

1 Goals and outcomes

The over-arching goal of our effort is to offer a more inclusive high quality math program which increases retention and graduation rates of Science, Technology, Engineering and Mathematics (STEM) majors.

The purpose of the M150A Online Tutoring Center is to support student learning in Calculus, the first required course for most STEM majors. Success in this course is highly correlated to retention and timely graduation. Of the CSUN students admitted as first-time freshmen between 1996 and 2002 who entered STEM majors less than 30% completed a degree in 6 years. Of this, only 4%, completed their degrees in 4 years. In examining the data closely to determine what factors led to success, we found that over 80% of entering freshmen who began as a STEM major and took Calculus in their first semester received a degree. Thus, the most promising approach to increasing retention of freshmen entering STEM majors is to ensure their timely matriculation in Calculus and required Mathematics courses. we will update numbers

Phase I (2010 - 2011) of this project establishes a pilot tutoring center. During Summer 2010, we set up a site on Moodle as the initial instance. Another site was set up on Drupal, but will not be ready for use until Spring 2011 at the earliest. ATI tested the tutoring website for compliance with the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) and the Section 508 Standards for Electronic and Information Technology (<http://www.access-board.gov/sec508/guide/1194.22.htm>). General discussions about universal design and accessibility have been initiated with Susan Cullen and Sandra Caesar. In August, five undergraduate tutors were trained. Three math faculty members (Alexander Alekseenko, Jacek Polewczak, and Carol Shubin) monitor the site daily and continue to improve the site and mentor the tutors. Faculty also directly assist the 230 student participants from five M150A courses during Fall 2010. Participating faculty have shown some M150A instructors and interested faculty how to use the site. We will arrange a departmental seminar later in the Fall 2010 semester.

In Phase II (2011-12) , we plan to particularly study whether the tutoring service particularly supports the needs of students with disabilities. This group of students take twice as long to matriculate a Mathematics course. Enrollment data shows that students with disabilities are very interested in pursuing STEM degrees: 32% more students with disabilities are enrolled in STEM programs as compared to all students. However, 40% less STEM degrees are awarded to students with disabilities. Our goal is to broaden the participation and achievements of students in all fields of Science, Technology, Engineering and Mathematics (STEM) education and associated professional careers.

The pilot Online Tutoring Center serves 230 M150A students. The passing rate for M150A classes is roughly 55-60 %. M150A directly affects approximately 25 % of the total STEM student population of 4000?? Secondly, mathematics service courses impact at least 43 non-mathematical STEM courses required by 25 degrees in Engineering, Computer Science, Mathematics, Physics, Chemistry and Biology.

We will achieve this goal by pursuing the following student success outcomes:

- increase the passing rates in M150A 5 %.
- increase retention rates to 5 %.
- accelerate graduation rates.
- providing in-person and online training materials to help faculty incorporate universal design into their pedagogy.
- develop a set of best practices to train and monitor the tutors.
- creating Online Tutorial Center with accessible tools for all students.
- increase participation of all student groups in STEM majors.

2 Alignment between the curriculum and outcomes

The Online Tutoring Center services are closely aligned with the M150A curriculum. Each section of the syllabus is covered and assistance is given to homework and test preparation.

a. Develop a questionnaire to assess the operation of the web space which will help us determine to what extent the website

1. provides meaningful help on calculus problems.
2. gives students opportunities to collaborate.
3. communicates to a variety learners.
4. is used for students.

b. Develop a questionnaire to assess the quality of tutoring services. Questions may include:

1. Are tutors able to resolve student questions?
2. In their work do tutors use resources such as learning materials assembled by math faculty, online encyclopaedias, search engines?
3. Are tutors able to address all types of learners?

3 Develop a meaningful, manageable, and sustainable assessment plan

a. Develop measures to assess quality of tutoring services and administer the measures in the beginning of each semester and in the middle of it. Evaluate on a scale of 1 to 10 each tutor's

1. pedagogical maturity.
2. ability to communicate.
3. use learning resource.
4. ability to accommodate different learning styles.
5. effectiveness in answering student question.

b. Develop measure to assess the usage and of the web-space. Count how many students

1. visited the web-space.
2. asked questions on the web-space.
3. acknowledged that using the web-space helped them answer their question.
4. formed discussions.
5. from NCOD and COD have visited the web-space.

c. Develop measures of implementing practices of universal design and training tutors and faculty to follow these practices.

1. In coordination with Sue develop a table of different learning styles and check whether material are available to address these styles.
2. How many training sessions were available to tutors and faculty in using universal design each semester?
3. How many tutors and faculty members attended the sessions?

4 Collection of assessment data

From the Moodle Statistics, we can evaluate use of online tutoring center by looking at activity logs and track the types of questions asked and how they are answered.

From the Math Department or Institutional Research, we will collect final exam results and compare with past results.

We will keep track of students outcomes in mathematics M150B (or M150A if they failed) the following semester and try to assess the value-added from the tutoring center. If a student failed, we will review their exams and tutoring center records.

We will research student preparedness background including high school of origin, SAT or ACT results, ELM, MPTI and MPTII results and other available pre-college indicators such as GPA. We will also collect data on past courses attempted at the college level.

We will collect data generated from our course coordinator including comparison of instructor grading and class averages by instructor. We will attempt to review finals exams over time for consistency in difficulty.

We will survey and have focus groups with students, tutors, ATI staff, and faculty participants to find out what worked and how could the tutoring center be improved.

We will also look for any unusual patterns or behavior that may emerge over time.

5 Assessing the assessment process

Our initial formal assessment will be made during Intersession 2011 and although we monitor the site daily and make many adjustments as we go. Results from assessment will be used to improve the sites effectiveness. Ineffectual material or methods will be dropped or modified. Tutor training will be reviewed and improved during Spring 2011. After making correlations between data, we may more clearly early indicators of student outcomes and learn what strategies work best to circumvent failure.

Assessment practices will be fine tuned and we will develop better rubrics for how each outcome will be assessed and what are benchmark goals for the outcome.

6 Who will collect and analyze the data?

The principles in the project include Alexander Alekseenko (Math), Susan Cullen (ATI) , Jacek Polewczak (Math), and Carol Shubin (Math). All will participate in in different aspects of assessment.

Alexander Alekseenko and Carol Shubin will review the success of different content materials and the tutor training and student performance.

Susan Cullen - assess the universal design of the tutoring center and report on ATI compliance.

Jacek Polewczak will assess matters more concerned with the hardware and software and its mathematics language accessibility.

7 Where and when will it be done?

We will review results after each semester.

* How will we reflect on the results/ when

This project has several phases. Phase I is just to get an online tutoring center available through CSUN's Moodlerooms and the College of Science and Mathematics' Webwork. Initial set of tutors were selected, trained, and monitored. Faculty will evaluate the site's setup and tutor training.

Materials were initially reviewed by ATI. We continue to work with them to address accessibility issues.

More importantly we have had many discussions about the website's design. Our long-term goal is to provide a universally designed site. Sue Cullen [We plan to seek input from NCOD and COD and special education experts in Phase II.]

*How will results and implications be documented?

The results will be documented in reports containing the course data pass rate, site usage, accessibility reports, survey results, recommendations, and other data. These reports will be posted on our M150A development site (<http://www.carolshubin.com/moodle>). This site also contains a blog for participants to log reflections, comments, suggestions and generally chronicle the development process. It keeps a calendar record of our meetings, their agendas, comments on events, and similar information.

Over time we will be able to see whether the expected impact in this category will be the reduction of dropout, failure and repeat rates from the Mathematics courses thus accelerating graduation rates. Such information will be relayed to the department and/or College of Science and Mathematics and College of Engineering and Computer Science and Institutional Research.

Best practices and reports can be posted in the Library as well as at CIELOs Ideashare.