

Mathematics Across the Curriculum Inspiration & Resources (and Opportunities)

"MAC & QR - Multiple Collegiate Models"
Borough of Manhattan Community College
March 28, 2008

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MAC³ supports faculty of all disciplines in creating curriculum that enhances the mathematical or quantitative literacy dimensions in their courses.

A little history



Mathematics Across The Curriculum
at Dartmouth College



- 1996-2000 MATC
- 2000-2004 MAC  
- 2005-2009 MAC³ 





Who has integrated mathematics into another discipline?

- What discipline?
- What mode of integration?
- What inspired you?

Disciplines involved in MAC³

Anthropology	Health
Art	Labor Studies
Art History	Marketing
Biology	Mathematics
Business	Music
Chemistry	Nursing
Computer Information Systems	Physics
Computer Science	Policy Studies
Developmental Math & Study Skills	Political Science
Economics	Social Services
English	Spanish
Environmental Science	Special Education
Ethnic Studies	Statistics & Data Analysis
Ethnomathematics	Urban Planning

Modes of Integration

- Projects within a Course
- Linked Assignments
- Entire Courses
- Learning Communities
- Department Wide Projects
- Institution Wide Projects

Why would we do this extra work?

- What do our students gain?
- What do we as faculty gain?

MAC³

32 courses, 521 students

Pre & Post Attitudes (21 question survey)

- Interest & confidence in doing math
- Concept of math
- Role of math in society
- Interdisciplinary teaching

Student Learning Self Assessment

- Learning of course specific math topics
 - Developed by Instructors - course specific
- Gains in math skills (7 questions)

Successful MAC Classes

(largest changes in attitude and skill acquisition)

- Independent of
 - Gender composition
 - Age composition
 - Integrated topic
 - Mode of integration
- Connected to
 - Small Class size (12 vs. 25)
 - Diverse Students (53% students of color vs. 33%)
 - Lower initial attitudes
- Faculty interviews are in process

Faculty Inspiration

- *"I've gained greater self-confidence in my teaching and professional identity, especially since I have battled with math anxiety and the 'imposter complex.'"*
- *"Personally it's the opportunity for an intellectual stretch that's inspiring me the most."*

Faculty

- *"Students must use math competently in order to be successful in Biology 201 – 203. Many students have difficulty in applying the math to biology. The MAC work has given me the opportunity to work more explicitly with the math and to develop exercises and activities that will allow students to practice applying these math skills."*

Faculty

- *"I'm more open to trying stuff and gradually seeing how creative math can be – and am increasingly aware of how important quantitative reasoning is, and that today everyone needs to use it!"*

Faculty

- *"It keeps me from being bored – the thought of teaching elementary algebra for thirty years scares the crap out of me, but developing materials such as what we did this week will keep me interested in teaching."*

Where to Begin?

- What do you need to do this work?

10 Essential Elements

- Get Institutional Support
 - Time
 - Funding
- Interdisciplinary
 - You need a partner from another discipline
 - Be open about the other discipline and about teaching
- Do your Homework
 - Web research
 - Read, Read, Read
 - Talk to others
- Take your Time
 - Spend three days away planning AND producing
 - Start small
 - Try everything you ask the students to do

Welcome to the MAC & QL Community

Mathematics Across the Community College Curriculum
www.mac3.amatyc.org
 Supports college faculty of all disciplines in creating curriculum using institutes and traveling workshops



Special Interest Group of the MAA and Quantitative Literacy
www.monsterworks.com/sigmaaq/
 Supports mathematics faculty working in quantitative literacy with newsletters, publications and presentation opportunities



National Numeracy Network
<http://serc.carleton.edu/nnn/>
 Supports a network of persons working in quantitative literacy with meetings, newsletters and a peer reviewed e-journal - "Numeracy"



The Center for Mathematics and Quantitative Education at Dartmouth
www.math.dartmouth.edu/~mqed/
 A collection of materials suitable for teaching quantitative literacy across all disciplines and levels & publication opportunities



Conferences & Workshops

- May 15-17 - Colby-Sawyer College, New London, NH
 - 2008 NNN Annual Meeting
 - http://serc.carleton.edu/nnn/news/annual_meeting.html
 - Writing with Numbers Workshop (Apply by April 15)
 - <http://serc.carleton.edu/nnn/news/workshop08/registration.html>
 - 12th Annual Northeast Consortium on Quantitative Literacy
 - <http://www.colby-sawyer.edu/necql/>

Conferences & Workshops

- July 15-18, 2008 - Middlesex CC, Lowell, MA
 - AMATYC MAC³ Summer Institute
 - Carol Hay - hayc@middlesex.mass.edu
 - Register by June 3
 - <http://www.amatyc.org/Events/Sum-Inst/SIB2008.pdf>

Conferences & Workshops

- July 31 - August 2, Madison, WI
- MAA Mathfest conference - www.maa.org
 - SIGMAA on Quantitative Literacy
 - *Guest Lecture and Reception*, Friday, 5:00 p.m. - 7:00 p.m. There will be a talk by Mo Hirsch, UC Berkeley followed by a reception.
 - *The Role of Quantitative Literacy Centers in Supporting Students (and Faculty)*, Thursday
 - *Math Matters: Numerate Approaches to Everyday Issues*, Saturday

Conferences & Workshops

- October 10-12 - Carleton College, Northfield, MN
 - “Quantifying Quantitative Reasoning in Undergraduate Education: Alternative Strategies for the Assessment of Quantitative Reasoning” - http://serc.carleton.edu/quirk/pka1_workshop08/index.html

Conferences & Workshops

- AMATYC MAC³ Traveling Workshops
 - Customized workshops for you!
 - Contact Pat Averbeck - Traveling Workshop Coordinator
 - tw@amatyc.org

Conclusion for Students

*I advise my students to listen carefully the moment they decide to take no more mathematics courses.
They might be able to hear the sound of closing doors.*

James Callabaro

Conclusion for Faculty

...a teacher of mathematics has a great opportunity. If he fills his allotted time with drilling his students in routine operations he kills their interest, hampers their intellectual development, and misuses his opportunity...

if he challenges the curiosity of his students...and helps them to solve their problems with stimulating questions, he may give them a taste for, and some means of, independent thinking.

George Polya

MAC³

32 courses, 521 students

- Improved Attitudes
 - Interest, confidence, role of math & interdisciplinary teaching
- Declined Attitudes
 - Concept of math
 - “I don’t need a good understanding of math to achieve my career goals.”
 - “I rarely use math outside of school.”

MAC³

32 courses, 521 students

- To what extent did you make gains in any of the following as a result of what you did in this class
- 1=not at all, 2=a little, 3=somewhat, 4=a lot, 5=a great deal
 - 3.4 - Understanding the relationship among concepts
 - 3.5 - Ability to think through a problem
 - 3.5 - Ability to solve problems
 - 3.2 - Ability to communicate mathematical ideas
 - 3.1 - Confidence in your ability to do mathematics
 - 3.2 - Feeling comfortable with complex ideas
 - 2.9 - Enthusiasm for mathematics

MAC³

32 courses, 521 students

- No significant differences in attitude changes according to age, gender or ethnicity
- Gender Differences in Enthusiasm
 - Men's enthusiasm for mathematics increased more than women's
- Ethnicity Differences for skill increases
 - African American students self reported higher increases in skills vs. Caucasian and Native American students