner centered

“Learning results from what the student does and thinks...”

– Herb Simon, CMU Professor, Nobel Laureate

Technology used judiciously

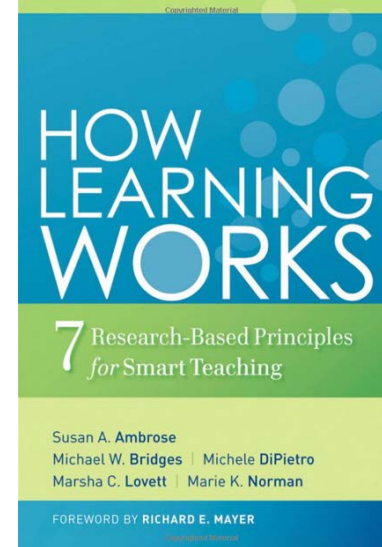
NOT tail wagging the dog

Research based

Applying learning science to design instruction

Data informed

Leveraging data for ongoing improvement

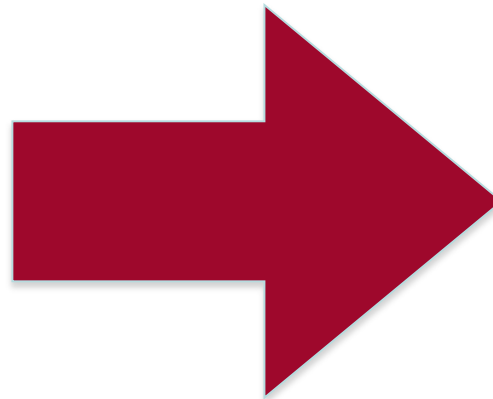


CMU Statistics Study

Traditional
College Course

> 100 hours

~3% learning gain



Adaptive, Data-
Driven OLI

Course

< 50 hours

~**18%** learning gain

Replicated 3 times at CMU
External report by ITHAKA

Lovett, Meyer, & Thille (2008, 2010).
See jime.open.ac.uk/jime/article/view/2008-14

Learning activities are instrumented to continuously assess student learning

Feedback to Student

Learn by Doing

Now you complete the table by computing the conditional percentages for the males.
What is the correct number for the cell indicated by the question mark?

Body Image				
Gender				
Female	560/760=73.7%	163/760=21.5%	37/760=4.9%	760/760=100%
Male	?			100%

295/560=52.7%
 295/855=34.5%
 295/440=67%
 295/1200=24.6%

Page 1 of 4 Next

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Page 1 of 4 Next

✘ That's not quite right. Focus only on the 440 males. What percentage of them responded "About right"?

Feedback to Instructor

Module 2

Examining Relationships

PREDICTED MASTERY LEVELS

Learning Objectives

- Classify a data analysis situation (involving two variables) according to the "role type classification," and state the appropriate display and/or numerical measures that should be used in order to summarize the data. [Show Sub-Learning Objectives]
- Produce a two-way table, and interpret the information stored in it about the association between two cat. variables by comparing conditional percents. [Show Sub-Learning Objectives]
- Graphically display the relationship between two quantitative variables and describe: a) the overall pattern, b) striking deviations from the pattern. [Show Sub-Learning Objectives]
- Interpret the value of the correlation coefficient, and be aware of its limitations as a numerical measure of the association between two quantitative variables. [Show Sub-Learning Objectives]
- In the special case of linear relationship, use the least squares regression line as a summary of the overall pattern and use it to make predictions. [Show Sub-Learning Objectives]
- Recognize the distinction between association and causation, and identify potential lurking variables for explaining an observed relationship. [Show Sub-Learning Objectives]
- Recognize and explain the phenomenon of Simpson's Paradox as it relates to interpreting the relationship between two variables. [Show Sub-Learning Objectives]

Applying this approach to...

Modern Languages – French language & culture

Philosophy – analyzing arguments

English – prose style and rhetoric

Psychology – general introduction

Economics – microeconomics



Apply **learning science results** to
design innovative instruction

Analyze **learning data** to guide
iterative design