

# Creating A Foundation for Open Knowledge

Technology Assessment of  
Web-based Learning

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# Overview



- ⌘ Problems of Access and Quality of Academic Content
- ⌘ Basic Strategy and Assumptions including Theory of Action
- ⌘ Hewlett Grantees & Demonstrations
- ⌘ Challenges

# UNESCO's Deputy Asst Director General for Communication and Information



⌘ *“Knowledge has become a principal force of social transformation. Knowledge-based and -led development holds the promise that many of the problems confronting human societies could be significantly alleviated if only the requisite information and expertise were systematically and equitably employed and shared.”*

# Problem

## ⌘ Lack of Access

- ☑ Technical -- Reliability, Bandwidth, Search Engines, Interoperability

- ☑ Cost

## ⌘ Lack of Quality

- ☑ Not Harnessing Power of Technology

- ☑ Little Quality Control

- ☑ Few Mechanisms to Evaluate

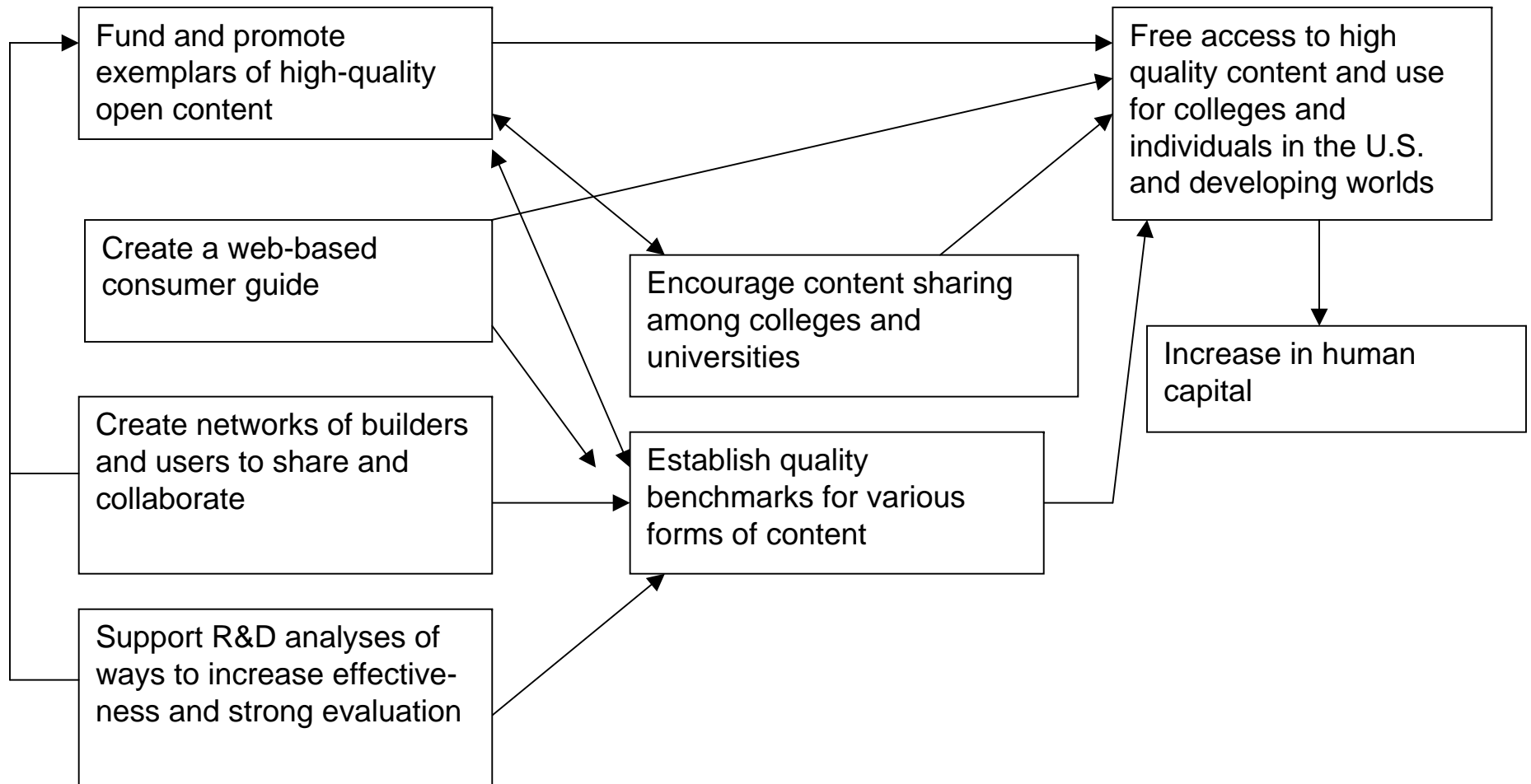
# Basic Strategy

- ⌘ Focus on high quality exemplars to enhance teaching and learning
  - ☑ Courseware, full courses, modules, learning objects, library collections, journal related data, etc.
- ⌘ Make free, accessible and reusable
- ⌘ Examine and address problems in use
- ⌘ Develop sustainable models

# Operating Hypothesis

- ⌘ Establish standards of practice
- ⌘ Stimulate other institutions to freely share
- ⌘ Materials are intended to support the improvement of teaching, learning and research
- ⌘ Help to equalize access

# Theory of Action



# Funding Examples

- ⌘ MIT OpenCourseWare, [ocw.mit.edu](http://ocw.mit.edu)
- ⌘ Harvard, Open Collections
- ⌘ Carnegie Mellon, Open Learning Initiative  
[cmu.edu/cmoli](http://cmu.edu/cmoli)
- ⌘ Rice U, Connexions, [cnx.rice.edu](http://cnx.rice.edu)
- ⌘ Meetings - national and international,  
learning objects and intellectual property.
- ⌘ OECD, UNESCO [ci-cairo.org/opencourseware](http://ci-cairo.org/opencourseware)



# Demonstration

⌘ MIT OpenCourseWare

📁 [ocw.mit.edu](https://ocw.mit.edu)

⌘ Internet Archive

📁 [archive.org](https://archive.org)

⌘ Carnegie Mellon

📁 [cmu.edu/cmoli](https://cmu.edu/cmoli)

# Challenges to Open Knowledge

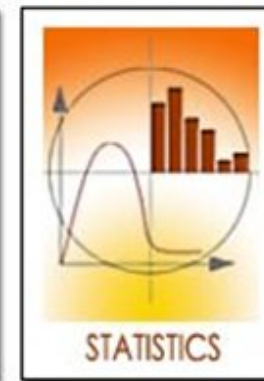
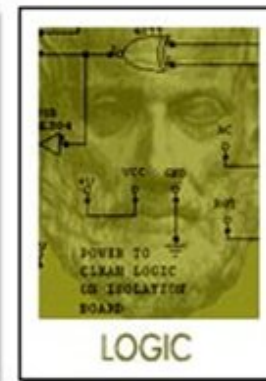
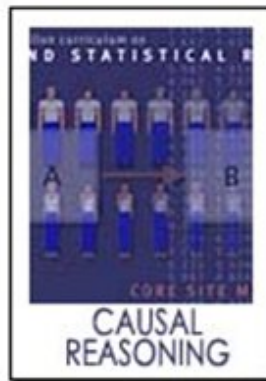
- ⌘ Intellectual Property
- ⌘ Cultural - Adaptations, translations
- ⌘ Academic - Institutional Incentives
- ⌘ Understanding Use
- ⌘ Technological - interoperability, search strategies, structure of knowledge
- ⌘ Financial - initial capital, sustainability

# Appendix



open learning initiative

Carnegie Mellon



## Cognitively-informed Education Data-driven Iteration

Funding for Carnegie Mellon's OLI has been provided by the William and Flora Hewlett Foundation

# Learning Environments that Engage the Student in Active Learning Practice with Frequent Opportunities for Feedback

2400 Cell Phones Revisited - Microsoft Internet Explorer provided by AT&T WorldNet

Address: https://ok.web.cmu.edu/course/front/snode?guid=bb1966b690020c1b009ec2866

Links: CSR1.0-local | Course 4 Dev | Course 3 - Prod | CSR1.1-local

MODULE 1.3: INDETERMINISTIC CAUSATION [Printable Module](#) | [Account Info](#) | [Contact Us](#) | [Sign Out](#)

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## 2400 Cell Phones Revisited

Both the cell phone and Colored Square simulations you used in the previous sections are instances of indeterministic causation. In this section we discuss how an indeterministic response structure only **appears** to be indeterministic because some of the causes for an effect were left out.

In the original simulation on the cell phone, you probably only managed to get about half of your calls to go through. Why? Isn't hitting the "SEND" button a cause of a call getting through? The answer is yes, it is a cause, but not the **only** cause.

We only showed you part of the story in the cell phone simulation. Here we uncover another cause of getting the call to go through: whether you are in range of a cell phone tower or not. You cannot control whether you are in range of the tower -- but in this simulation you can observe it (your location appears as a small square).

SIMULATION OF CALL ATTEMPTS, LOCATION AND CONNECTIONS

ATTEMPTS: 4      CURRENT LOCATION      CONNECTIONS: 3

RESET

Self-Assessment LSEC\_V01\_A\_det\_indet004

Self-Assessment LSEC\_V01\_A\_cause\_ind014 - Microsoft Internet Explorer provided by AT&T WorldNet

Self-Assessment LSEC\_V01\_A\_cause\_ind014

[Question 1](#) | [Question 2](#) | [Question 3](#) | [Question 4](#) | [Question 5](#) | [Question 6](#) | [Question 7](#) | [Question 8](#) | [Question 9](#) | [Question 10](#) | [Question 11](#) | [Question 12](#)

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### Question 3

SIMULATION OF WATER, TURBINE, LIGHT CAUSAL SYSTEM

In the simulation above, which quantity can you directly intervene on, as opposed to just observe? (Choose only one answer - and be careful - this is a little tricky)

Choose **exactly one** of the following:

- A. The Light Bulb.
- B. The Red Handle on the spigot.
- C. The Turbine Wheel.
- D. None of the above

# Mental Scaffolding Supports Students' Knowledge as Constructed Through Practice

The screenshot shows the StatTutor interface in Microsoft Internet Explorer. The window title is "StatTutor - Microsoft Internet Explorer". The interface is divided into several sections:

- Questions & Variables:** This section contains two columns. The left column lists variables: Sex (Student's sex), Height (Student's height), Eyes (Student's lenswear (eg:eyeglasses, orcontact lenses, ornone)), and ShoeSize (Student's shoe size). The right column lists questions: 1. How do students' heights depend on their shoe sizes? and 2. Does lenswear (contacts, eyeglasses, or none) depend at all on whether a student is male or female?
- Work Plan:** This section is on the left and contains a list of steps: 1. Understand the problem (with sub-steps: Check data format, Consider study design), 2. Reflect on question, 3. Analyze data (with sub-steps: Plan analyses, Exploratory analysis, More formal analyses), 4. Draw conclusions (with sub-steps: Consider what results mean, Reflect on conclusions), and 5. Summarize (with sub-steps: Summarize Findings, Evaluate validity).
- Plan analyses:** This section is on the right and contains a "Hint" button. It includes the text: "Before choosing appropriate analyses, it is helpful to: Identify the relevant variables: Which variable(s) among those listed below is/are particularly relevant to the current question?" followed by checkboxes for Sex, Height, Eyes, and ShoeSize. Below this is a section for "Classify the relevant variables:" with two rows of text: "The variable \_\_\_\_\_ is the \_\_\_\_\_ variable, and is \_\_\_\_\_" and "The variable \_\_\_\_\_ is the \_\_\_\_\_ variable, and is \_\_\_\_\_".

# The Student is a Participant as well as an Observer

Market Experiment, (c) 2000, econU.com - Microsoft Internet Explorer

Address <http://zuni.hss.cmu.edu/econu/experiments/sd/market.asp>

**ECONU.COM**  
IT'S TIME FOR ECONOMICS TO COME ALIVE!

Update This Page   Go to the Other Sessions   Return to Your Home Page

Market ends at 2/9/2003 22:00 EST (closes in 203 hours).

Welcome Jane

**Textbook Market**

You are a **demand**er (buyer) in this session.

You have 1 trade(s) remaining in this session. Your next trade has a **Buyer Value** of \$42. Thus, your profit from this trade will equal \$42 minus the price you pay. If you do not make this trade, you will earn \$0 (therefore, avoid trades at prices above \$42).

To make as much profit as possible, try and trade at the lowest price you can get below your Buyer Value of \$42.

Your **current profit** in this session is \$0.

Transactions				
Trans	Price	Buyer	Seller	Date/Time
1	38	John	Bill	1/31/2003 15:49 EST

Transactions				
Trans	Price	Buyer	Seller	Date/Time
1	38	John	Bill	1/31/2003 15:49 EST

If all of your outstanding offers are accepted, your potential trades will be used up.

**Current Offers**

Offers To Buy	Offers To Sell
<p><b>Buy At \$ 35   Bidder: Candace</b> [I am offering more \$\$ than Jane...]</p>	<p><b>Sell For \$ 25   Asker: Willie</b> [Get your used textbooks here!] <input type="button" value="Accept This Offer"/></p>
<p><b>Buy At \$ 30   Bidder: YOU</b> [I offer \$30 and not a penny more...]</p> <p><input type="button" value="Remove This Offer"/></p>	<p><b>Sell For \$ 40   Asker: John</b> [One Slightly Used Textbook...] <input type="button" value="Accept This Offer"/></p>

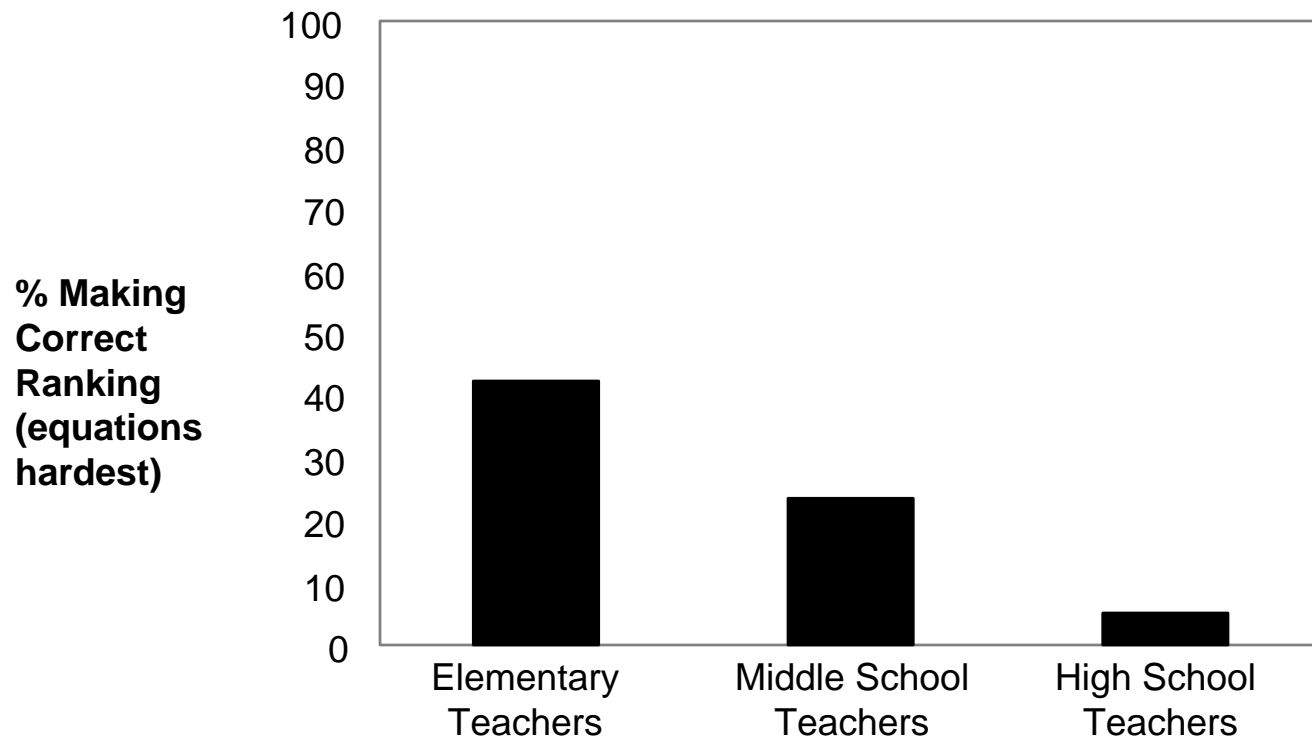
# Tools that allow Instructors to Create Interactive Student Activities

1M Sodium Hydrogen Carbonate

Species	Molarity
H <sup>+</sup>	4.624e-9
OH <sup>-</sup>	2.163e-6
Na <sup>+</sup>	1.000e0
HCO <sub>3</sub> <sup>-</sup>	9.797e-1
H <sub>2</sub> CO <sub>3</sub> *	1.015e-3
CO <sub>3</sub> <sup>2-</sup>	1.015e-2



# Data-driven Iteration Mitigates The Expert's Blind Spot:



**All OLI courses are instrumented to collect data about student use to inform the next iteration of course design.**