

The Insight

After teaching a course, it is useful to combine different kinds of assessment (formal and informal, quantitative and qualitative) to decide what adjustments need to be made to a course. This information most commonly comes from exam scores, but can come from a wide variety of places.

Implications

Blending quantitative information like exam scores with informal observations, student survey responses, and education literature helps target particular changes one might make to a course to most efficiently improve them.

"The goal is to turn data into information, and information into insight." -- Carly Fiorina

"Closing the loop" Part II: identifying areas for improvement

In a November 2016 Learning InSights article, I listed these questions that it is useful to ask oneself upon completion of a course, to determine how to most effectively use assessment data to improve one's courses:

1. Do you need to adjust your goals for student performance?
2. Would it help to modify your learning objectives and/or outcomes?
3. Would it be worthwhile to experiment with a new assessment technique?
4. Could changes in preparatory materials help?
5. Might you introduce an activity in a more engaging way?
6. Would it help to change any of the steps in an activity?

This note follows up by discussing how I addressed each of these questions upon teaching a section of MATH 220 (Calculus 1) during Fall 2012, my first semester at Ferris. My answers reveal the sources I used to find assessment data or other information that guided my responses to the questions and suggested particular changes I needed to make in MATH 220. These sources, indicated in boldface below, are good places to look if you want to obtain data that will help you "close the loop".

1. Do you need to adjust your goals for student performance?

In a class like MATH 220, I define success largely by student performance on exams. Thus the primary source of data in determining whether students succeed is **quantitative data from summative assessments**. I like to keep track of not just the class average or median, but the percentage of the class scored 90% or better on each exam (also 80% or better, etc.), the correlation between students' grades from exam to exam and student performance on individual questions. In Fall 2012, student performance in my MATH 220 class was good on the first exam but plummeted thereafter; as such I did not decree the class to be a success. Changes needed to be made before I taught MATH 220 again.

(Question 2 doesn't apply to MATH 220, because the learning outcomes are set by the department and common to all instructors.)

3. Would it be worthwhile to experiment with a new assessment technique?

I had some **personal experience from teaching other courses** before coming to Ferris where I used technology-based, laboratory-style assignments that were well received by students. Also, **literature on the scholarship of teaching and learning** of mathematics suggested positive impacts from other institutions' use of technology-centered activities. All this indicated that implementation of regular computer assignments could pay dividends in MATH 220.

4. Could changes in preparatory materials help?

In Fall 2012, I taught 220 in a very traditional style with many lectures where I copied my lecture notes onto the board as we went, expecting students to follow along. However, **observations of my students during office hours** revealed a major problem with my approach: my expectation (based on my own experience as a student and my experience as a postdoc at other institutions) was that the students' notes would look pretty much like mine. But at FSU, I noticed over and over

that while students had copied everything I wanted them to, their lack of proficiency in the use of underlining/spacing/indenting/etc. in their notes led to key ideas getting “lost in the shuffle”. This told me that I needed to give them some guidance on how to take notes, or even better, that I should provide them with notes where the key ideas were easy to find.

5. Might you introduce an activity in a more engaging way?

Qualitative comments on student evaluations of my Fall 2012 course indicated students found the class quite dry, and that students wanted more opportunities to “do” things (rather than listening to me talk). **Student attendance** was also spotty. This suggested that I needed to make my course more student-centered.

6. Would it help to change the steps of an activity?

A major topic in MATH 220 is optimization: finding the maximum or minimum value of a certain quantity. In Fall 2012, by **looking qualitatively at students’ work** on exams, I noticed that students often struggled to distinguish two classes of applied optimization problems which are solved by different, but related procedures. In particular, they frequently attempted to use the method for the first class of problem to solve problems in the second class, and vice versa. After observing these errors, I reflected on the activities I used to develop students’ skills at solving optimization problems, and decided that a restructuring of these activities would help prevent the common error I saw in Fall 2012.

In the last part of this series (to appear next week), I will discuss some of the changes I made to my MATH 220 course in response to this analysis, and reveal the impacts of these adjustments.