INCREASING STUDENT ENGAGEMENT IN LEARNING CALCULUS THROUGH PBL, ORAL ASSESSMENTS, AND WRITING

Mary Pilgrim
Department of Mathematics
Colorado State University

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Abstract:

Evidence-based research in education supports the use of classroom methods that encourage student engagement in learning. Providing an environment that prompts students to analyze their own learning promotes the development of metacognitive skills, and has been shown to enhance learning. This is particularly important in mathematics courses, since a robust understanding of mathematics underpins success in other STEM disciplines, and is therefore essential for supporting increased persistence in STEM fields. Regrettably, mathematics courses are often taught in traditional, non-engaging, teacher-centered ways, especially at large institutions where many thousands of students enroll in these courses each year.

To address this problem, I developed and implemented a section of Calculus I that incorporates problem-based learning, oral assessments, and writing as active teaching and learning strategies in the classroom. Preliminary results indicate that students who participate in such activities perform better on both procedural and conceptual exam questions. I will present the framework for instruction, sample activities, sample student responses, and preliminary data. I will also discuss future plans to implement our strategies on a larger scale - specifically how Graduate Teaching Assistants can be trained to implement such activities.

Mary E. Pilgrim (pilgrim@math.colostate.edu) is an Assistant Professor in the Department of Mathematics at Colorado State University (CSU). Her current research interests are focused on improving success rates in Calculus I through pedagogy and curriculum. She has worked specifically on problem-based learning, writing to learn, and oral assessments and has created a two-semester version of Calculus I at CSU. Other research areas include self-regulated learning and GTA training.