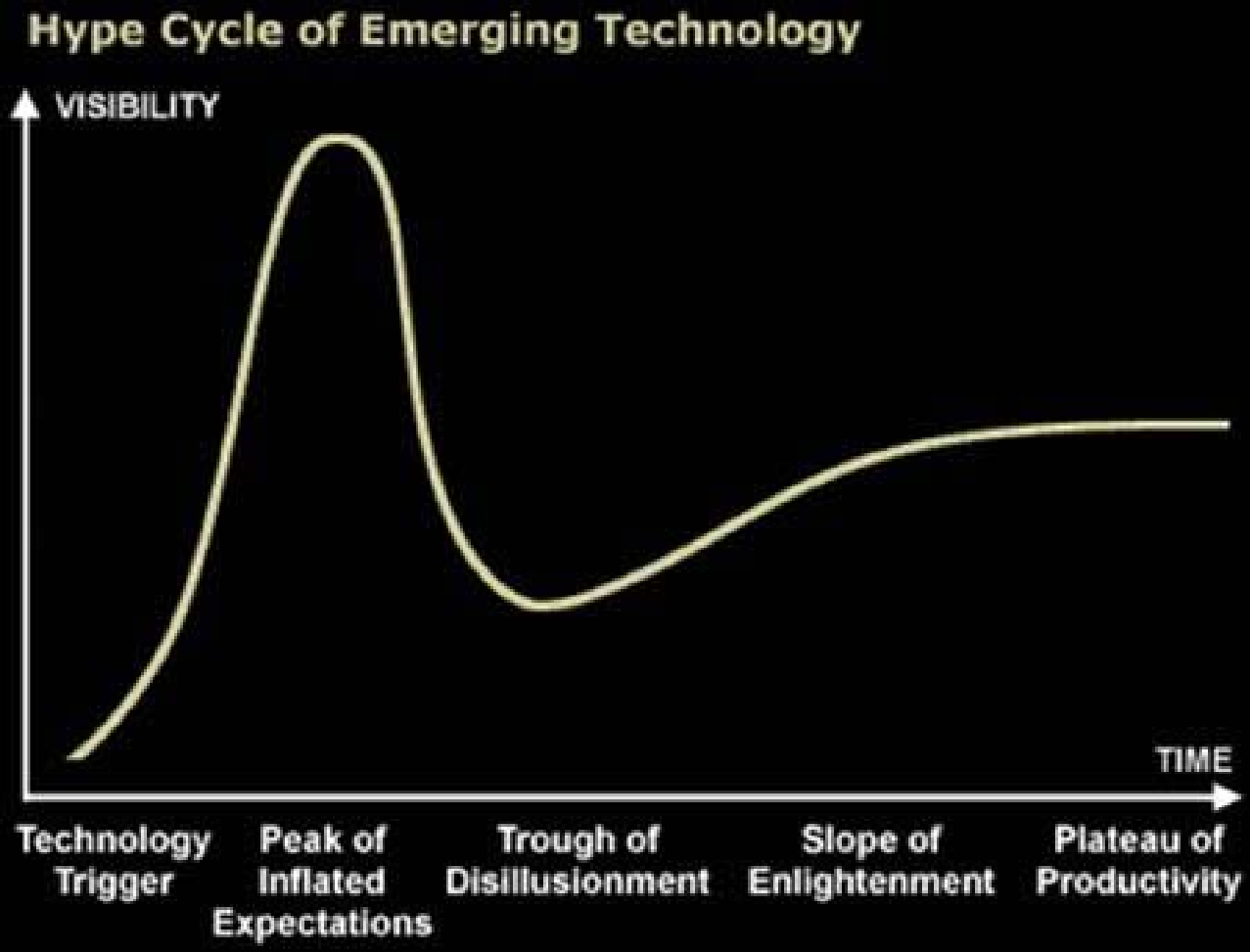
The Science of Learning and Implications for E-Learning Systems

Dr. Joel M. Smith
Vice Provost and CIO,
Carnegie Mellon University

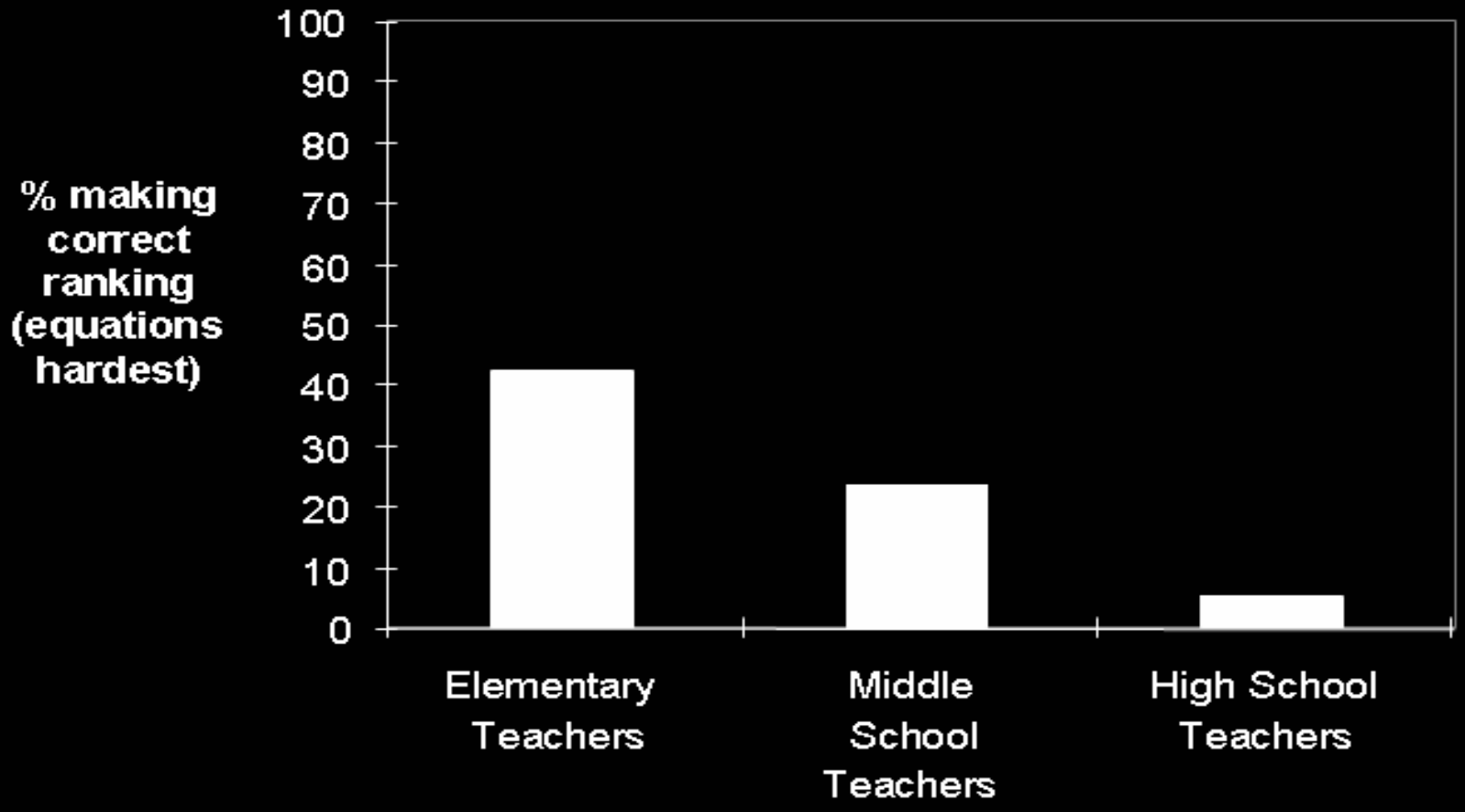
E-mail: joelms AT cmu.ed

Hype About eLearning



Ref: Gartner Group

A Surprising Source of the "Trough of Disillusionment": The Expert's Blindspot



Ref. Nathan, M.J. & Koedinger, K.R. (2000)

Another Source of the" Trough of Disillusionment" – No Evidence the Interventions Work

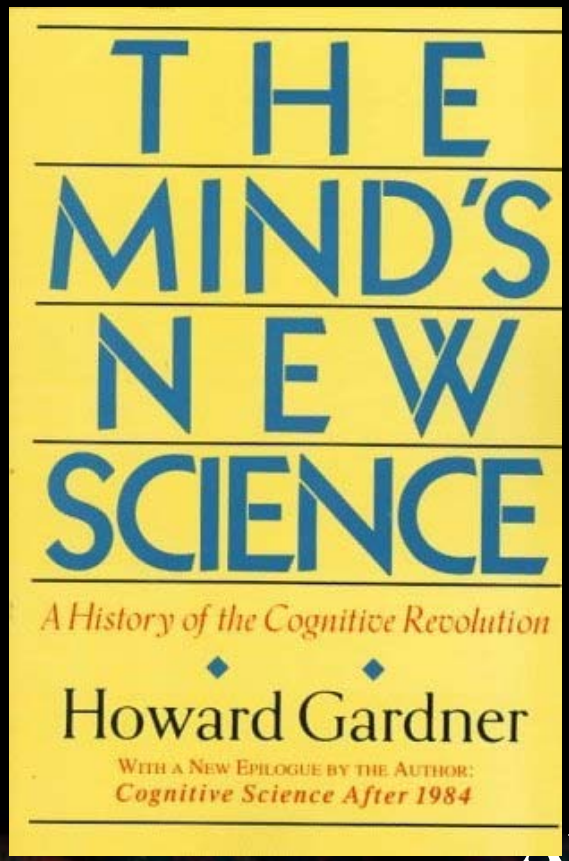
What Works Clearinghouse:

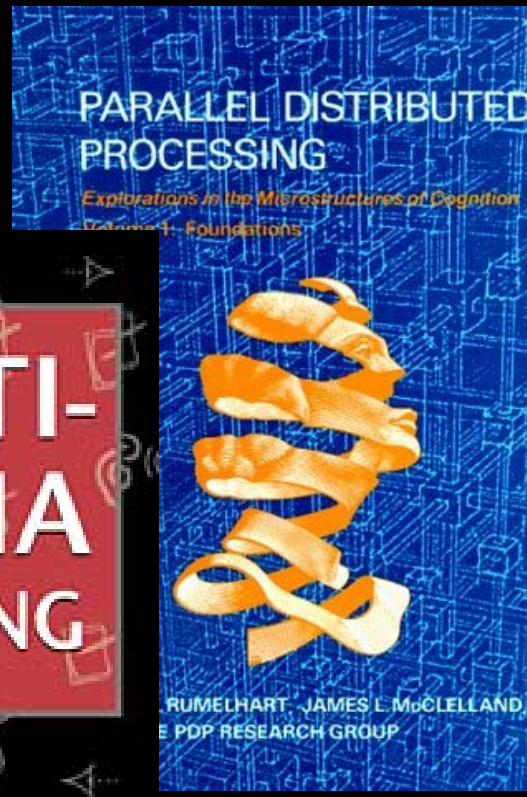
"Only 5 of the more than 40 middle school math interventions known to be available for adoption have any studies of their effectiveness that meet the WWC evidence standards."

http://www.whatworks.ed.gov/

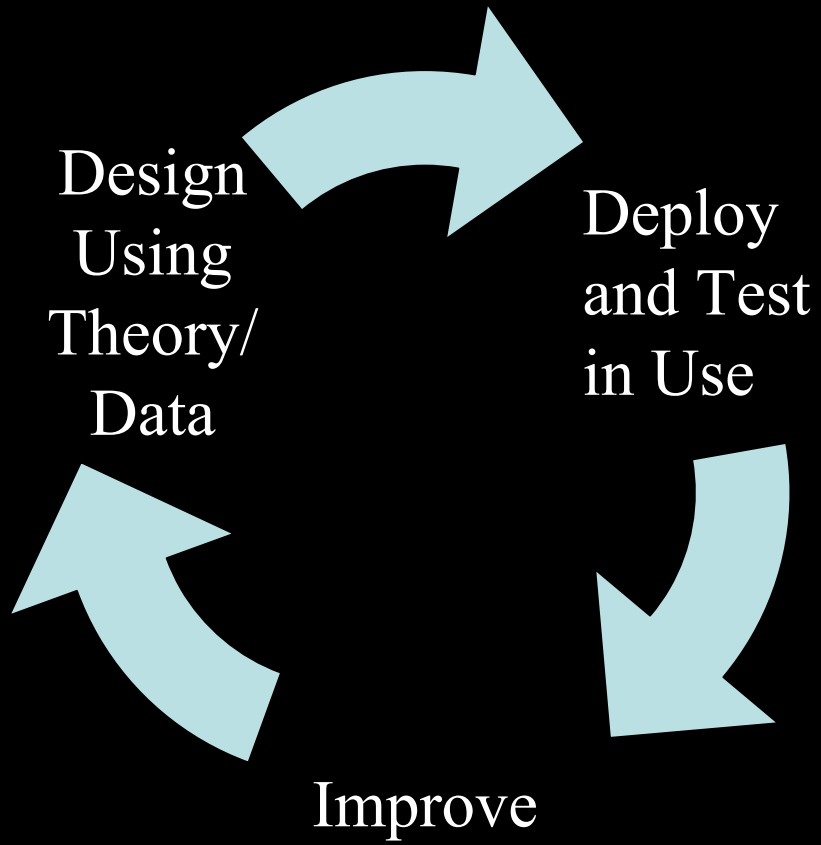
Getting to a "Plateau of Productivity"

Taking a Scientific Approach to eLearning





Requires a Scientific Approach: Use-Based Design



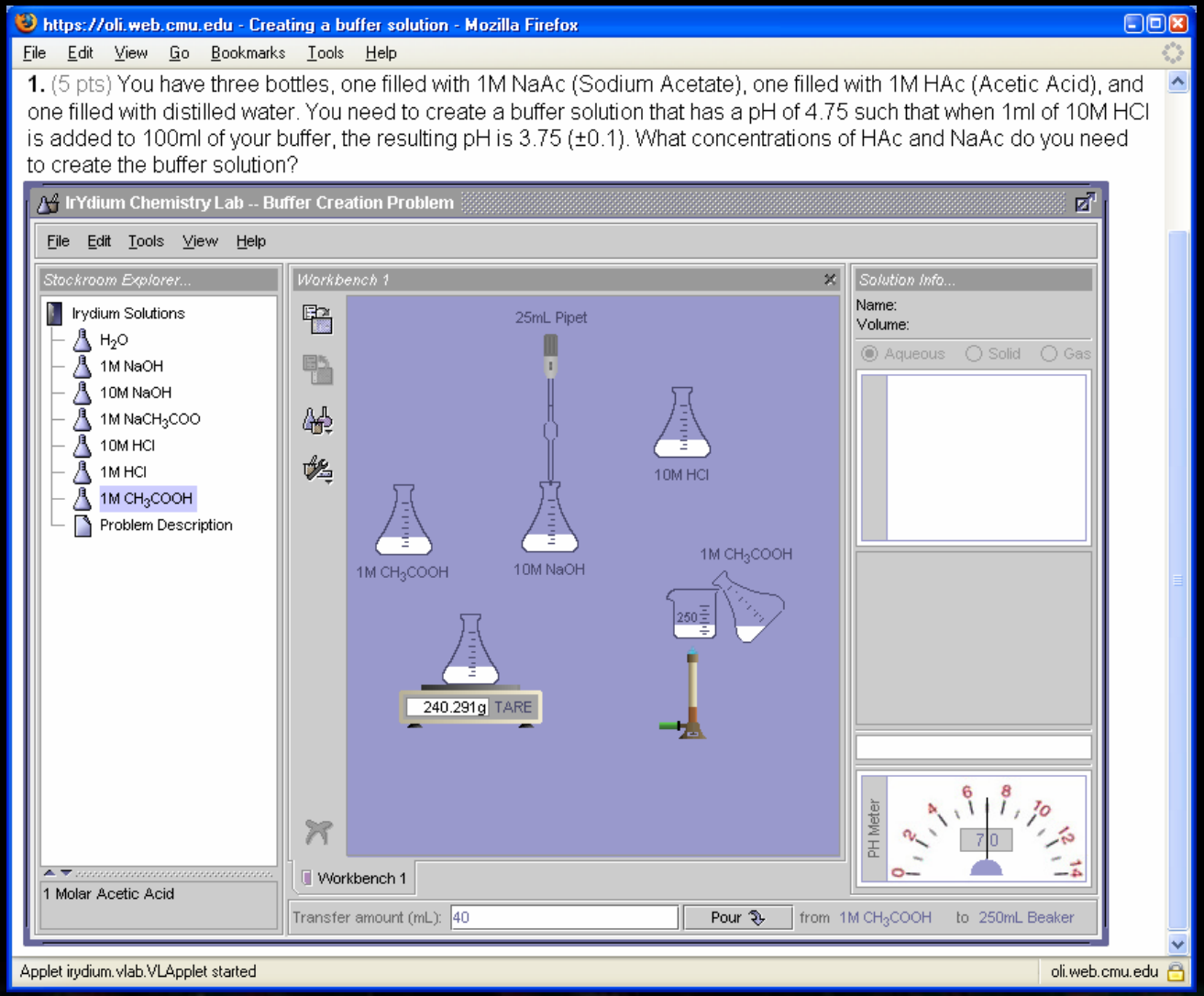
Formative Evaluation for eLearning Interventions – An Example

Laptop Program Hype

VS.

Laptop Program Reality

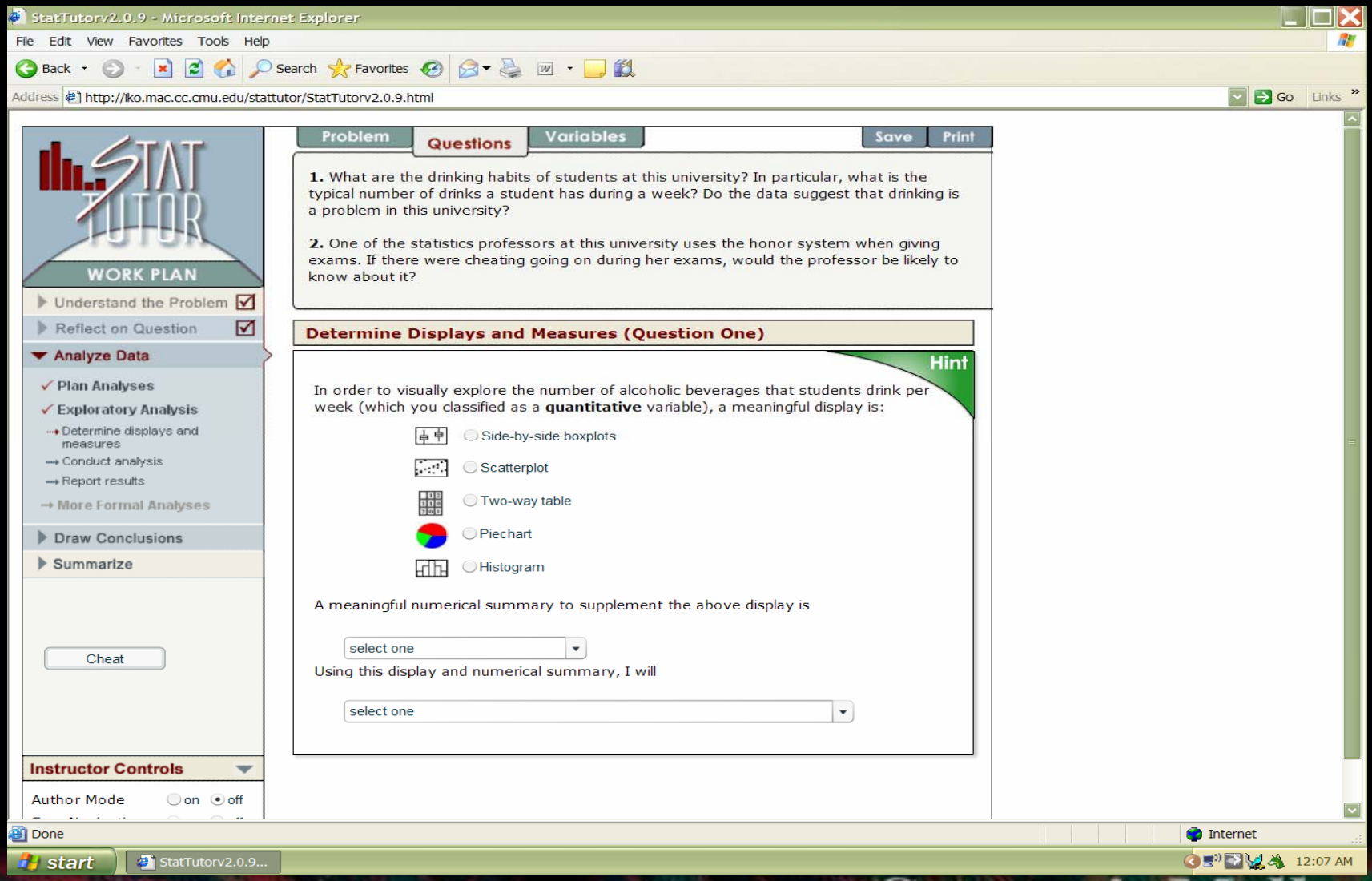
eLearning Can Be Transformative



www.cmu.edu/oli

Carnegie Mellon

eLearning Can Be Transformative



But…Show Us the Data!

EXAM	Descriptive Statistics	Traditional	Online
First Midterm *(EDA + Producing Data)*	Sample size Mean Standard Deviation	201 90.17 8.59	20 88.75 6.23
Second Midterm *(Probability)*	Sample size Mean Standard Deviation	202 81.62 14.25	20 81.45 13.82
Third Midterm *(All of inference)*	Sample size Mean Standard Deviation	201 85.87 11.91	20 85.10 16.80
FINAL *(comprehensive)*	Sample size Mean Standard Deviation	204 83.54 11.06	20 84.79 12.23

Ref: Marsha Lovett

What Do We Do?

Establish a *research and evaluation organization* in every educational system that evaluates eLearning interventions.

Time to Get Past the Hype

Accepting what "*looks like* it should work" will leave us in the eLearning "trough of disillusionment."

Let's Transform Education

Use scientific knowledge and techniques to get to the "plateau of productivity" and use technology to make our educational systems more effective!