

Community-based projects in general education statistics course

We incorporated semester long group projects into 2 sections of Statistics I for the first time during the spring semester of 2007. Project groups were formed based on students' interest levels in the topics. The projects were used to reinforce course concepts and to help students see the significance of mathematics and statistics in understanding civic issues. In addition to the group projects, connections between civic issues and knowledge of mathematics/statistics were explored through carefully chosen lecture examples, homework and group work.

Samples of projects chosen by students

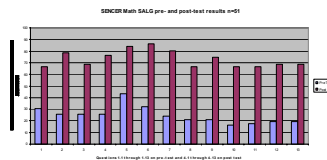
Domestic Abuse in Downtown Minneapolis: Gender, Race and Language; Mercury in Metro Lakes and Fish Consumption Advisories; Does Where You Live, Affect the Price You Pay for Prescription Drugs? A comparison of prescription drug costs in urban, suburban and rural areas surrounding the Twin Cities; Life After Retirement: An education on the benefit of saving; A Comparison of Crime Rates to Costs of Rental Properties in the Communities of Minneapolis; Housing in Ramsey County: A comparison of diversity, affordability, types of loans and foreclosures

Project Stages

- Stage 1 **Brainstorming for topics** Students come up with a list of possible topics.
- Stage 2 **Background investigation** Students research available resources for background information.
- Stage 3 **Proposal** Groups submit one page proposals with bibliographies.
- Stage 4 **Data Collection** Groups gather data from surveys or from reliable sources.
- Stage 5 **Rough Draft** Groups submit typed rough drafts of the final report for initial feedback.
- Stage 6 **Oral Presentation** Group give 15 minute presentations to the class with a 5 minute question and answer period.
- Stage 7 **Final Written Project and Dissemination of Results** Groups prepare final report and then take an action by writing a letter to a local paper or university/state official.

Assessment

The Math SENCER SALG (Student Assessment of Learning Gains) pre and post versions were administered to 51 students enrolled in 2 sections of Statistics I.



Student comments

- "The course gave a global picture to understanding the use and need for statistics – that made a big difference in my desire to learn."
- "Keep doing the group projects. They are a lot of work but worth it for understanding stats better."
- "The group project not only helped me learn a lot but also gave me the chance to feel close to some of my classmates. My experience with other classes where there was no group project was loneliness. Maybe because of my "difference"."
- "To be able to put what we learn in statistics and use it for a reality check, I was able to grasp the material faster and learn it better."
- "The project helped me see how statistics is related to every life instead of seeing it as a requirement for my major."
- "The project was great. I would encourage it for all courses because it encourages students to get involved and get in the know."

Workshop for Community and Resident Faculty

In the spring of 2007, we held a workshop for Metropolitan State University Faculty to discuss SENCER initiatives at the university and to encourage math and science faculty to incorporate civic engagement into their courses consistent with the philosophy of the SENCER project. We particularly hoped to attract math and science community (adjunct) faculty who teach the majority of the university's lower-division math and science courses. For the math and science departments to successfully incorporate civic engagement into their curriculum these faculty members must be informed and supported in the initiative.

Disciplines represented at workshop

We also hoped to attract faculty from across the university to initiate dialog about the use of mathematics and science in understanding civic issues. We were pleased to have colleagues from political science, literature, ethnic studies, technical writing, social science, creative writing, and psychology, as well as math and science colleagues, present at the workshop.

Outcomes of workshop

After the workshop, faculty were encouraged to take a modified version of the MATH SENCER SALG to assess their interest and motivation in incorporating civic issues into mathematics and science courses.

An additional outcome of the workshop was the formation of a new relationship with the Center for Community Based Learning (CBL). The CBL will be offering a workshop in the fall semester to acquaint math faculty with the services offered by the center. Five math community faculty have expressed an interest in attending the workshop.



Current and Future Initiatives

New Course in Development *Mathematics of People & the Environment* is being designed as a prerequisite for all of the university's general education mathematics courses, including College Algebra and Statistics I. The course emphasizes quantitative skill development, data analysis and mathematical modeling through studying greenhouse gases & climate change, food webs & biomagnification, population growth, and invasions & epidemics. This course will be piloted in Spring 2008.

Interpreting Percentages

Between 1990 and 2002, greenhouse gas emissions in South Korea grew by 97% whereas emissions in the U.S. grew by 18%. Can you determine which country is the larger emitter in 2002, or is there additional information that you would need to know to answer this question?

Interpreting Units

In a 2004 Lake Michigan mercury data report, mercury concentrations in adult lake trout ranged as high as 396 ng/g and averaged 139 ng/g. How does this compare to the 0.072 ppm mean amount of mercury in commercially harvested freshwater trout?

Modeling

Suppose you drive 4 miles per month on average and your vehicle has a fuel efficiency of 24 mpg. Determine a model for carbon dioxide emissions generated from this vehicle over a one-year period. Use your model to estimate your own yearly emissions.

Data Analysis

Determine the 95% confidence interval for the average electricity consumption during the Month of May for Minnesota households. Interpret what this interval tells you using everyday language.

SoTL Project How does teaching mathematics through civic issues impact both a student's ability to apply appropriate mathematical arguments or tools to math-related problems arising in their lives, and his/her readiness for further mathematical study? We intend to conduct a systematic assessment of student learning in both our traditional and our "SENCERized" lower-division mathematics courses during the Spring 2008 and Fall 2008 semesters.