Institutionalizing Undergraduate Research at Predominately Undergraduate Institutions

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Outline

- Why Undergraduate research?
- Working with state systems and consortia
- High impact practices
- Research rich curricula
- Organizational culture and change

Why Undergraduate Research, Scholarship, and Creative Activity?

- Why has the involvement of undergraduates in research, scholarship, and creative activity (URSCA) with faculty gained national significance?
- Engagement in high-impact practices yields greater educational outcomes for students who participate in them in comparison with those who do not.
- UGR is unique in that it plays to the strengths of the faculty, focuses on student learning and outcomes and frequently connects well with institutional missions

Why Undergraduate Research, Scholarship, and Creative Activity?

- **Student Benefits from URSCA**
  - Cognitive and Intellectual Growth
  - Professional Growth and Advancement
  - Personal Growth and Development
- **Faculty Benefits from URSCA**
  - Research, Scholarly, and Creative Outcomes
  - Mentoring and Teaching
  - Job Satisfaction and Personal Development
- **Institutional Benefits from URSCA**
  - Learning Outcomes
  - Faculty Quality and Morale
  - Recruitment and Recognition

Osborn & Karukstis, 2009

Employers' Priorities

- Innovation in the Workforce (95% of employers say they give hiring preference to
workers with skills that enable them to contribute to innovation in the workplace)
- Skills that cut across majors/disciplines
- Think critically
- Communicate clearly
- Solve complex problems
- Demonstrate ethical judgment
- Apply knowledge in real world settings

Liberal Education, Spring 2013, Vol. 99, No. 2.

Undergraduate Research Outcomes

- Innovation
- Skills that cut across majors/disciplines
- Think critically
- Communicate clearly
- Solve complex problems
- Demonstrate ethical judgment
- Apply knowledge in real world settings

Institutionalizing UGR Workshops 1996-2015

- *1996 – 2006*:
  - Offered 1-2 national-level workshops annually, as well as workshops to groups of institutions and/or to individual campuses upon request.
- *2007 – 2014*:
  - Offered several series of workshops in targeted programs funded by the National Science Foundation.
  - Offered workshops for 6 **state systems and public and private consortia** to improve the quality of undergraduate education at each of the constituent campuses and within the larger systems/consortia. (NSF-CCLI/TUES, Type 3 Award)
- *2014-present*
  - Offer topical workshops in connecting UGR to curricula or to high impact practices
- Served ~450 institutions to date.

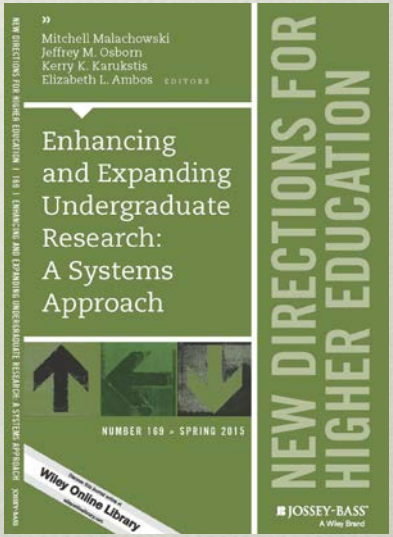
Participant Systems and Consortium

- 6 systems/consortia
- 80 institutions
- 292 faculty and administrators
  - Council of Public Liberal Arts Colleges (COPLAC, 23 institutions)
  - University of Wisconsin System (UW, 11 institutions)
  - California State University System (CSU, 9 institutions)
  - City University of New York System (CUNY, 11 institutions)
  - Great Lakes Colleges Association (GLCA, 10 institutions)
  - Pennsylvania State System of Higher Education (PASHE, 14 institutions)

Summative Phase

Scope and Goals

- Using the lens of institutionalizing undergraduate research within the participating systems/consortia, this phase helped to develop a better understanding of the processes and the most effective drivers of organizational and culture change.
  - Performed culture audits of each of the six systems/consortia participating, and representative member-campuses.
  - Collected and reviewed key data from each system/consortium and representative member-campuses.
- Held a Summit meeting in March 2014.
- Results and recommendations were published 2015 in a volume of *Directions for Higher Education (Jossey-Bass)*.



The key Implementation Goals cited by Campuses

- Curriculum changes to incorporate/integrate UGR
- Finding new sources of funding
- Establishing an UGR campus office and/or UGR Committees
- Providing incentives for faculty involvement
- Marketing and communication with the campus community (advocacy)
- Engaging campus administrators and motivating them to include UGR in campus planning and budgeting
- Integrating UGR into faculty workload
- Faculty development (e.g., workshops on implementing UGR)

Strategies Considered Most Challenging to Implement

- Integrating UGR into the curriculum
- Changing faculty workload to accommodate UGR
- Establishing an UGR campus office
- Finding external funding
- Incorporating work with UGR into faculty incentives for promotion or tenure

(Top-down planning was part of the problem….)

With the exception of top-down planning, all of these strategies were cited as essential for effective institutionalization of research

Additional Implementation Hurdles and Campus Needs

- Managing resource scarcity
- Need for more faculty buy-in
- Improvement of administrative infrastructure
- Faculty time constraints and incentives
- Interest in knowing about other campus models—best practices
- Funding needs
- UGR across the many disciplines

Lessons Learned

Systems/Consortia

- Workshops were seen as a valuable opportunity for the attending teams to hear from others about ways to tackle various UGR implementation issues, particularly how to be innovative with scarce resources.

- Information sharing (as advanced by the workshops) is seen as critical in uncovering local challenges that are unique to each campus.

- UGR implementation progress varies a great deal among the campuses in each of these systems. Some campuses are reasonably far along and have UGR embedded in their culture; other campuses are just starting.

Lessons Learned

Systems/Consortia

Challenges for system/consortium level administrators include:

- Getting accurate information about the status of UGR on different campuses.
- Configuring prospective assistance to match widely varying campus needs.
- Determining how to get widely different campuses to share a reasonably consistent vision for UGR.
- Maintaining a shared vision when personnel change at both the campus and system levels.

Example Outcomes

System and Consortium Level

PASSHE

- Raised awareness of UGR as a central retention strategy, and included UGR in the System's completion agenda and strategic plan.
- Selected UGR as a means to demonstrate student success in the state's performance-based funding model.

CUNY

- Organized a CUNY Undergraduate Research Council to coordinate efforts across the campuses.
- Used the CUNY Performance Management Process to select UGR as a means to demonstrate improving student success.
- Launched an Idea Grant competition to seed innovations in integrating research into the curriculum.

Example Outcomes

System and Consortium Level

COPLAC

- Established a steering committee consisting of UGR directors, faculty mentors, academic deans, and chief academic officers to meet bi-annually and develop a set of best practices for recognizing and rewarding faculty work in UGR mentoring.
- Engaged in conversations with AAC&U and was recognized as an partner in the LEAP States Initiative, with a special focus on continuous improvement in UGR.

GLCA

- Created an UGR Advisory Board to promote sharing and collaboration across GLCA campuses.
- Used the UGR Advisory Board to offer a series of webinars on UGR topics to exchange ideas.

Results obtained through Culture Audits by: Wabash College's Center for Inquiry; National Association of System Heads (NASH)

Research Question:

Why does the institutionalization of UGR occur more rapidly in certain environments?

Factors Conducive to Tranformational Change

- Having a communication strategy that keeps UGR efforts in front of member institution presidents, chief academic officers, and Boards of Trustees.
- Linking the expansion of UGR to national/state-wide/consortial student success initiatives, as well as to the long-term educational impact and financial health of the system/consortium.

Factors Conducive to Tranformational Change

- Identifying strong campus leaders to maintain interactions among UGR advocates from the different system/consortium institutions to keep the momentum going.
- Making system/consortium-wide investments in centralized activities that support UGR such as system-wide student research competitions and/or showcase events and the development of new metrics for tracking UGR and student success, both pre- and post-baccalaureate.

Emerging Issues

- Connect UGR to other High impact practices
- Build UGR into curriculum, especially in disciplines with many students
- How do we count UGR in faculty workload?
- What role should UGR play in promotion and tenure?

High Impact Educational Practices

- First year seminars
- Common intellectual experiences
- Learning communities
- Writing-intensive courses
- Collaborative assignments and projects
- Undergraduate research
- Diversity/global learning
- Service learning/community based learning
- Internships
- Capstone courses

George Kuh, High Impact Educational Practices, AAC&U, 2008

What do First Year Students Expect?

(NSSE 2014 results)

- 76% expect to do an Internship
- 43% expect to study abroad
- 56% plan to do a capstone
- 35% expect to do research with faculty

What informs student expectations?



Faculty Perception of HIPs

- How important is it to faculty that undergraduates do HIPs ("very important + important") :
  - Culminating Exp/Capstone 86%
  - Internships 82%
  - Community Service 58%
  - Research with faculty 57%
  - Learning comm.(FY) 46%
  - Study Abroad 41%

- *FSSE 2014 Upper Division Faculty results*

Participation in HIPs Varies by Major

	First-Year Students			Seniors					
	Learning Community	Service-Learning	Research with Faculty	Learning Community	Service-Learning	Research with Faculty	Internship or Field Experience	Study Abroad	Culminating Senior Experience
Arts & humanities	15	47	5	23	54	28	46	25	59
Biological sciences, agriculture, natural resources	17	49	8	26	54	47	55	17	45
Physical sciences, math, computer science	14	44	7	20	42	41	47	11	44
Social sciences	15	49	5	23	60	34	50	21	48
Business	15	54	5	22	57	13	44	14	43
Communications, media, public relations	18	51	5	26	66	22	67	20	57
Education	16	62	4	37	82	17	69	12	50
Engineering	18	47	6	27	48	34	58	12	60
Health professions	15	57	5	30	80	20	55	9	38
Social service professions	14	57	5	27	71	18	54	9	39
Undecided/undeclared	12	47	4	19	65	16	30	11	24
Overall	15	52	6	25	62	26	52	15	47

Disparities in High Impact Practices

For seniors in all HIPs:

- Fewer 1st generation students
- Fewer students of color
- Fewer transfer students
- Fewer part time students
- Fewer older students

Recommendations on HIPs

- Be intentional about structuring HIPs and assess outcomes
- Introduce HIPs early and often
- Embed HIPs into curriculum, requirements, advising
- Expose students to “mini-HIPs” (research in a course, etc)
- Encourage a robust partnership between academic and student affairs to foster a range of HIPs.

Jillian Kinzie, Indiana University

Applying the HIP Hallmarks

6 common elements that—*when employed*—make the practices high impact:

- They are effortful
- They help students build substantive relationships
- They help students engage across differences
- They provide students with rich feedback
- They help students apply and test what they are learning in new situations
- They provide opportunities for students to reflect on the people they are becoming

(Kuh, 2008; excerpts from O'Neill, Peer Review, 2010)

Incorporating Research in the Curriculum Requires a Shift in Educational Paradigms

Paradigm	Approach
Teaching	Telling students what they need to know
Learning	Engaging students in learning how to learn; emphasis on learning what they need to know
Discovery	Encouraging students to seek and discover new knowledge; inquiry with no boundaries

"….undergraduate education should adopt the **"Student as Scholar" Model** throughout the curriculum, where scholar is conceived in terms of an attitude, an intellectual posture, and a frame of mind …... With this framework, not only each research project, but also each course, is viewed as an integrated, and integrating, part of the student experience."

D. Hodge, K. Pasquesi, M. Hirsh. P. LePore, "From Convocation to Capstone: Developing the Student as Scholar",
AAC&U Network for Academic Renewal Conference, 2007.

Components of a Research-Supportive Curriculum

- Early exposure
- Search, read and evaluate the chemical literature;
- Articulate a concise, approachable research question and its context
- Design and execute experimental approaches to a research question employing appropriate instrumentation and techniques;
- Critically interpret the data obtained through their experiments and utilize it in an iterative manner to devise new experiments;
- Solve problems as they arise during the execution of an investigation

Enhancing Research in the Chemical Sciences at Predominantly Undergraduate Institutions
http://abacus.bates.edu/acad/depts/chemistry/twenzel/summit.html

Recommendations for Curriculum Design

- Begin with a clear leadership strategy that addresses an identified need
- Develop an investigative framework to provide energy and monitor progress
- Establish multiple mechanisms for ongoing feedback
- Utilize a flexible architecture to encourage implementation
- Seek additional opportunities to sustain the innovations so they become part of the institutional culture.

See Chapter 18. in Developing and Sustaining a Research-Supportive Curriculum: A Compendium of Successful Practices, K. K. Karukstis & T. E. Elgren, eds., Council on Undergraduate Research, Washington, D. C., 2007.

Institutional Change

What do we do if we want to change the culture towards enhancing undergraduate research on our campus?

*Mitch Malachowski, Marcus Webster, "Transforming our Institutions into Research Rich Environments," Council on Undergraduate Research Quarterly, **29**, 43, 2009.*

Changing Institutional Culture

- Changing the culture is one of the most difficult changes of all
- The circumstances need to be right for change to take hold
- The change process needs leaders who will give it long-term attention
- Connections need to made among many different stakeholders
- Faculty champions are essential
- Appropriate levels of infrastructure

Eight Stage Process for Creating Change

- Establish a sense of urgency
- Create the guiding coalition
- Develop a vision and strategy
- Communicate the change vision

Adapted from *Leading Change*, John Kotter, 2014

Eight Stage Process for Creating Change (continued)

- Empower broad based action
- Generate short term wins
- Consolidate gains and produce more change
- Anchor new approaches in the culture

General Features of Successful UGR Programs

- Programs mesh with institutional/departmental goals
- Programs started by interested faculty who also sustain them
- Administration supports program physically and psychologically
- Rank and tenure process rewards involvement
- Program is campus-wide
- Research-rich Curriculum
- Teaching is supported as well as scholarship

Conclusions

- Faculty scholarship is here to stay
- Undergraduate research is a powerful high impact practice and an exceptional mode of faculty teaching
- Enhancing student learning through research should be one of the goals for all faculty involved in research across the campus.
- Transforming the culture requires an understanding of the campus and a strategic approach to change
- For maximum impact, undergraduate research needs to be imbedded in the curriculum
- All faculty in all departments who engage in research should include students in their projects