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Measuring Learning: The Ultimate Teaching Evaluation

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Presented by:

Dr. Linda B. Nilson

Dr. Linda B. Nilson is founding director of the Office of Teaching Effectiveness and Innovation (OTEI) at Clemson University and author of *Teaching at Its Best: A Research-Based Resource for College Instructors*, now in its third edition (Jossey-Bass, 2010) and *The Graphic Syllabus and the Outcomes Map: Communicating Your Course* (Jossey-Bass, 2007).

She also co-edited *Enhancing Learning with Laptops in the Classroom* (Jossey-Bass, 2005) and Volumes 25 and 26 of the major publication of the Professional and Organizational Development Network in Higher Education, *To Improve the Academy: Resources for Faculty, Instructional, and Organizational Development*, as associate editor (Anker, 2007, 2008) and Volumes 27 and 28 as head editor (Jossey-Bass, 2009, 2010).

Dr. Nilson has also published many articles and book chapters and has presented conference sessions and faculty workshops at colleges and universities both nationally and internationally on dozens of topics related to teaching effectiveness, assessment, scholarly productivity and academic career matters. She has been a regular presenter at the Lilly Conferences on College Teaching for years. She has held leadership positions in the Professional and Organizational Development (POD) Network in Higher Education, the Society for the Study of Social Problems, the Public Relations Society of America, Toastmasters International, Mensa and the Southern Regional Faculty and Instructional Development Consortium.

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Measuring Learning: The Ultimate Teaching Evaluation



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Measuring Learning: *The Ultimate Teaching Evaluation*

August 25, 2011

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Participant Outcomes

You will be able to:

- Design tests & instruments to serve as solid evidence of your students' learning
- Attach a numerical score to the learning
- Counter-balance student ratings & comments

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Why Address This Topic?

Poll: How valid do you think student ratings are as a proxy measure of student learning?

- a. Very valid
- b. Somewhat valid
- c. Mildly valid
- d. Not valid; student ratings & learning are unrelated.
- e. Not valid; student ratings & learning are negatively related.

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Why Address This Topic?

Faculty dissatisfaction with over-reliance on student ratings.

Only mild correlation between student learning and instructor's rating

Instructors who better prepare students for upper-level work receive lower ratings.

(Glenn, 2011)

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Types of Measurement

End of course only

- Integrative essay or journal entry
- Targeted essay
- Perceived student learning gains instrument

Pre- and post-test

- 1st-week writing + correction exercise
- 1st-week essays + "value-added" essay final
- 1st-week final exam (ungraded) + final exam
- "Knowledge (& skills) Survey" of confidence

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End of Course Only

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Integrative Essay, Journal Entry

Students review course material and draw their own conclusions about it, its value, and their learning.



(Atlas, 2007 – Setting: expository writing course)

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Targeted Essay

For example: Answer to job interview question for dream job: "What are the most important things you learned in your XXX course? Demonstrate your skills in applying XXX."

- (Adapted from Weimer, 2007 - Setting: communication studies course)

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Perceived Learning Gains

Student Assessment of Learning Gains (SALG) survey instrument

- Many course templates (mostly in sciences) at www.salgsite.org/instructor/home
- Includes items on most effective course elements

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Transparency in Learning & Teaching survey instrument – ongoing study

- Form at <https://illinois.edu/sb/sec/1428>

- Info at

<http://www.teachingandlearning.illinois.edu/transparency.html>

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“How much has this course improved your skills/abilities in each of the following?”



List of 32 skills at <http://www.clemson.edu/OTEL/services/webinars.html>

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Activity: Conduct a skills analysis of one of your courses

Check the skills your course is designed to develop or improve from the list of 33 on your handout. (Skills should reflect learning outcomes.) These are your dimensions of “perceived learning gains.”

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To Represent Learning as a Numerical Score (for Easy Use)

Average numerical score (grade) of integrative or targeted essays

OR

Average score across relevant perceived learning items

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Pre- and Post-Test



1st-Week Writing + Corrections

1st week: Ungraded writing assignment on key concepts, principles, techniques, processes, causes, effects, etc.

Final: Letter to “pre-class self” correcting errors, poor reasoning, misconceptions, etc. in 1st-week assignment. (Griffiths, 2010)

1st-Week Essays (ungraded) + “Value-Added” Essay Final

1st week: Take-a-stand essay questions in class (brief, unscored)

Final: Rewrite essays with supporting evidence and critique of 1st essay, even if no change of position.

–Developed and used by Dr. Michael Coggeshall, Professor of Anthropology, Clemson University

1st-Week Final Exam (ungraded) + Final Exam

Give students the final exam *twice*:
1st time: 1st week in class; score, but don't grade.

- Harm done? They may remember what's important.

2nd time: as usual for grades

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Knowledge Surveys

Series of questions or tasks covering *knowledge & skills* of entire course or unit (from outcomes, exercises, old exams, etc.)

Different levels of thinking

Answer = *students' perceived ability* to answer question or perform task

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Knowledge Surveys *Examples of Answers*

a) I do not understand the question, I am not familiar with the terminology, **or** I doubt I can answer the question well enough to pass.

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b) I understand the question and 1) I think I can answer at least half of it correctly, **or** 2) I know where I can find the correct answer within 20 minutes.

c) I am confident that I can answer the question well enough to earn a passing or better grade.



Do Students Know What They Do and Don't Know?

Students overestimate abilities (except possibly the best students) when they know the least.

- Less likely in engineering, scientific, and technical disciplines – students more likely to know they don't understand terminology.

But students *underestimate* abilities when they know most.

- Histogram (handout) at <http://serc.carleton.edu/NAGTWorkshops/assess/knowledgesurvey/index.html> shows final course grade (learning) usually exceeds confidence (KS results) at end of course.

KS results vary directly with student learning.

Knowledge Surveys Examples of Items

State Newton's Laws of Motion.
(knowledge)

Translate this passage into French.
(comprehension)

Apply Archimedes Principle to measure
volume of irregularly shaped object.
(application)

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In this experiment, what variables
must be controlled? (analysis)

Explain these biological concepts
to a 12-year-old. (synthesis)

Assess investments in this portfolio
for (a) aggressive growth; (b)
growth; (c) income. (evaluation)

Many more at

[http://serc.carleton.edu/NAGTWorkshops/
assess/knowledgeurvey/examples.html](http://serc.carleton.edu/NAGTWorkshops/assess/knowledgeurvey/examples.html)

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Learning as a Numerical Score on 1st-Week Writing + Corrections

Average numerical score (grade) of
students' correction exercise.

OR

Score 1st-week writing & calculate
average differences between two
scores, as between pre- & post-test
finals and KSs (later slide).

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Learning as a Numerical Score on 1st-Week + "Value-Added" Essays

Coggeshall grades final essays on amount of supporting evidence. He reports % of class that develops & backs argument w/evidence.

Other schemes possible:

- Average numerical score (grade) of final
- Calculate average difference between 1st-week essays & final score.

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Learning as Numerical Score on Pre- & Post-Test Final Exams & Knowledge Surveys

Debate on calculation of learning gain:

- $\frac{(\text{Post-test}\% - \text{Pre-test}\%)}{\text{Pre-test}\%}$
- $\frac{(\text{Post-test}\% - \text{Pre-test}\%)}{(100\% - \text{Pre-test}\%)}$ "average normalized gain"

Note which calculation you are using.

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Calculation Difference

$$\frac{75\% (\text{final avg}) - 25\% (1^{\text{st}}\text{-time avg})}{25\% (1^{\text{st}}\text{-time avg})} = \frac{50}{25} = 2$$

"Students increased their knowledge of the subject by 200% during the course."

vs.

$$\frac{[75\% - 25\%]}{(100\% - 25\%)} = \frac{50}{75} = 66.6$$

"Students gained 2/3 of their knowledge on the subject during the course."

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Poll:
Which instrument would you prefer?

- a. Integrative essay or journal entry
- b. Targeted essay
- c. Perceived student learning gains instrument
- d. 1st-week writing + correction exercise
- e. 1st-week essays + "value-added" essay final
- f. 1st-week final exam (ungraded) + final exam
- g. Knowledge survey

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Chat:

Do you think it is worth the effort to measure your students' learning and submit the figures in your review?
Why, or why not?

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Thank you for participating

We'd like to hear from you. Please consider filling out a survey that can be found at:
<http://www.surveymonkey.com/s/082511>

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