

QEP Impact Report

Department of Mathematics and Computer Science

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The QEP served as a catalyst for change already under discussion in the Department of Mathematics and Computer Science. During the 2009 Fall semester, we started formally aligning our goals with those of the QEP. Throughout the last four years, we have redesigned several of our courses substantially in order to comply with the University QEP. Our goal in retooling was to provide opportunities for our students to integrate knowledge and skills from academic and co-curricular experiences. By looking at our capstone seminars (MATH 479, CS 495 and 496) and our logic and proof course (Math 250), I reflect below on how well our students achieved the ability to “Solve Complex Problems” and “Communicate Effectively and Responsibly.”

Solve Complex Problems

All students in the department complete MATH 250, which introduces them to mathematical proof writing and logical argumentation, the crucial building blocks for solving complex problems in Mathematics and Computer Science. Additionally, all students complete a capstone project that incorporates review of existing work and elucidation and/or extension of the results. In the Mathematics Capstone, which is taken by all our Mathematics and Mathematics education students, students write and present three papers. These assignments demand increasing levels of independence and mathematical maturity, culminating in either independent research or a detailed review of a research journal article. Their third and final paper requires the students to read and comprehend mathematics found in professional journals. Topics for the third project included: Application of quasi-groups and Latin squares in cryptography, Election forecasting, How to predict the outcome of a national election by 7 p.m. on election night, and Final offer arbitration. In the CS Capstone, students work on a yearlong software development project that involves many, if not all, of the areas they have studied in their CS courses. They must create a program involving a non-trivial algorithm coupled with a graphical user interface. Topics for their projects included: A Marching Band Drillbook Mobile App, Chess Artificial Intelligence Using Bitboards, and A Natural Language Parser.

Communicate Effectively and Responsibly

In the Mathematics Capstone, students have ample opportunity to practice effective communication; students develop four assignments for this course. For three of the assignments, each student writes a paper and gives a presentation, both prepared in *LaTeX* (a Mathematical document markup language). The fourth assignment is preparing a résumé. In the CS Capstone, students have ample opportunity to practice effective communication, as they have to complete bi-weekly progress reports and make three presentations explaining their work. One of these presentations is a poster session at Western’s undergrad research expo. Capstone students also complete a CS portfolio, where they reflect on the work they have accomplished and what they have learned during their four years at Western.