

Carnegie Course Redesign Final Report – UMCP Math 115 Redesign

The first non-pilot semester for the Math 115 Redesign was Spring 2012. Thus we will compare data for Spring 2012 with the corresponding Spring 2011 and Spring 2010 semesters.

A. Impact on Student Learning

1. Improved Learning: Comparison of the students who completed the course and earned a grade of C or better in the first non-trial semester of Spring 2012 vs. Spring 2011, and 2010 are as follows:

Spring 2012: 62.7%

Spring 2011: 59.9%

Spring 2010: 63.0%

Given the fact that the final examinations for the three spring semesters were deemed to be comparable, we conclude that during Spring 2012 the student learning was approximately that of the pre-redesign semesters.

2. Improved Retention: Comparison of the percentage of students who withdrew between the first hour examination and the final examination yields the following information:

Spring 2012: 17.9%

Spring 2011: 21.3%

Spring 2010: 19.8%

Thus there appears to be a modest improvement in retention with the redesign Math 115.

3. Other Impacts on Students

On average students occasionally read the week's sections before attending lecture or lab. However, when asked to rank resources (text, fellow student, TA, technology), 39 said that they first turned to the textbook, which was available as an ebook through the online homework system. Their second choice was one of the TAs, while the third choice was a fellow student (judging by the averages of the choice numbers). "Other" was often listed as Google.

Thirty-one students listed the TAs as one of the best features of the lab; two listed them in the worst features of the lab. Other good features included collaboration, easy access, individual attention, flexible hours. Among the worst features students listed were noise, not enough TAs, long waits occasionally for TA help, time limits/constraints, password protection (this forced them to come to the lab).

More importantly, however, we need to compare the attitude of the students in the Math 115 redesign with students who have taken Math 115 before the redesign came into effect. In fact, the students in the Math 115 redesign appeared to be relatively satisfied with the course. That has not been true of the pre-redesign Math 115, because the students have generally taken precalculus in high school (or in college), and are unhappy needing to take it again.

B. Impact on Cost Savings

As suggested in the redesign plan, there was no expectation of direct cost savings. Indeed:

For Math 115 the following were in effect for each of spring semesters: 2012, 2011, and 2010:

- One faculty member, with a one-unit teaching load for Math 115
- Three full-time teaching assistants, each assigned to 2 sections

There are some modest on-going costs for the Math 115 redesign not appearing with the earlier Math 115 course: electricity, upkeep for computers, etc. The department is not charged for electricity. The upkeep for computers will involve new purchases every few years. Also, upstart costs were considerable, and included furniture, laptop computers, white boards, security system.

However, if retention continues to increase with the redesigned Math 115, then there will be a nominal indirect cost savings to the campus, as well as student good will. Also, we are initiating use of this computer laboratory off-hours for calculus students who need remediation.

C. Lessons Learned

1. Main Pedagogical Improvement Techniques

- Students getting immediate feedback from the computer
- Students having immediate access to teaching assistant help
- Students able to work together in small groups

2. Cost Reduction Techniques

See B above.

3. Implementation Issues

- The lab was occasionally overloaded, especially Fridays because homework assignments were due then. Resolution: Rearrange deadlines for homework assignments, and limit student access to the lab except during their scheduled lab times.
- The TA's generally did not get to know their students. Resolution: Require students to attend the lab during their scheduled lab times.
- The noise level could be annoying, especially on Fridays. Resolution: Rearranging student lab schedules, and more effective use of the white boards should diminish the noise level.
- Waiting time for access to a TA was sometimes annoying. Resolution: Better use of the portable white boards, and rearrangement of student lab schedules.

D. Sustainability

The course would appear not only to be sustainable over the long haul, but also it will surely serve the students registered for it better than the traditional method, and will be able to serve as a model for other redesign courses in mathematics at UMCP.