COMPUTER-AIDED COLLEGE ALGEBRA - A PRELIMINARY STUDY REPORT

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Abstract. We are experimenting with the development of a computer-aided College Algebra program at Oklahoma State University (OSU) using the computer software MyMathLab (MML). A mixed-model study was conducted during the 2008 Fall semester involving approximately 1400 students. The purpose of this study was three-fold: 1) Describe College Algebra students' perceptions related to participating in MML computer-aided instruction; 2) Describe which MML computer learning components students found beneficial; and, 3) Describe the ability of College Algebra students participating in MML computer-aided instruction to effectively communicate their mathematical thinking. A description of the redesign model and available preliminary findings will be discussed.

Introduction. Like many similar-sized institutions, OSU teaches College Algebra to approximately 2000 students annually as one of its entry-level mathematics course options. Instructional delivery can been characterized as traditional with large section sizes (100 students approx.) taught by experienced non-tenure staff in three 50-minute class meetings per week. During 2007-08, the researchers began to seriously investigate a redesign of the College Algebra experience. We begin by discussing some of the motivations for considering a computer-aided College Algebra experience, describing the model that we developed, and presenting findings of the study. The motivations for this consideration included such issues as: 1) less than desirable student success rate, i.e., grade of C or better; 2) high student drop rate; 3) variability among sections and semesters with respect to grades assigned and content expectations; 4) controlling costs of course delivery.

The OSU Redesign Model. The redesigned delivery model for College Algebra was supported through a grant to OSU from the National Center for Academic Transformation (NCAT) during the pilot semester, Fall 2008. NCAT is an independent, not-for-profit

organization that provides leadership in using information technology to redesign learning environments to produce better learning outcomes for students at a reduced cost to the institution. The department redesigned 8 of its 27 sections of College Algebra during Fall 2008. Each of the 8 redesigned sections met one time per week for 50 minutes in *Focus Groups* limited to 25 students (as contrasted with the regular sections that met three times per week for 50 minutes with enrollments of 50 students each). During these sessions, instructors reminded students about deadlines and course expectations, answered questions about the previous week's work, and previewed the upcoming week's content. Connecting with students once per week was viewed as important for keeping them organized and for maintaining a sense of class. *Weekly Task Lists* were also developed that provided a roadmap of tasks that they should complete during the week and clearly spelling out student expectations.

In addition to the required *Focus Group* sessions, students in the redesign sections were also required to spend three hours per week in the OSU Mathematics Learning Resources Lab (MLRC) which was open 60 hours per week and staffed by instructors and undergraduate tutors. While in the MLRC, students used the MML help features, videos, and online textbook to learn the week's content and to complete their homework and quizzes. It is believed that the key to our redesign model was shifting students' time from passively attending lecture to actively working on mathematics.

Preliminary General Findings. Evidence from the department's pilot semester suggests that the redesign is improving learning outcomes in College Algebra as measured by scores on the same final examination. Students in the redesign sections all had comparable experiences; covered the same material, similar assignments, and uniform grading. Students in the redesign sections had a higher retention rate than those in the control group of the traditional sections. Unfortunately, there was little difference between the redesign and control group with respect to DWF rates. Cost saving measures will not be realized until there is full implementation of the redesign.