Online Math Remediation for UMD Pre-Freshmen Targeting Underrepresented STEM Groups

Improvement of Campus Climate 2012-2013 Proposal

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Objectives: The objective of this proposal is to create an online pilot program for math remediation specifically designed for high school seniors (Class of 2013) during UMD’s Spring Semester 2013. The proposed program will target students who:

- are from underrepresented groups (African American, Latino/Hispanic, Native American, and possibly other identified groups) in STEM disciplines.
- have an ACT score that places them in a class lower than Calculus I or the student feels underprepared for Calculus I
- have committed to attending UMD.
- have expressed interest in pursuing a STEM-related degree or career

Online Mathematics Remediation Program: The proposed program consists of two specific aims:

Aim 1: To introduce students to MyMathLab, an interactive and easy-to-customize online math learning program. Students will learn, review, and practice course objectives from the course in which they placed. A pre-test would be used to identify the strength and weakness of registered students and, consequently, the course objectives will be designed. Using MyMathLab program, the instructor (Rachel Breckenridge) will guide the students through the designed course objectives tailored based on the student proficiency test. Once the students achieve 90% proficiency on course objectives, they would be allowed to take a final exam as a means to place into the next math course. The model is to “study-up-then-test-out” of remedial math courses at UMD. The learning outcomes for students in this model will be knowledge (Basic Algebra, College Algebra, and Precalculus), problem solving skills, and critical thinking. The SCSE Unit Change Team will serve as a resource for the PI and help solving any unanticipated problem that may arise.

Aim 2: To introduce students to the current majors and faculty in STEM here at UMD on two Saturdays. Program students would be introduced to the Multicultural Center, careers in STEM, research opportunities, and other pertinent resources and topics through various activities during their visit. The SCSE Unit Change Team will be an integral part in this on-site visit to highlight the opportunities for new knowledge, professional development, self discovery, and support system that UMD offers.

Learning Outcomes for Participating Students:

1. Students will become proficient in mathematics (Basic Algebra, College Algebra, and Pre-calculus) to the expected level needed to excel here at UMD/STEM programs, which will ultimately translate to higher GPA and therefore better career choices upon graduation.
2. Student will learn and appreciate a new model of online learning with an engaged instructor.
3. During this course and the on-site visit, students will enhance their communication and teamwork skills, critical thinking, and learn about different aspects of the STEM program here at UMD.
4. Students will learn about the support system needed for their success here at UMD while discussing career options after the completion of their STEM degree.

Outcome Assessment:

1. Increased proficiency in course objectives based on computerized pre- and post-tests.
2. Students who complete the program will pass a final exam to test into the upper math course.
3. Program satisfaction and longer-term achievement and involvement outcomes (Outcomes 2-4) will be assessed by Student Success Strategy Map or other method if possible.

Significance: Upon successfully completing this pilot program, students will be well prepared to join UMD as freshman with additional awareness of the support system within the STEM community here on campus. In addition, those students will be at least one semester ahead in their required math course sequence. These
factors would enhance the likelihood of these students to complete a STEM degree, with higher GPA, in a shorter amount of time [Hurtado, et al., 2010 and Museus, et al., 2010]. Importantly, this program will help SCSE to attract and retain underrepresented students while providing them with the necessary tools to succeed in STEM fields. The proposed program will also addresses Action Step 2 and 4 of Goal 2 of the UMD Strategic Plan by implementing an effective process to increase, retain and support diverse or Native American students in the SCSE. Once successful, this pilot program could be adapted by other disciplines in SCSE as a recruiting tool and as a means to continue the support of incoming diverse or Native American students.

Itemized Budget:
1. Course release for the PI to plan and implement course objectives for three courses (Basic Algebra, College Algebra, and Precalculus), accompanying materials, and final exams for the program, about $7000.
2. Stipend for participating faculty, staff, and mentors for Saturday experiences, $200 per participating faculty, staff, and mentor. For six people on two Saturdays would be $2400.
3. Brunch at UMD dining hall (about $9 per person) and snacks (about $3 per person) for participants and presenters during Saturday experiences, about $12 per participant for each Saturday. For two Saturday experiences and 30 people the total would be about $720.
4. MyMathLab web access costs about $80 per student but has verbally been negotiated as free from Pearson Higher Education for the pilot program by the PI. If the verbal agreement is not upheld or a cap is set, at the most about $1920 would need to be budgeted.

Other Forms of Potential Funding:
1. SCSE course release or pay for continuing the program into summer 2013
2. Strategic Initiative Small Grant (up to $3,000) for summer 2013

Timeline:
1. January 22 - February 15: Prepare courses on MyMathLab, identify target students, and enroll students
2. February 16: Web conference as an introduction, students take pre-test, and start on-line classes
3. February 23: Kick-off Saturday on-site visit experience to UMD
4. March 16: Benchmark 1 (expectations and reminders communicated to students)
5. April 6: Benchmark 2 (expectations and reminders communicated to students)
6. April 27: Benchmark 3 (expectations and reminders communicated to students)
7. May 4: Closing Saturday experience for the semester, opportunity to take final exam
8. May 4-15: Grading final exams and analysis of assessments
9. Based on other the availability of other forms of funding, the program may continue for the summer

Faculty Requesting Funds: Rachel Breckenridge (rbrecken@d.umn.edu), Instructor of Mathematics and Statistics

Approval from Immediate Supervisor: Dr. Zhuangyi Liu (Mathematics and Statistics Department Head)

Approval from Unit Head: Dr. Penelope Morton (SCSE Associate Dean)

References: