Preparing the Next Generation of Faculty as Effective Teachers

NRC Meeting:
Barriers and Opportunities in Completing 2- and 4-Year Degrees

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Faculty members are situated in contexts that affect how they do their work, including teaching.

Because many forces affect them, a single approach to encouraging change in practice is not enough.

Key factors affecting teaching include the faculty member’s background, their department and institutional contexts, the disciplinary context, and external factors.
Systems Approach to Understanding Faculty Members’ Teaching-Related Decisions

- External Context
  - Colleges/Degartment
    - Reward Systems
    - Professional Development
  - Institution
    - Faculty Member
      - Work Allocation
      - Leadership Practices
    - Employers
    - Accrediting Organizations
    - Government
    - Scholarly Associations
A Key Lever for Change in Faculty Practice: Socialization in Doctoral Education

The Center for the Integration of Research, Teaching, and Learning (CIRTL)

A national network of universities committed to preparing a national faculty committed to addressing:

- The persistently high STEM undergraduate attrition rate
- The need for STEM-prepared citizens and workforce
- Undergraduate student perceptions that STEM teaching is neither motivating nor effective
Mission:

• To enhance excellence in undergraduate education through the development of a national faculty committed to implementing and advancing effective teaching practices for diverse learners as part of successful and varied professional careers.

• www.cirtl.net

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Strategy:
Leveraging the System

Undergraduate Education

Comprehensive University
Liberal Arts
Masters University
Research University

2-yr College

80% Ph.D.’s

100 Research Universities
The CIRTL Network – October 2013

Membership - 22 Core Institutional Members

22% of nation’s PhD production
The CIRTL Network

- Boston University
- Cornell University
- Howard University
- Iowa State University
- Johns Hopkins University
- Michigan State University
- Northwestern University
- Texas A&M University
- University of Georgia
- University of Texas at Arlington
- University of Alabama at Birmingham
- University of California, San Diego
- University of Colorado Boulder
- University of Houston
- University of Maryland, College Park
- University of Massachusetts Amherst
- University of Missouri-Columbia
- University of Pittsburgh
- University of Rochester
- University of Wisconsin Madison
- Vanderbilt University
- Washington University in St. Louis
The Core Ideas of CIRTL

• **Teaching-as-Research (TAR)**
  - The use of research methods to address questions about teaching and students’ learning in systematic, deliberate, and reflective ways
  - STEM professor becomes a change agent

• **Learning Community**
  - Learning communities create supportive and collaborative environments where participants construct knowledge and support each other’s learning
  - Participants learn together about teaching and learning

• **Learning through Diversity**
  - Excellence and diversity are intertwined
  - Students and faculty bring many experiences and skills
  - Learning is enhanced by using the diversity of the learning community to enrich the learning of all
Elements of the CIRTL Program

- Institutional Programs for Graduates through Faculty
  - Low to High Engagement Professional Development
    - Workshops
    - Courses
    - Fellowship Programs

- Network Opportunities
  - Cross-Network Online Courses
  - Cross-Institutional Exchanges
  - Café Coffee Hours and Connections
CIRTL at Michigan State: Integration into Existing Programs

FAST Fellowship Program (Future Academic Scholars in Teaching) A mentored Teach-as-Research program

44 Fellows 2006-10
CIRTL Cross-Network Programs

- Online CIRTL Network Courses
- Network Exchange Programs
- CIRTL Casts
- CIRTL Virtual Coffee Hours
- CIRTL Online Learning Communities around specific topics
CIRTL Outcomes and Impact

• Impact on Future Faculty
  • Creating a group of future faculty with the tools to do discipline-based education research
  • Helping those future faculty find positions

• Impact on undergraduate learning
  • Improving courses and learning through TAR projects
  • Preparing future faculty to enter faculty roles prepared to implement and model effective teaching practices

• Impact on current faculty
  • Involving faculty in evidence-based teaching and related research

• Impact on institutional research success
  • Leveraging NSF Broader Impact Criterion to promote change in STEM education
Impact on Participants

• Based on evidence from five research and evaluation studies, “high-engagement participants”:

  • Use high-impact teaching approaches
    • Instruction that increase student engagement
    • Course design based on learning outcomes
    • Ongoing assessment aligned with learning goals
    • Engagement of diverse student perspectives

  • Use data to improve teaching and learning

  • Develop an identity as a teacher

  • Consider a wide range of institutional employment options
    • Knowledgeably discuss teaching in interviews

  • Experience an effective start as a faculty member
Impact on Undergraduates

- CIRTL doctoral students doing TAR projects improve undergraduate courses

- The outcomes that CIRTL participants learn align with research-based effective teaching practices

- Research evidence shows CIRTL participants use skills, knowledge, and attitudes they have gained as early career faculty to support undergraduate student learning
Although the assessment of the first implementation proved to be somewhat inconclusive, the more rigorous assessment of the “Heart of a Fuel Cell” LO during the second implementation revealed a large improvement in the pre- and post-quiz scores from 42% to 80% (n = 35). In this case, the
Dear Bob:

It has been my pleasure to work with Sarah and Eric, not only because they are fine individuals, but because it has permanently changed the way I look at teaching. I would never have come up on my own with the approaches these two are trying. Sarah's concept quizzes have turned out to be an extraordinary avenue to get weekly feedback on what the students do and do not understand.

- Professor Laurel Goodwin
  UW Geology Department
CIRTL ’s Work as a Lever for Change in 2- and 4-Year Degree Programs

• Preparing future faculty committed to teaching as part of dynamic careers

• Preparing future faculty with the knowledge, skills, and values needed for leading and implementing improved teaching and learning environments and practices within departmental and institutional change

• Creating a national dialogue about preparing the next generation of STEM faculty
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