David Offner : MTH 241, Discrete Mathematics
Individual Course – Outcomes Assessment 2011-2012

Select a course you are teaching that has identified outcomes. (Outcomes should be listed on the syllabus):

MTH 241, Discrete Mathematics

PLAN

Select one of the outcomes. This quadrant of the Assessment Cycle asks the question, "What did I want my students to learn?"

The students should be able to create and write proofs using mathematical induction.

DO

This refers to the range of possible measurable learning activities you have incorporated into your course such as projects, papers, performances, presentations, and exams.

The students read about the technique in their book, observed me demonstrate the technique, and practiced the technique in class, on homework, and on two tests.

CHECK

Describe how you measured the accomplishment of the outcome. In other words, what methods did you use to measure and evaluate student learning resulting from "DO" course activities?
Describe the results of your measurement.

I observed the performance of the students on two questions on the final which asked the students to apply the technique. One of the problems was very similar to what they had dome many times during the class and should have been routine. The other problem was a little less familiar and I expected it to be somewhat challenging. Both questions were scored out of 20 points.

The results: On the routine problem, 3 students scored 19 or 20 points, reflecting mastery of the technique, an understanding of the mathematics, and clear, coherent writing.

The remaining students scored between 13 and 15 points, reflecting some progress, but a significant deficiency in one of the areas mentioned above. Of these students, three appeared to have a solid grasp of the technique of mathematical induction, but did not grasp the proper mathematical concepts to apply it properly.

On the less routine problem, only three students grasped enough of the mathematics to be awarded 15 or more points on the problem, and only one solution was perfect. The solutions largely reflected an understanding of the basic form of an inductive proof, but many students had trouble formulating the inductive hypothesis or knowing how to apply it.

ACT

As a result of the information gathered in "CHECK," what changes (if any) did you make in the instructional process?

Induction is an important technique in mathematics, but students often struggle when they first encounter it, and it often takes repeated trials to really master it. I am encouraged that the students generally understand the form of an inductive proof. The results also clearly show that their understanding is a work in progress, and I will continue to think about how to help them understand this concept. One idea that comes to mind after looking at these results is to ask the students not only to write inductive proofs, which I did many times in the course, but identify particular parts in the proof and what role they play. E.g. What is the inductive hypothesis? What statement are you trying to prove in the inductive step? Etc. This might help some of the struggling students identify exactly where they are losing the thread, and show them what questions they should be asking themselves to ensure their proofs are correct.