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STEM II Initiative at Columbus State University

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Program Components

- .Service learning course
- .Peer instruction
- .Faculty SoTL mini-grants



Service Learning Course

Employed a Master Teacher

- .30 years of K-12 teaching experience
- .National Board certified
- .Former president of GSTA

Developed course: Inquiry Approaches to Teaching

- .Open to students in all majors
- .One credit hour
- .Students observe twice in elementary classrooms
- .Student pairs teach three math/science lessons in participating elementary schools after practicing them together
- .Part of the UTeach Columbus program



Spring 2012 Enrollment: 32 (exceeds goal by 25%)

A second course is planned for fall 2012: Inquiry-Based Lesson Design.

Peer Instruction Project

Investigators: Cindy Henning, Tim Howard, Kathleen Hughes, Kim Shaw



Follow up on a prior mini-grant by Kathleen Hughes, utilizing a Peer Instruction Leader in Anatomy and Physiology. That work has been published in a peer-reviewed journal.¹

Project elements:

- .Matched-pair design
- .Peer Instruction Leader assigned to designated lab section
- .PIL attends all lectures, meets 4/semester with instructor
- .Help sessions avail. to all students enrolled w/instructor
- .(All students eligible for help in tutoring center)
- .Weekly PIL support group meeting and guidance

Fall 2011 — 11 sections (584 students served²):

Principles of Biology (4 lab sections), Principles of Chemistry (1 lab section), Math Modeling (1 section), College Algebra (1 section), Pre-calculus (1 section), Principles of Physics (1 lab section), Introductory Statistics (2 sections)

Spring 2012 — 8 sections (793 students served²):

Principles of Biology (3 lab sections), Principles of Chemistry II (1 lab section), College Algebra (2 sections), Pre-calculus (1 section), Applied Calculus (1 section)

Challenges:

- .Help session attendance ($\leq 10\%$ of course enrollment)
- .Available sections for matched pairs
- .Matching peer leader schedules

Lessons Learned:

- .In-class involvement by PIL
- .Lab interactions with PIL
- .Set help session schedule prior to registration would help
- .Prepared review sheets at help sessions
- .Exam questions from help session reviews

¹ Hughes, K. (2011, in print). Peer-Assisted Learning Strategies in Human Anatomy & Physiology. *American Biology Teacher*, March 2011.

² Includes students enrolled in all sections taught by the same instructor

Faculty SoTL Mini-grants

Four projects supported in 2011-2012 academic year:

- Development of Undergraduate Curriculum in the Area of Experimental Physical Chemistry**, by Rajeev Dabke
Status: Complete
Outcomes:
.New techniques available for use in courses
.Article submitted for publication
- Use of a Writing Consultant in a Science Course**, by John Barone
Status: In progress
- Evaluation of Two Peer-Assisted Learning Strategies in BIOL 2221**, by Kathleen Hughes
Status: In progress
- Methodology and/or Technology: Making a Difference in Improving Students' Problem Solving Skills**, by Zdeslav Hrepic

Status: Data Collection Complete, Analysis in progress
Outcomes: See presentation at this conference



Program Benefits:

- .Development of new pedagogies
- .Promoting faculty interest in SoTL
- .Spawned a monthly SoTL STEM seminar

Reaping Additional Benefits

UTeach Columbus

Through a newly designed, streamlined curriculum and the support of highly experienced Master Teachers, university students prepare to teach secondary math and science via a model that has proven highly successful around the U.S. at recruiting teachers who stick with the profession and excel at inquiry-based instructional methods. This program has been made possible through Georgia's Race to the Top funding, with a grant worth up to \$1.4 million. CSU committed to substantial matching contributions in order to demonstrate support, and long-term planning for the sustainability of this program.

CRAFT-STEM

The Columbus Region Academy of Future Teachers of STEM is an NSF Robert Noyce Teacher Scholarship program funded with grant number 1136356. Program components include a STEM Honors Summer Camp engaging high school juniors and seniors in STEM research and activities, \$4500 summer internships for CSU freshmen and sophomores, and scholarships worth \$10,000-13,000. This five year grant is worth approximately \$1.2 million.

MAST = Math And Science Teachers Council

A group of STEM and STEM education faculty collaborating to promote K-12 teacher preparation and improve university student learning. Formed in conjunction with the first STEM Initiative.

Math & Science Learning Center

A community resource dedicated to enhancing the learning of math and science through development, best-practices training for college faculty as well as in-service and pre-service K-12 teachers. The center also provides tutoring and tutor training. Established with STEM Initiative funding.

SoTL-STEM Seminar

CSU faculty discuss original, ongoing research and recent findings; efforts to replicate published SoTL findings; findings in the literature that SoTL authors might wish to know about; research on best instructional practices; and useful advice for faculty who wish to begin SoTL projects in a supportive, collegial environment.

Increased profile for STEM and STEM Education in Columbus region

The impact of these efforts is an increased profile, on campus and within the community, for STEM. The combination of these efforts, together with strong administrative backing at CSU, is making efforts in this arena highly public, and a high priority for CSU.