

Archived Information

The Boston College Mathematics Case Studies Project
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Goal: To improve university level mathematics faculty and graduate student teaching practices and understanding of pedagogy.

Summary: The BCCase project has developed new materials—case studies—to increase knowledge of pedagogy and improved teaching practices among mathematics graduate students. These students will go on to become the next generation of university mathematics faculty. This project thus establishes the foundation for a generation of university mathematics faculty who are well-prepared to engage and successfully teach preservice K-12 teachers.

Purpose (in the context of the Mathematics and Science Initiative): Programs to improve K-12 teacher knowledge of mathematics will benefit from the inclusion of university-level mathematics faculty and of graduate students engaged in mathematics doctoral study. Such faculty and advanced students have a valuable mathematical perspective, but must also be skilled mathematics communicators if they are to be effective with preservice teachers. Graduate students in mathematics, particularly at research institutions, typically focus their efforts on the acquisition of mathematical knowledge and research expertise. These graduate students go on to become university faculty who are not necessarily well-equipped to teach preservice teachers. The purpose of this project is to address this gap.

Accomplishments: The BCCase project (www.bc.edu/casestudies), funded by a grant from FIPSE (1998-2002), has created innovative materials--case studies--for graduate students in mathematics, field-tested them with diverse groups of graduate students, and demonstrated their effectiveness. They have also developed support materials for faculty who wish to use the materials, and begun their dissemination.

More detailed information: The use of case studies as a teaching tool is common in certain disciplines, such as law and business. However, there had been no large-scale effort to use this methodology with graduate students in mathematics prior to this project. In the context of this project, a case is an excerpt from a teaching situation that focuses on and describes one or more of the following: teacher behavior; student responses; student learning or mislearning; classroom management; instructional content or practice; and the relations between teacher, students, and the teaching assistant (TA). All of these have been identified as impacting student learning. Fourteen case studies were developed by the project. These case studies are narratives of university classroom scenarios, typically a compendium of actual situations, described from the perspectives of various students and of the instructor.

The materials prepared were subjected to extensive field-testing. Evaluation was carried out by an independent evaluator. Her testing gave evidence that “the cases were a catalyst for increased awareness of pedagogical issues by TAs.” In addition, a wide range of institutions have reported success in using the case studies created by this project. The BCCase case studies have been published (reference below).

The project also worked to develop the faculty skills necessary to successfully use these materials, holding workshops and mini-courses.

Plans for the next 12 months: Prof. Friedberg and the American Mathematical Society have secured a joint grant from the Calculus Consortium of Higher Education to offer mini-courses in the use of the case studies to mathematics departments at regional AMS meetings. This will serve as a partial dissemination of the results of this project.

BOOK REFERENCE: S. Friedberg et al, Teaching Mathematics in Colleges and Universities: Case Studies for Today’s Classroom (available in Faculty and Graduate Student editions), American Mathematical Society in cooperation with the Mathematical Association of America, Issues in Mathematics Education Volume 10, 2001.