

A Low-Tech Method for Instantaneous Student Assessment
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Abstract: The use of a low-tech technology, index card sized sheets that students fill out and return in the final minutes of class lecture, can give an instructor instantaneous feedback on how well the topics in the lecture went. Although this method is more cumbersome than having students ask questions, it gives every student to anonymously ask a question that they may be too shy or insecure to ask during the lecture. The questions, along with the instructor's remarks, are read back to the class during the start of the following lecture.

Introduction

Obtaining student response during classroom lectures is an ongoing challenge. Different methods work for different instructors. Having tried to use several previous methods, such as asking direct questions and waiting for a student response, have some limited use, but typically fail to get overall class feedback. Calling on individual students for answers seems to antagonize certain students, particularly those who are struggling in the course anyway.

While visiting the Geomatics (Geomatics is a term that combines surveying with information systems) program at Texas A&M University, Corpus Christi campus during the Fall 2000 semester, I observed a professor of that program, Dr. Joe Loon, using a unique approach. He required every student at the end of every lecture to write down two things: first, what they learned in lecture that day; second, what they did not understand during that day's lecture. Intrigued by the idea, I did not immediately adopt the idea, but decided to incorporate it into the Spring 2001 courses.

I adopted the practice of having students write down what they learned and what they had difficulty with beginning the Spring 2001 semester. I had great success and readopted the procedure, with a small modification, during the Fall 2001 semester.

Spring 2001

I used the practice of having students write down what they learned and what they had trouble with in SUR 312 – Legal Principles of Boundary Surveying and in SUR 328 – Principles and Practices of Construction Surveying. A third class I taught, SUR 412 – Advanced Topics in Boundary Surveying is a discussion-based course rather than a lecture-based, so the exercise did not seem to be appropriate to this class. As an incentive, I gave students points for attendance based on their filling out and returning the responses. Each student response was worth 4 points towards a possible 100 points for attendance. There were 1000 points possible for a perfect grade in each class.

The SUR 312 class had 15 students, all of whom were Surveying Engineering majors. The class consisted of 3 lecture hours given in 2 periods on Tuesdays and Thursdays.

The SUR 328 class had 48 students, of whom approximately one half were Civil Engineering students, one quarter Civil Engineering Technology students, and the remainder were Surveying Engineering students. The class had 2 one-hour lectures on Mondays and Wednesdays and 2 three-hour labs, one half the students attending one or the other of the labs.

I prepared index card sized paper sheets for handout at the end of each lecture. An example is shown in Figure 1. This sheet was made using an 8 ½ by 11 paper in landscape mode on which 4 sheets could be printed. Each 8 ½ by 11 sheets was cut into 4 individual index card sized 4 ¼ by 5 ½ inch sheet.

SUR 312	Name: _____
What is the most important thing you learned today?	
What one thing did you find most confusing/ didn't understand today?	

Figure 1: Student response sheet

In both classes, I handed out the student response sheet with about 5 to 10 minutes of lecture remaining. I continued with my lecture until the end of class. Students handed in their response sheets as they exited the classroom. At the start of the next lecture, I would read each question and answer it, often reviewing material on the blackboard or whiteboard. While a few students turned in blank sheets, most of the rest would give a positive response to the most important thing that they had learned in lecture that day, either a specific item, such as how to compute a vertical curve, or a general category, such as curve computations. I found out that typically about one-third of the class would respond with a question about material they found confusing or didn't

understand. Approximately 5 to 15 minutes of the following lecture were devoted to answering reading and questions. On days when an exam or quiz was given, the response sheets were not handed out. The 5 to 15 minutes of the next lecture were then given to going over the graded exam or quiz.

In the SUR 312 course, lecture feedback was evident after each lecture. I relied heavily on PowerPoint slide presentations for this class, giving students advanced access to the lecture slides on WebCT. The course follows legal topics concerning location of property boundaries. Questions concerning lecture topics occurred after every lecture. Approximately 1/3 of the class would use the response sheets to ask their questions. Most questions were on nuances of law or terms related to lecture topics. Many questions asked were interesting in that they lead directly into that day's lecture. Other questions asked were deferred until later in the semester with the promise that the question would be answered when more material was covered and the question could be put into a more meaningful and knowledgeable context.

In the SUR 328 course, lecture feedback was quite good, probably because of the large number of students in the class. I gave the class no restrictions on what they could or could not ask. I relied primarily on the blackboard for sketches, computation and notes. I received questions about the sketches, questions about the computations, and questions about the notes after every lecture. I also received comments about my lecture style, complaints from students about other students, and questions about topics that we had not yet covered. In one instance, the about 2/3 of the class had questions and the number of questions led to using up 40 of the 50 minutes of the following lecture period to answer them. This frustrated some of the students who commented on their response sheets that day that they felt the lecture was wasted because of the time spent responding to questions. In some instances, the same question would be asked by the same student in successive lectures. Rather than spend extra time answering the questions again, I would acknowledge the question in class and ask that any students who needed a better answer see me during my office hours. In looking through the responses at the end of the year, I noted that the two students who performed most poorly in the course did not ask one question during the entire semester. Most questions were asked by students who eventually received a grade of "B" or "C" in the course.

There was one major drawback to requiring student response to get an attendance grade – several students near the end of the semester decided to skip lecture in SUR 328 to work on a physics project. They had assumed that in a class of 48 students, 3 students would not be missed. They collected extra response sheets in the lecture before the one they planned to miss, filled them out and had accomplices turn them in during the next class period. They were caught by two circumstances: first, none of the three participating students were on hand to receive returned homework assignments, and second the lecture deviated from what was shown on the lecture schedule. When confronted, the

students admitted wrongdoing and quickly realized that risking failure in the course and possible expulsion from the university was too great a cost to pay for their escapade.

Fall 2001

I used the practice in three courses, SUR 285 – Introduction to Photogrammetry, SUR 452 – Land Development Design, and SUR 464 – Land Information Systems Applications. I did not use it in two other courses I taught, SUR 401 – Ethics and Professionalism in Surveying or SUR 450 – Senior Project. The SUR 401 class is another discussion-based course and SUR 450 is a project course. This time, the writing of responses was not tied into any type of attendance grade. While class attendance dropped, there were no attempts to cheat on class attendance. All of the courses in which student response sheets were used relied on a combination of WebCT- and blackboard-based lectures.

The SUR 285 course had 17 students, all of whom were Surveying Engineering majors. The SUR 452 course had 10 students, all of whom were Surveying Engineering majors. The SUR 464 course had 15 students, again all Surveying Engineering majors. Each course had 2 one-hour lecture periods and 1 three-hour lab session.

The SUR 285 course experiences were very similar to the experiences in SUR 328, possibly because many of the students in SUR 285 had taken SUR 328 the previous semester. Again, the student performing most poorly in the class asked not one question during the semester.

The SUR 452 course experiences were similar to the SUR 312 experiences, but this was no surprise since the SUR 312 course is a prerequisite for the SUR 452 course and all but one of the students in the course had taken the SUR 312 course the previous semester. About 1/3 of students used the response sheets to ask primarily legal questions.

The SUR 464 course responses were interesting in that this course includes topics related to management and policy. Again, about 1/3 of students would use the response sheets to ask questions, but were in tune with the course and most often asked questions related to topics on management and policy. Towards the end of the semester, some of the response sheets questions related to students asking trivial questions related to other students such as “Can we get a classroom coffee pot so XXX can stay awake in class?”

In all classes, students responded positively on what they had learned that day, although, again, some would respond with a specific item while others responded with more general terms.

Conclusions

Student response sheets have proven to be a good measure of lecture success in lecture-based classrooms. Using student response sheets has greatly increased the number of questions asked about lecture without reducing the number of in class questions asked. Students mostly responded positively about what they had learned that day and about 1/3 would ask a question related to the lecture.

Student response sheets give the lecturer a focused review at the start of the following lecture to respond to questions and, many times, lead into that day's lecture. When lecturer answers to questions took too much time at the start of class, there was often restlessness among several students. Students who repeatedly asked the same questions were referred to the instructor's office hours for answers.

At some point, the author would like to review the student response sheets and check them against student class performance. Students overall have responded positively and seem to like this tool as an additional aid to learning in the classroom.