

Implementing Practices That Lead to Institutional Change:

Faculty Development

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Institutionalizing innovations in science education requires

- * Support from faculty
- * Support from administration
- * Recognition through competitive grant funding and national awards
- * Dissemination through articles, books, workshops, and national meetings

Programs and practices that contribute to the success of interdisciplinary curriculum reform efforts

- * Examples from a sampling of different institutions
- * Small group discussion
- * Report back



University of Arizona

History of Interdisciplinary Research

- * **Graduate Interdisciplinary Programs**
applied mathematics, biomedical engineering, cancer biology, genetics, insect science, neuroscience, physiological sciences, statistics
- * **Interdisciplinary Training Programs**
IGERT - genomics, biomath/biophysics, geology/archeology
- * **Interdisciplinary Seminars**
Quantitative Biology Colloquium
- * **Quantitative Biology Consortium**
- * **GK-12 Experiences**
CATTS and BioMe



University of Arizona

Undergraduate Opportunities

- * **HHMI Biomath**

Integral Calculus
Differential Equations
Statistics

- * **Interdisciplinary UBRP**

Math, Computer Science, Physics, Engineering

- * **Q-Bio**

Modules for quantitative thinking in the life sciences

- * **Integrated Science Program**

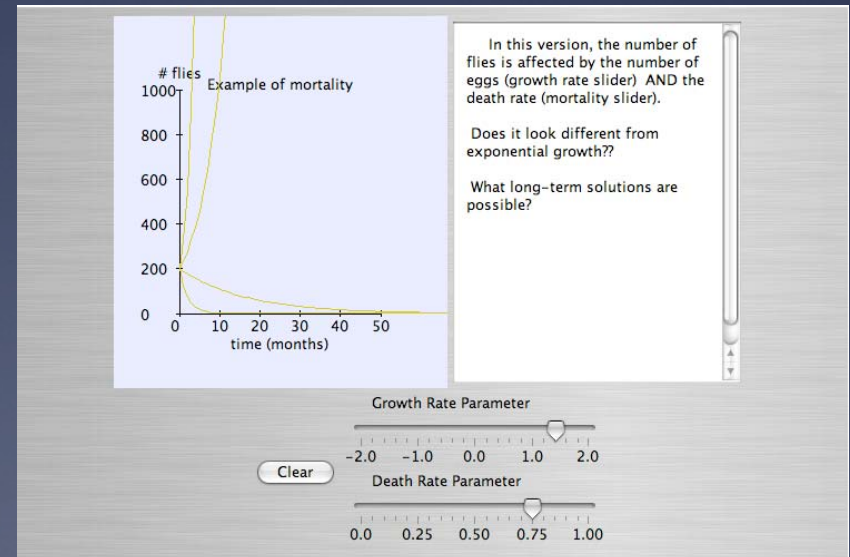
- * **Mathematics Courses**

Mathematical Ecology, Mathematical Modeling



University of Maryland

- * Mini-grants for curriculum development
- * Team-based approach
- * Interdisciplinary projects
 - * Infusing math into intro biology (MathBench)
 - * Calculus for the life sciences
 - * Physics for biology majors





University of Maryland

- * Support for curriculum development
 - * HHMI, NSF CCLI, internal
 - * Faculty release time or summer salary
 - * Support for graduate students and/or postdocs to assist with development and implementation





University of Maryland

- * College-based Teaching and Learning Center

- * Resource library

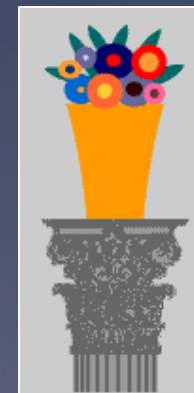
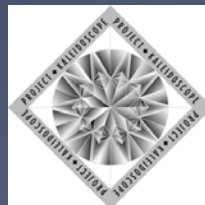
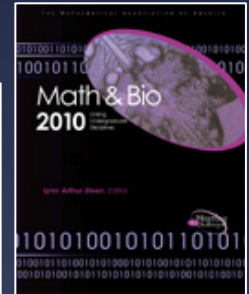
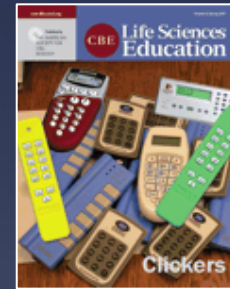
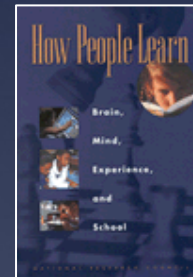
- * New faculty orientation

- * Workshops

- * Visiting Teacher/Scholars

- * Individualized assistance with course development, assessment and dissemination

- * Travel grants to attend workshops and conferences





Harvey Mudd College

- * Faculty from different disciplines share responsibility for guiding interdisciplinary courses, rather than taking sole responsibility for only part of the course
- * Each faculty member receives full teaching credit for their involvement in team-taught interdisciplinary courses
- * Colleagues (local and non-local) are invited to sit in or give guest lectures

Truman State University

- * Use interdisciplinary research projects to develop faculty sensitivity to interdisciplinary work and train students to approach biological questions from an interdisciplinary perspective
- * This created an infrastructure that enabled the creation of a new interdisciplinary minor in mathematical biology





University of Richmond

- * Recently developed courses involving multiple departments
 - * Scientific Calculus (Mathematics, Biology, Chemistry)
 - * Mathematical Models in Biology and Medicine (Mathematics, Biology)
 - * Biological Imaging (Computer Science, Biology)
 - * Bioinformatics (Computer Science, Biology)
 - * Biological Physics (Physics, Biology)



University of Richmond

Strategies for faculty involvement in interdisciplinary course development

Idea formulation phase

- * Faculty members sit in on each other's courses

Development phase

- * Reassigned time for faculty in both departments
- * Undergraduates interview faculty in related departments to find examples and datasets

Implementation phase

- * Team teach the course.
- * Each faculty member receives full teaching credit for their involvement in the course

Follow-up phase

- * Client advisor: During the 2nd offering, a faculty member other than those teaching the course reviews the course for relevance

Small Group Discussion

- * What are the formal and informal practices at your institution that facilitate faculty involvement in interdisciplinary curriculum reform?
- * What are the challenges to institutional change?
- * What strategies and practices are needed to facilitate institutional change (to move the adoption curve forward)?