Examples of SoTL in Mathematics

Georgetown University mathematics professor James Sandefur investigated his students' problem solving strategies. He conducted "think-alouds" with his students, in which a student is asked to solve a problem and say aloud everything that they think as they do so. Sandefur videotaped a number of these think-alouds and learned much about the strategies (good and bad) his students often use to solve mathematics problems. He also describes how what he learned has impacted his teaching.

Retrieved 9/9/07 from
http://www.vanderbilt.edu/cft/resources/teaching_resources/reflecting/sotl.htm

---

Michael Burke
Mathematics
College of San Mateo
Carnegie Scholar 2005

I am excited about the benefits of the integrative learning experiences I am able to offer my students in the "Tools for Thought" learning community. However, learning communities do not fit comfortably into the structure of the college, and so these benefits are available to a relatively small number of students. My CASTL project is an attempt to bring some of the benefits of this integrative experience to students in my stand alone mathematics classes. I plan to design additional integrative assignments, built around real world data, from a variety of fields. I hope to provide background information to my students through readings and, perhaps, by inviting colleagues from different disciplines into my classroom. Thus, the integrative experiences I propose will involve background information and data from a variety of disciplines, mathematical treatment of the data, and interpretation of the data, all expressed through writing about the issues involved. Issues that I would like my students to explore include the growth of the minimum wage, global warming, worldwide petroleum consumption, carbon dating, the mathematics of polling, and models for population growth.

Project Snapshot: http://www.cfkeep.org/html/snapshot.php?id=12770746101412

Barry Rubin
Social Science, Professional
Indiana University
Carnegie Scholar 2001

In today's world, an informed citizenry must be able to understand how statistics can be used to analyze and present information. Yet, required courses in statistics are unsuccessful in conveying necessary concepts. This project addresses the problem via digital video-based case studies. The research question is: “Do collaborative exercises derived from digital, video-based case studies increase student motivation and learning of basic statistical concepts in introductory courses?” Course web sites for both undergraduate and graduate introductory statistics classes have been constructed, digital video streaming has been implemented on these sites, and one case study has been completed, placed on the web sites, and pilot tested with the graduate-level introductory statistics class. The case study was used

for a small group, in-class discussion where students applied critical thinking to determine the next steps for statistical analysis. A Likert-scale questionnaire was administered to the students. The results show that student learning and motivation were substantially improved. This outcome was supported by significantly improved performance on the final exam. Two additional case study videos have been produced and are currently being uploaded to the undergraduate class web site, with the intent of utilizing one of these new video cases and the original regression analysis video case for this summer's offering of the class. Both the Likert-scale questionnaire and a focus group will be utilized to obtain data pertaining to the success of the new video-based case study. The results of utilizing this additional case study will be presented at a later date.

Project Snapshot: http://www.cfkeep.org/html/snapshot.php?id=36475569975074

Curtis Bennett
Mathematics
Bowling Green State University
[now at Loyola Marymount University]
Carnegie Scholar 2000

I am studying how semester long research projects in a mathematics capstone class for prospective teachers influence student attitudes about what make good mathematical questions and the overall influence such projects have in the class. This project was exploratory in many ways, and the results indicate that students' attitudes towards what makes a good problem do seem to have shifted slightly towards a more mathematical view. Of perhaps more interest are the over all effects of the projects on the class that were observed. The projects appeared to influence how I taught the class, what the students considered important in the class and the conversations that occurred in the class. In the project work I gathered pre- and post-surveys on student attitudes, taped office hour conversations, collected student work, kept a journal, was given a copy of one student's notes of the class, and conducted three exit interviews on the class (one of a large subset of students in the class and two individual interviews). Much of this material has been analyzed to suggest the changes in student attitudes and the class. A fairly substantial summary of the class and my work so far is available through my course portfolio for the class at: http://myweb.lmu.edu/cbennett/Portfolio/portfoliocover.htm