

Engaging Mathematics: Creating a National Community of Practice

About the Initiative

To make math “real,” Engaging Mathematics applies the well-established SENCER method to college-level mathematics courses, teaching “through” issues of compelling civic consequence “to” the mathematics needed to comprehend them. Two lead institutions are partnering with four colleges and universities in a generative learning community.

Real issues include: sustainability, the interdependence of monarch butterflies and milkweed plants, eco-tourism at a Nicaraguan coffee cooperative, modeling groundwater pollution and climate change, homicide rates in Chicago, racial profiling by Minneapolis police, student loan debt, and the mathematics of voting.



Using algebra to understand the relationship between milkweed plant density and Monarch butterfly population to predict trends in each

© 2015 Thor A. Wagstrom. All rights reserved.

Goal 1: Develop New Mathematics Courses and Models

Faculty from lead and partner institutions are offering new curricular materials developed through the Engaging Mathematics community of practice. New curricula cover a range of mathematical topics and civic issues and embrace diverse learning practices targeted at different levels of mathematical competence.

Partners will be using each other’s curricular materials to teach courses in the coming year. Their “user” (student and faculty) formative evaluations help Engaging Mathematics partners refine their courses and materials.

In the next phase of the project, courses and these refined products will be packaged into teaching manuals and disseminated via the project website. A collection of Engaging Mathematics products will be designated as SENCER model courses and will be disseminated on the SENCER website.

Using calculus to help sustain a Nicaraguan coffee co-op

Photo credit: Stephen Geffre



Goal 2: Draw Upon Existing Curriculum Materials to Increase Their Use

To avoid the mistake of “reinventing the wheel,” Engaging Mathematics partners are using NSF-supported and other innovations and available data sets for use in student learning. Existing data sets are used in concert with student-collected data. Where they suited the goals of proposed new courses, existing texts and modules were found and used. Several libraries and online collections of courses have been located, reviewed, and used, as appropriate.

As a learning community, with the leadership of Co-PI Frank Wattenberg, Engaging Mathematics partners will continue to become aware of and make use of existing high quality materials and curricula that support and advance the goals of their courses.



Organizational Gathering of Engaging Mathematics Partners

Goal 3: Create a Wider Community of Scholars Within the SENCER Community Supporting Reform in Mathematics

Resources, curricula, and event announcements are being disseminated on engagingmathematics.net, the dedicated project website. This is linked to the SENCER and NCSCE websites. Engaging Mathematics partners have presented their work at the 2014 and 2015 SENCER Summer Institutes and at SENCER regional conferences. Faculty Development Programs (FDPs) have been offered and continue to be offered at the lead institutions, Metropolitan State University and LaGuardia Community College. Participants in the FDPs have gone on to teach Engaging Mathematics curricula, reaching an increasing number of students and widening the community of scholars actively reforming mathematics education.

For 2016, Engaging Mathematics partners will again present their work at the 2016 SENCER Summer Institute and at SENCER regional conferences. Faculty Development Programs will continue. New webinars—featuring Engaging Mathematics course materials, curricula, and pedagogies—will be developed and made available to a broader community interested in STEM-education reform and quantitative literacy.



NATIONAL CENTER FOR
SCIENCE & CIVIC ENGAGEMENT
N C S C E



Stony Brook University



@MathEngaging

Goal 4: Offer a Program of National Dissemination

Engaging Mathematics partners have presented their work at national conferences that attract audiences beyond the SENCER community. These include the American Mathematical Society/Mathematical Association of America’s (MAA’s) Joint Mathematics Meetings, International Conference on Technology in Collegiate Mathematics, and MAA’s Summer MathFest. Resources, curricula, and event announcements are also publicized on the project website and through the project’s Twitter account. Two new teaching manuals can be accessed on the project website. Project-developed modules have been adopted by faculty members at non-partner institutions. In the last year of the project, more than 1,100 students have enrolled in Engaging Mathematics courses.

Six new Engaging Mathematics teaching manuals will be published this summer. In the next year, partners will continue to disseminate their work at national conferences. Plans include offering MAA PREP courses, workshops at American Mathematics Association of Two-Year Colleges, MAA mini-courses at the Joint Mathematics Meetings, and more. The first Engaging Mathematics webinar, “*Evidence Matters: Using the Scholarship of Teaching and Learning to Tell the Story of Curriculum Development*,” will be offered on May 5 from 12-1 pm (Eastern).

Updates and resources developed throughout the initiative are available online to all interested educators, administrators, and students at www.engagingmathematics.net.



Applying power and energy functions to answer the question: How much energy does a wind turbine produce? Comparing taxes, loan payments, and other costs to determine: Are wind turbines cost effective?

(WindImages, 2009)

Goal 5: Develop Assessment Tools to Gauge Student Progress, Interest, and Confidence

Engaging Mathematics partners have developed and delivered content assessments to measure student progress and student self-assessment surveys to measure student interest and confidence in mathematics.

Results of these summative assessments will be analyzed and reported at the completion of the project.

Project Leadership

Institutions:

Augsburg College, LaGuardia Community College, Metropolitan State University, Normandale Community College, Oglethorpe University, Roosevelt University, United States Military Academy

Leaders:

Wm. David Burns, Principal Investigator
National Center for Science & Civic Engagement

Dr. Cynthia Kaus, Co-Principal Investigator, Metropolitan State University

Dr. Mangala Kothari, Co-Principal Investigator, LaGuardia Community College

Dr. Frank Wattenberg, Co-Principal Investigator, United States Military Academy

Christine DeCarlo, Engaging Mathematics Coordinator
National Center for Science & Civic Engagement