CUR Perspectives on the Race for CUREs

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Course-Based Undergraduate Research Experiences (CUREs)

• Not new....but definitely seeing intense interest right now!
  • historically have been offered at small, predominantly undergraduate institutions (PUIs) principally affiliated with CUR
• Current interest levels due to:
  • *Education research correlating student success with high-impact practices such as undergraduate research*
  • Federal agency studies of STEM education success support UR expansion
High Impact Practices (HIPs): Effect on Underserved Undergraduates (Finley & McNair, 2013)

Average Boost to Students’ Perceptions of Their Deep Learning and Gains by Participation in Specific High-Impact Practices

- Learning Community: +7.7
- Service Learning: +8.5
- Study Abroad: +4.3
- Internship: +5.2
- Student/Faculty Research: +8.1
- Senior Capstone: +6.1
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President’s Council of Advisors on Science and Technology (PCAST)

PCAST Recommendation: Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.*


Karukstis, 2017
Undergraduate Research Experiences for STEM Students: Successes, Challenges, and Opportunities (2017)

Karukstis, 2017
Council on Undergraduate Research

• A national (with international partners) organization of individual (>13,000) and institutional (>700) members representing all disciplines and over 900 institutions of all types.


• Two multidisciplinary, administrative-based divisions: At-Large and Undergraduate Research Program Directors.

The mission of CUR is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship.
CUR/CURE Milestones

• 1978: CUR founded with ten (10) chemists at PUIs
• 1980: CUR Quarterly initiated - first newsletter/publication - articles on incorporating research into curriculum - mostly as thesis/capstone
• 1985: Oberlin College (PUI) hosts conference on science in liberal arts colleges - main take-away - importance of undergraduate research to STEM workforce
• 2001: CUR Council votes to broaden CUR membership to include all fields and all types of institutions
• 2010: CUR and the National Conference on Undergraduate Research formally merge (faculty plus student programs)
• 2012: CUR publishes Characteristics of Excellence in Undergraduate Research (blueprint for institutional excellence)
• 2014: CUR formally adopts Strategic Pillar: Integration of Research into the Curriculum
Why is COEUR so Important?

- **COEUR - Characteristics of Excellence in Undergraduate Research**
- **COEUR** is a summary of best practices that support and sustain highly effective undergraduate research environments
- **COEUR** is a guide to build, evaluate, and maintain robust, productive, meaningful and sustainable undergraduate research programs
- **COEUR** is used by institutions, programs, academic departments, faculty and administrators as they work to develop and enhance their undergraduate research programs
The 12 Characteristics of Excellence

- Campus mission and culture
  - e.g., institutional commitment
- Administrative support
  - e.g., UR program office
- Research infrastructure
  - e.g., space, instrumentation and equipment
- Professional development opportunities
  - e.g., research leaves, mentorship training
Recognition
- e.g., UR in promotion and tenure guidelines

External funding
- e.g., institutional funding for research

Dissemination
- e.g., peer-reviewed publication, exhibition, or performance; student research conferences

Student-centered issues
- e.g., community of student scholars
The Characteristics cont.

- **Curriculum**
  - e.g., integration of teaching and research; student course credit for research

- **Summer research program**
  - e.g., faculty & student compensation

- **Assessment activities**
  - e.g., assessment of student learning

- **Strategic Planning**
  - e.g., does UR figure in institution’s strategic plan

**CUREs Can’t Sustain Without All COEUR**
Another CURE Driver: CUR’s Institutionalizing UR Workshop Program

• 1996 - present:
  ❖ Offered 1-2 national-level workshops annually, as well as workshops to groups of institutions and/or to individual campuses upon request.

• 2007 - present:
  ❖ Offered several series of workshops in targeted programs funded by the National Science Foundation through DUE 06-18721 and DUE 09-20275.
    ❖ For DUE 09-20275 collaborated with 80 institutions from six systems/consortia on assisting them build undergraduate research cultures and programs system-wide.
    ❖ Worked with Oklahoma, Tennessee, and Nevada INBRE/EPSCoR.
    ❖ Research embedded to curriculum central focus

• Served more than 600 institutions to date.
PCAST Recommendation: Advocate and provide support for replacing standard laboratory courses with discovery-based research courses.*

Replacing Standard Labs with Discovery-Based... $$ is Key Consideration

- Summer immersion
- One-on-one mentoring for semester or year-long projects
- Research-based curriculum (primarily upper division)
- Research-infused curriculum (often lower division)
Toward Sustainable CUREs: NSF IUSE CUR Transformations Grant: Developing Research-Rich Curricula

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Jeffrey Osborn, The College of New Jersey
Kerry Karukstis, Harvey Mudd College
Jillian Kinzie, Indiana University
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CUR Transformations - Project Goals

• True curricular reform leading to sustainable CURES requires a long time arc and poses significant challenges, such as:
  ❖ Gaining an understanding of the different disciplinary cultures.
  ❖ Rethinking faculty workload and reward systems for both tenure-line and non-tenure-line faculty.
  ❖ Developing sustainable faculty leadership structures, particularly against a backdrop of administrative and faculty turnover.
  ❖ Establishing strong partnerships among faculty, students, and administrators.
  ❖ Expanding student participation.
  ❖ Scaffolding curricular elements linked to student learning outcomes.
  ❖ Partnering with students to fundamentally change the learning process.

• Through participation in this CUR Transformations project institutions and departments will directly tackle these challenges and research the change process with respect to faculty and student culture.
The “Big Picture: CURE Sustainability

Across the institution

First-year to Senior

Community
CURES CAN BUILD COMMUNITY HEALTH AND VITALITY

BUSINESS FRAMEWORK:
UR CONNECTS TO ENTREPRENEURSHIP, START-UP COMPANIES, JOB CREATION

SOCIETY FRAMEWORK:
UR CONNECTS TO COMMUNITY SERVICE, MEETING REGIONAL NEEDS
High Impact Practices (HIPs): Effect on Underserved Undergraduates (Finley & McNair, 2013)

Average Boost to Students’ Perceptions of Their Deep Learning and Gains by Participation in Specific High-Impact Practices
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PARTNERING WITH
THOSE WHO
SERVE THE
COMMON GOOD.

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Thank You

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To Cite this Work