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ANSWERING THE “SO WHAT” QUESTION: STRATEGIES FOR EVALUATING INSTRUCTIONAL INTERVENTIONS

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What is evaluation?

“Evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, **improve program effectiveness, and/or inform decisions about future programming.”**

Patton, M.Q. (2002). *Qualitative research and evaluation methods*, 3d ed. Thousand Oaks, CA: SAGE, p. 10.

1. WHAT WOULD YOU LIKE TO FIND OUT?

*i.e.,
What's your question?*

“A TAXONOMY OF QUESTIONS”*

A key principle ...is that there is no single best method or approach for conducting the scholarship of teaching and learning. Indeed,[there is] a need for approaches that are useful and doable in varied contexts.” (Hutchings, 2000, p. 1).

1. What Is?
2. What Works?

What Is?

- What does the process of student learning with the LO look like?
 - ▣ Does this process vary for subgroups of students (e.g., majors/nonmajors, men and women, novices and experts, “A” students vs. “C” students)?

What Works?

- Do students achieve my learning objectives for the LO?
- How does student learning change over time, before and after use of LO?
- Do students learn better because of this LO (i.e., attributing impact or gains to LO)?

1. What does the *process* of student learning with the LO look like?

Examples:

1. Think-alouds

<i>Skills</i>	<i>Experts</i>	<i>Novices</i>
Corroboration	Experts compare documents against each other because every document reflects a point of view.	Novices see some sources as biased and some as unbiased.
Sourcing	Experts look to the source of the document as a key piece of information.	Novices see attribution as just one more piece of information.
Contextualization	Experts try to locate a document, to situate it in its time and place.	Novices do not take this step.
Visuals	Experts check its correspondence with other sources.	Novices judge by the quality of the artwork.

 PD-INEL

2. Case studies (e.g., Modey, 2009)

<http://www.crlt.umich.edu/grants/ISLwinners2008.php>

2. Do students achieve my learning objectives?


Examples:

1. Reimagining Learning Spaces (Hoagland, Teacher Education)

<http://elixr.merlot.org/case-stories/technology--learning/reimagining-learning-spaces/virtual-classroom-visits2>

- Background
- Experience a visit → Learning from the visit → Self-reports

2. Authentic student work ex.



3. How does student learning change over time, before and after use of LO?

4. Do students learn *better* because of this LO (i.e., attributing impact/gains to LO)?

Non-random comparison

Table 1. A Comparison of the Lecture and Active Learning Formats

Course	Sections (No.)	Av Enrollment	% Pass
<i>Standard Lecture Format: 1984–1994</i>			
Chem 301A	8	48	71 ± 5
Chem 301B	8	50	63 ± 4
Chem 301C	8	40	85 ± 3
<i>Cooperative Learning and Active Learning: 1994–1998</i>			
Chem 301A	3	43	92 ± 2
Chem 301B	3	50	86 ± 4
Chem 301C	4	44	94 ± 2



Table 2. A Comparison of Student Performance in Other Classes, Fall 1995–Winter 1998

Organic Lecture Pedagogy	Lab	Students (No.)	Lab Retention (%)	GPA
Intense active learning	302A	109	97	2.73
Predominantly lecture	302A	129	72	2.26
Intense active learning	302B	84	96	2.67
Predominantly lecture	302B	91	86	2.62



Paulson, D.R. (1999). Active learning and cooperative learning in the organic chemistry lecture class. *Journal of Chemical Education*, 76(8): 1136–1140.

Random selection

Questions raised about experimental design and controls in T&L

- Are you depriving some students of a more educationally powerful educational experience?
- Will student knowledge about group assignment affect findings?
- Will students talk to each other (or “switch” groups)?
- Is the assignment too artificial to be reproducible or give useful findings?

See, e.g. Astin(1991) and Holcomb, J.P. The ethics of experimentation: A statistician wrestles with the orthodoxy of a control group. In P. Hutchings, Ed. *Ethics of Inquiry: Issues in the Scholarship of Teaching and Learning* (pp. 19-26). Menlo Park: Carnegie Foundation.

Evaluation Question



Activity

What key research question would you like to ask about your LO?

Discuss in your disciplinary teams
(5 min.)

2. HOW DO I ANSWER THIS QUESTION?

Dimensions of Evaluation*



1. Inputs
2. Environment
3. Outputs/Impacts

Inputs

Factors possibly influencing Outputs/Impacts

- Student background
 - ▣ Gender, race/ethnicity
 - ▣ UM academic history
 - ▣ SAT / ACT score
 - ▣ Motivation to take class
 - ▣ IT experience

Inputs



Activity

Based on your experience in your course
(or the literature), ...

1. Which inputs seem important to capture?
2. How might you do so?

Discuss in your disciplinary teams
(5 min.)

Environment

- Teaching Practice
- Use

Environment



Documentation of Teaching Practice

- What audience?
 - ▣ Instructors, IT support, faculty developers, ...

- Why?
 - ▣ Replication, dissemination, adaptation, lessons learned, data analysis/interpretation...

Environment

Documentation of Teaching Practice

- What would an instructor want/need to know?
 - ▣ Time
 - ▣ Resources
 - ▣ Challenges, barriers & strategies (logistical vs. pedagogical)

 - ▣ Delivery mode: online vs. in-class
 - ▣ Types of assignments (optional vs. required)
 - ▣ Timing/frequency of practice and/or feedback
 - ▣ Criteria for LO selection

Environment

Documentation of Teaching Practice

- What/how collect data?
 - ▣ Journals/"lab notebook"
 - ▣ Blog entries
 - ▣ Time sheets
 - ▣ Assignments/wrappers/syllabi
(e.g., mapping LO's to learning goals)
 - ▣ Surveys/Focus groups: instructors

Environment: Use of Online Systems

- What UM systems can “track” use?



ctools.umich.edu



SiteMaker



um.lessons



M UNIVERSITY OF MICHIGAN WEBLOGIN

CTools Data Structure

- Logged “events” – user actions that are “meaningful”
- Date / Time stamp
- Reference information
- Session ID
 - ▣ User / Browser information
- Site ID

Environment: Questions About Use

- What types of questions?
 - ▣ How many? (counts)
 - ▣ When? (once, many, how often, for how long)
 - ▣ Who? (individuals, groups, user types)
 - ▣ Which? (tools, activities)
 - ▣ What? (content, sites, sequence)
 - ▣ Why? (hmmm... tricky...)

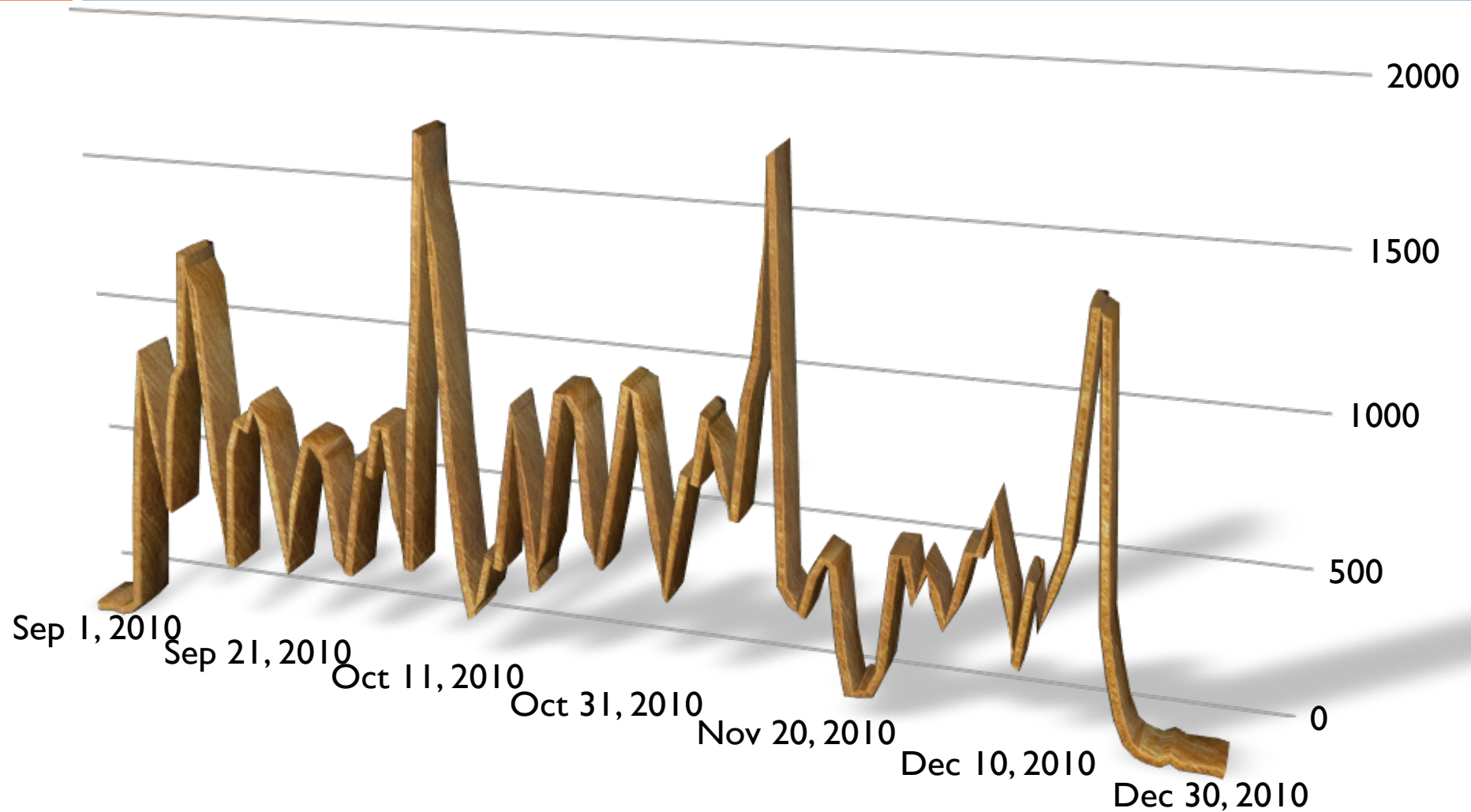
Example: How Many

COUNT	REF
522	Exam _ Review Information/W11 Exam Room Assignments.pdf
447	Schedules/CourseInfoW11.pdf
439	Schedules/CourseScheduleW11.pdf
412	Exam _ Review Information/Review Notes _ Questions/E1reviewW11.pdf
393	Exam _ Review Information/Review Notes _ Questions/E4W11review.pdf
371	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F08key.pdf
367	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W_10key.pdf
364	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W10key.pdf
349	Lecture Notes/3.E2LecW11.pdf
346	Lecture Notes/5.E3LecW11.pdf
343	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F08.pdf
335	Exam _ Review Information/Review Notes _ Questions/E5W11review.pdf
330	Lecture Notes/2.LecE1W11.pdf
327	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W10.pdf
319	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2F08key.pdf
305	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W08key.pdf
295	Exam _ Review Information/Review Notes _ Questions/E3ReviewW11.pdf
294	Lecture Notes/9.E5LecW11.pdf
293	Lecture Notes/1.Introch125Winter11.pdf
291	Exam _ Review Information/Review Notes _ Questions/E2reviewW11.pdf
287	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W_10.pdf
282	Lecture Notes/7.E4LecW11.pdf
280	Exam _ Review Information/Review Notes _ Questions/E1reviewkeyW11.pdf
271	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F10key.pdf

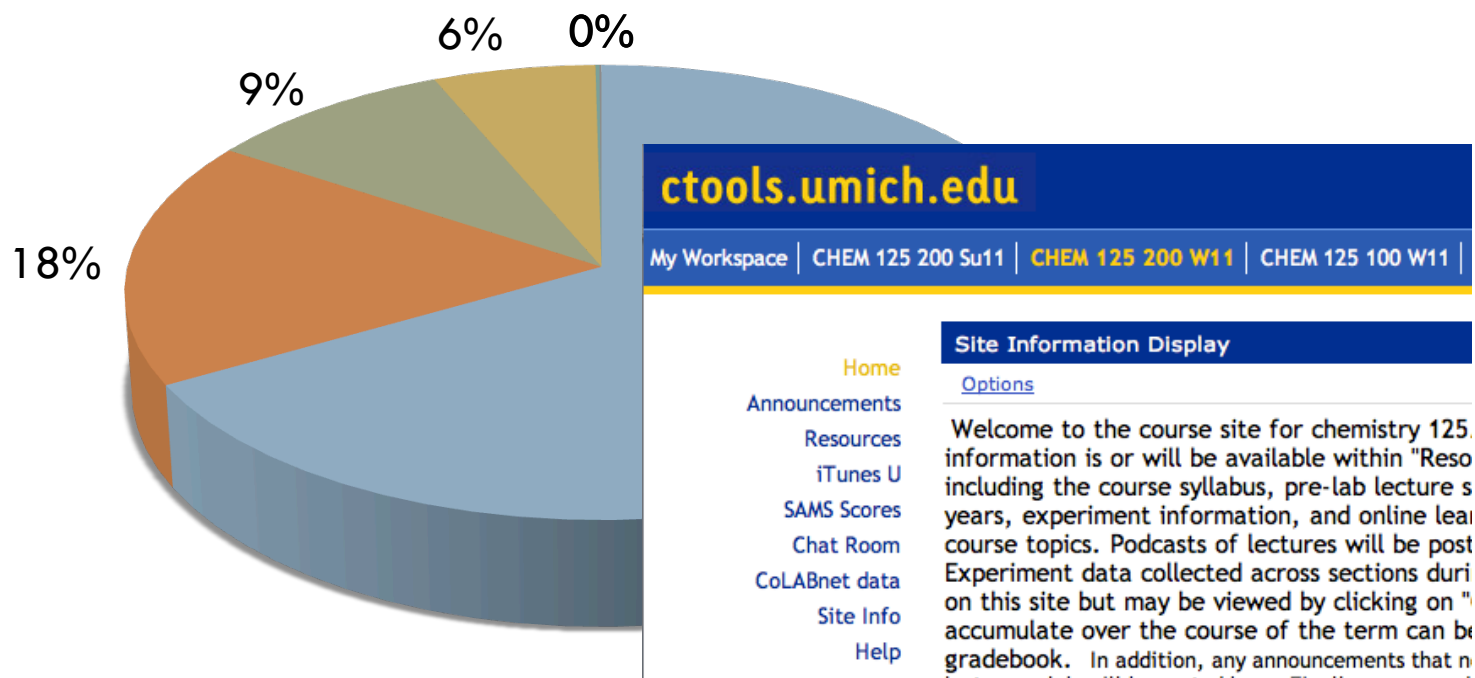
Example: How Many

TOTAL	# USERS	REF
522	210	Exam _ Review Information/W11 Exam Room Assignments.pdf
412	172	Exam _ Review Information/Review Notes _ Questions/E1reviewW11.pdf
447	167	Schedules/CourseInfoW11.pdf
393	165	Exam _ Review Information/Review Notes _ Questions/E4W11review.pdf
439	162	Schedules/CourseScheduleW11.pdf
371	161	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F08key.pdf
335	160	Exam _ Review Information/Review Notes _ Questions/E5W11review.pdf
364	160	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W10key.pdf
280	159	Exam _ Review Information/Review Notes _ Questions/E1reviewkeyW11.pdf
327	155	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W10.pdf
343	154	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F08.pdf
319	153	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2F08key.pdf
287	152	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W _ 10.pdf
330	152	Lecture Notes/2.LecE1W11.pdf
367	151	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W _ 10key.pdf
349	150	Lecture Notes/3.E2LecW11.pdf
295	148	Exam _ Review Information/Review Notes _ Questions/E3ReviewW11.pdf
212	147	Exam _ Review Information/Review Notes _ Questions/E6W11review.pdf
291	146	Exam _ Review Information/Review Notes _ Questions/E2reviewW11.pdf
209	146	Exam _ Review Information/Review Notes _ Questions/E2reviewkeyW11.pdf
305	146	Exam _ Review Information/Sample Exams/Hourly Exam II/Exam2W08key.pdf
269	144	Exam _ Review Information/Review Notes _ Questions/E4F10reviewkey.pdf
271	144	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1F10key.pdf

Example: When



Example: Which



Example: What Sequence

EVENT_DATE	EVENT	REF
3/14/11 19:07	pres.begin	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence
3/14/11 19:08	content.read	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W_10.pdf
3/14/11 19:09	content.read	Exam _ Review Information/Sample Exams/Hourly Exam I/Exam1W_10key.pdf
3/14/11 19:30	pres.end	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence
3/14/11 19:43	pres.begin	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence
3/14/11 19:45	content.read	Lecture Notes/3.E2LecW11.pdf
3/14/11 19:46	content.read	Lecture Notes/5.E3LecW11.pdf
3/14/11 20:49	pres.end	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence
3/14/11 20:51	pres.begin	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence
3/14/11 21:13	content.read	Lecture Notes/3.E2LecW11.pdf
3/14/11 21:16	content.read	Lecture Notes/4.E2LecWinter11.pdf
3/14/11 22:14	pres.end	/presence/7f547ead-f5e8-4a1c-bdfe-0057a7da5f20-presence

Environment: Combining Data

- Use data + Input Data
 - ▣ Which students are using LOs?
 - ▣ Relationship of use to academic success?
 - ▣ Factors that are correlated with use?

- Trending across pilots
 - ▣ Similarities? Differences?

Environment: Use

- Other types of data:
 - ▣ Student attendance
 - ▣ Time on task
 - ▣ Student self-reports of usage patterns

Environment



Activity

Q3. Which aspects of environment (e.g., teaching practice, student use of LO) in your course are important to capture?

Discuss in your disciplinary teams
(5 min.)

Impact/Outcomes

- Knowledge
- Behavior
- Values/Attitudes

Q4. What outcomes are important to measure for your LO, based on your research question?

Q5. What methods might you use to measure outcomes?

Instructor Self-Reflection (e.g., teaching journal)

Peer Review of Teaching (e.g., structured observation of teaching practice, review of teaching materials)

Possible Outcome Measures

Direct Measures of Student Learning/Experience (e.g., tests, **LO assessments**, evaluation of portfolios or writing, registrar data)

Indirect Measures of Student Learning/Experience (e.g., focus groups, surveys, **LO surveys**)

Q6. Are there ethical issues with your measurement of outcomes?

- “Ethics of Comparison”
- Prospect of public display of student work
 - ▣ Student concern about labeling their work as “wrong”
- Linking research participation with grades
 - ▣ Can students truly freely consent?
- Lack of student participation in analysis of the data

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Impacts/Outcomes



Activity Worksheet Q4-Q6

What outcomes are important to measure for your LO and research question?

What methods might you use to measure those outcomes?

What potential ethical concerns (yours or students') do you anticipate with your evaluation design?

How might you mitigate/address those concerns?

Discuss in your disciplinary teams
(15 min.)