SPEAKING OF TEACHING

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Do You Know Where Your Students Are? Classroom Assessment and Student Learning

You've just covered a difficult concept in lecture, one it's essential students understand fully before you can tackle a new chapter. You've scheduled a midterm in two weeks, but want to make sure your students are ready now for the next topic. How do you quickly find out whether they're with you?

This morning you taught a class in which three central general principles organize many details and examples. You feel satisfied with the class until later that day, during office hours, a student asks a question that makes it clear he thinks one of the examples is a general principle. Did more students miss the structure you thought was clear? How will you find out?

You assume students remember what was covered in the last class, so you begin today from where you left off. When a student stops you in the middle of class and asks you to define a term from the last class that you've been using casually throughout the lecture, you hesitate. Was this student absent, or has the class missed a key term? How will you know for sure?

Getting Useful Feedback

When teachers ask themselves "How much of what I'm teaching are students learning?" and when they get specific kinds of feedback to answer this question, they can better focus their teaching. In effect, they can then begin to determine what is and isn't working in the classroom. Classroom (or in-course) assessment provides a simple and relatively easy way of finding out what and how well your students are learning. It also helps students see what they may need to do to develop their academic or learning skills.

Traditionally many instructors have evaluated their students' knowledge by giving examinations and papers in the middle and at the end of each quarter. As a result, a professor lecturing to a large introductory class might not recognize until the middle of the quarter that many students had trouble explaining or using a concept covered in the second week of class, or that some students consistently confused two closely related ideas.

Even if a teacher collects problem sets or other weekly homework, some students may be able to complete assignments without fully understanding the central concepts or developing the skills which are part of the larger aim of the course. And even in a small class where students offer comments and ask questions, crucial issues may have been misunderstood or overlooked by those who keep silent.

Focus on Student Learning

Classroom assessment focuses on the learner, and provides feedback to both the professor and the students on the quality of learning and the effectiveness of the teaching taking place in the classroom. Because they are not meant to be tests that classify students, assessments are most often anonymous; their purpose is to inform the teacher whether there are gaps between what the students know and what the teacher expected them to have understood.

The kinds of information assessments can provide fall into three main categories:

- the level of students' academic skills and intellectual development
- students' awareness of the effectiveness of their own learning skills
- student reactions to various teaching methods, materials, and assignments.

In understanding where students stand in their academic development (e.g., do they have sufficient background knowledge or academic skills?) and in immediately

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knowing students' reactions to specific aspects of a class (e.g., do they believe the exams cover the material stressed in class?), instructors can adjust their teaching to help students learn better.

Step 1: Do a Quick Assessment

Suppose you've decided that your students need to have a clear understanding of a central and complex concept in your discipline, one that you've been covering the entire week. At the end of your final lecture on the topic leave a few minutes free and ask your students to write what is often called a "one-minute paper." Have students take out a sheet of paper (or hand out 3 X 5 notecards) and answer a question such as "What was the most crucial information conveyed about this concept?" or "What was the most important thing you've learned in today's lecture?" Explain to them why you're doing this—that you want to see if the class has understood a central aspect of the course—and tell them not to put their names on the papers. Collect the responses and review them as soon as possible. Even in a large class this process shouldn't take an inordinate amount of time; simple assessments can be evaluated relatively quickly—perhaps 20 or 30 seconds each. If your class includes TAs or course assistants, this task can be delegated to a reporter who fills you in on the overall results.

Step 2: Evaluate the Assessment

The next step is to evaluate what you've learned. Are the students making sense of the material? Or has something gone awry? From the responses you should be able to determine the intellectual sophistication of the students regarding course materials. As K. Patricia Cross, the originator of classroom assessment techniques, explains:

"When I use the minute paper in my graduate class in which I'm teaching cognition at some point, one of the things I use it for is to demonstrate the different levels of cognitive development within the class. For instance, I will analyze the data from a group of minute papers and find some people feeding back to me as the most important thing they learned that day, a simple fact: 'There'll be spaces for 10,000 new teachers in California community colleges in the next ten years.' Well that's interesting, but if that's the most important thing they learned that day, it's kind of disappointing.

"Somebody else will say, 'The fact that there are going to be 10,000 new teachers needed in the next 10 years means that people are going to have to orient this new incoming group to the mission and purpose of the community college because not many of them will know much about it.' A third group shows a different level of analysis by saying that the thing that struck them was that we were going to have two generations of teachers—one, the old generation that came in during the huge bulge in the 1960s and 1970s, and then, the new generation coming in, creating the possibility of a generational clash of values and purposes and so forth.

"Well, those are different levels of cognitive perception within the class itself. And [presenting results of a minute paper exercise is] a more complex way of feeding back relatively simple data [than merely describing different levels of cognition]. It's amazing how quickly students get that point and then strive to emulate the higher levels of development."*

Step 3: Open the Dialogue

Cross's concluding point is important. Once you've gathered your results and understood where the class stands in its comprehension of the concept, your final

* *The National Teaching and Learning Forum*, 1 no. 6 (1992): 2-3.

Define Your Goals

When asked what their goals are for a course, many teachers answer with the general notion that they want to cover a certain area of molecular biology or introduce their students to eighteenth-century English fiction. But when we take the time to consider the academic skills necessary for success in our disciplines, we know that what we're really teaching goes much deeper. Is it marginally important or truly essential that your students develop certain kinds of problem-solving skills? That they develop the ability to think holistically? That they learn how to draw reasonable inferences from observations? That they improve their listening, reading, writing, or memory skills? That they develop skill in using materials, tools, or technology central to the subject? That they learn to work productively with others or develop leadership skills?

K. Patricia Cross and Thomas A. Angelo, central figures in the recent development of classroom assessment techniques, have produced a *Teaching Goals Inventory* that outlines 52 potential teaching goals. Instructors are asked to rate—from unimportant to essential—the significance of each goal to a particular course. While many of us have the urge to mark 10 or 15 goals as "essential," it's clear that no one course can accomplish everything. The inventory helps us focus on what we can reasonably achieve in a quarter, and helps us construct a syllabus and course with those particular essential goals in mind.

Copies of this *Teaching Goals Inventory* are available at CTL or can be requested by calling our office at 723-1326.

step is to share these results with the class. They will appreciate the effort you're making to clarify material and assist them in their learning. Also, they will be able to evaluate their own level of knowledge and easily see whether they are working hard enough at analyzing or synthesizing course materials. Indeed, the knowledge they gain from the assessment can be built into other class projects, so that students are encouraged to continue to monitor their intellectual development or their acquisition of specific skills.

Quick assessments made only two or three times a quarter can be helpful in avoiding disappointments in student performance on midterms and finals. They can also provide you with immediate information when you want to know whether something you've never taught before is conveyed effectively or materials you've never used before are clear to your students.

To be useful, assessments should be specific enough to provide feedback on what or how students are learning particular information or concepts. They should focus on aspects of teaching or learning that can be altered as the course progresses. And assessments should be relatively simple to use and you should be able to evaluate the results quickly.

Most importantly, though, good assessment techniques should both assess and teach. The time spent doing these assignments can help students learn more effectively and efficiently. When students are encouraged to take the time to gauge what they know and how well developed their learning and academic skills are, they then begin to recognize their capacity to become active learners.

How To Assess: Examples to Use or Adapt

The following examples have been gathered from Stanford faculty members and also adapted from Classroom Assessment Techniques: A Handbook for Faculty *by K. Patricia Cross and Thomas A. Angelo (Ann Arbor: NCRIPTAL, 1988). Copies of this handbook are available at CTL.*

Academic and Intellectual Development

***Documented Problem Solution*:** Students can often solve problems in a course without understanding larger concepts or why certain steps are necessary. To understand whether or not students are focusing not just on the problems but also on developing their problem-solving skills, instructors can ask students to explain how they went about approaching and solving one of the problems assigned as homework. Instead of assigning the normal load of work, reduce it, but ask students to take one of the problems and, as they solve it, to write down step-by-step what they were thinking at each stage of the problem-solving process. Reading through these protocols gives instructors a sense of how well students understand problem-solving strategies, and can help determine if more or less class time needs to be devoted to these general strategies.

Concept Maps: If you've presented several concepts or issues over the course of a few lectures, and want to know whether students are properly understanding the relationships among these concepts, you might have them draw a picture or map to illustrate the connections they see. Tell them to sketch the relationships between a few basic terms that you provide, and also ask them to include relationships to any other terms they associate with the major concept. From the drawings you can observe the sophistication of your students understanding of the kinds and levels of connection between ideas, and then by providing the class with your own example of a concept map, you can help them correct or improve their understanding.

Learning Skills Development

Studies of Time Spent Learning: If you want to increase students' awareness of their proficiency in the study skills necessary to succeed in your course, ask them to estimate, check, document, and then reflect on how well they use study time. Using one assignment or activity, students estimate how much time it should take to complete the task, and then monitor themselves as they complete the assignment. Afterwards, they write a brief account of the process and the results. In reading these accounts, you can gain a sense of how well students use their time, and whether students' learning skills are developed sufficiently to handle the course load. Students become much more aware of their habits regarding study time—and this self-consciousness usually encourages them to use this time more effectively.

Process Self-Analysis: Somewhat similar to an analysis of time spent learning, this assessment asks students to focus on how they've accomplished a task or assignment. By keeping a record of the steps they've taken in completing an assignment students can begin to pinpoint where they are successfully developing techniques for moving through projects. Especially in courses where students will be presented with similar types of assignments (labs, essays, projects) several times, this process analysis will help them monitor their progress in skills development. For example, an instructor who assigns several papers over the quarter might be interested in seeing how and when students actually begin to write, and whether they use any prewriting strategies such as outlining, freewriting, or brainstorming. By having students document the things they do as the paper progresses, the instructor can understand how

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students approach the assignment, and students become more aware of their strategies for completing or avoiding the assignment. To prepare students for this kind of assessment, the teacher needs to offer plenty of advance warning so that students begin documenting from the beginning of the project. Students also may need examples of how to keep useful records of their progress.

Teaching Methods and Materials

One-Minute Papers: As mentioned previously, the one-minute paper is an easy and effective way of getting feedback on a particular question you have for your class. End class a few minutes early and ask students to answer a question such as "What was the muddiest point in today's lecture?" or "What were the main points of today's class?" or "What one question do you still have about today's material?" Dennis Matthies, lecturer for CTL, feels he's been able to raise students' awareness of their own learning strengths and weaknesses by asking "What is one thing I could do to help you learn the material better?" Even in a large class, reading through student responses takes relatively little time. Teachers can then explain in the next class session whether the majority of the class has grasped important material, and can also address questions or problems students have raised. Matthies has one piece of advice about asking assessment questions at the end of class: write the question on the board. Otherwise, some students who are distracted at the end of the class period may misunderstand, or fail to hear the question accurately.

Exam Evaluations: As Angelo and Cross note, "Students have a tendency to learn what teachers *inspect* rather than what they *expect*." While tests and exams are evaluations of students' performances, they also can be valuable opportunities for teaching. To help you see what or how well students are learning from exams, or to see how appropriate or useful these tests are, asking a question or two about them can help you make exams more effective. For example, you might ask: "What section of this exam was particularly difficult and why?" or "What material did this test not cover that you expected it to?" You might even ask students to submit questions or problems that they would have put on the test. This is a particularly helpful way of seeing the level of student competence with the material, and gives you suggestions for future exams.

CTL will offer a series of six lectures on
various aspects of university teaching
this coming spring quarter.
Lectures and discussions will be on
Mondays 12:00-1:00
in CERAS 304.
Look for a detailed schedule of speakers
and topics in coming weeks,
or call Mark Gonnerman at 3-6487
for more information.

Advice on Assessing Classes

Stanford instructors who have been using assessments in their courses this year have found them very helpful, but offer the following advice to beginners:

- Start small. Don't ask for more information than you can examine and evaluate.
- Ask specific questions; the more vague the question the more varied and vague the responses will be.
- Don't ask if you don't want to know. You may get responses you didn't really want to hear.
- Look at the assessments immediately. If you don't evaluate the result soon after class, it's likely you never will.
- Respond to the assessments in the next class period. Unless you show that these are an important part of your approach to improving student learning, many students will stop taking them seriously.
- Explain, in your response, what good feedback is. Students need to learn how to give useful feedback, and will do this through evaluating their response in relation to the class's.
- Be very clear about the fact that these are not going to be graded. And be very clear about whether they should or should not be anonymous.
- Experiment. Adapt what other teachers have used to your specific needs and course goals.

Discuss Teaching With Your Colleagues on CTL's Electronic Bulletin Board

Have a question about teaching that you'd like to ask, or a comment to make about a teaching experience you've had? Start a conversation on our bulletin board. At the "command" prompt on Forsythe, type "show bboard su.org.teaching" and add your thoughts to our ongoing discussion. For information on accessing bulletin boards from other systems, please contact your system's administrator.