

Student and Faculty Member Engagement in Undergraduate Research



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Undergraduate Research Today



- has gained increasing prominence as a feature of the American college experience
- in large part due to the Boyer Commission report that urged reform in undergraduate education to make ‘research-based learning the standard’
- some propose that undergraduate research has moved from ‘cottage industry’ to a ‘movement’ (Blanton, 2008)

Evidence of UR Benefit



Participation in undergraduate research (UR) has positive benefits for student success:

- **positively affects analytic and critical thinking** (Bauer & Bennett, 2008; Kuh, Chen, & Nelson Laird 2007 Pike, 2006; Volkwein & Carbone, 2004)
- **increases in academic achievement and retention** (Cole & Espinoza, 2008; Nagda, Gregerman, Jonides, von Hippel, & Laursen, 1998)
- **clarity in choice of academic major** (Tompkins, 1998; Wasserman, 2000; Seymour, Hunter, Laursen, & Deantoni, 2004) and
- **enrollment in graduate school** (Bauer & Bennett, 2003; Hathaway, Nagda, & Gregerman, 2002; Seymour et al 2004; Lopatto, 2004; Russell, 2006).

UR also important for faculty members



- faculty mentors report significant benefits to their quality of work and life
- believe the research experience contributes to student cognitive and affective development, including intellectual curiosity, understanding scientific findings, thinking logically about complex material, and synthesizing information from diverse **SOURCES** (Zydney, Bennett, Shaid, & Bauer 2002; Odedokun, Dyehouse, Bessenbacher, & Burgess, 2010)

Purpose of This Study



- We know UR is beneficial for students. We know a little but less about faculty perceptions of and engagement in UR.
- This study gives unique look at student *and* faculty engagement, and faculty perceived importance of UR.
- Specifically:
 - Who are the student and faculty members who participate in undergraduate research?
 - Do faculty perceive value in UR? and
 - What demographic and institutional characteristics contribute to faculty and student participation in undergraduate research?

Guiding Framework



- Social Exchange Theory - the more often a person perceives value and/or is rewarded, the more likely s/he is to perform the action (Blau,1968; Emerson; 1976; Homanss, 1974 ; Thibault & Kelly, 1959.
- it is possible that students become involved in undergraduate research because they believe it will help them to learn a concept or skill more thoroughly, earn better grades, or increase chances for graduate school or post-college employment.

Perceived Organization Support



- posits that work rewards and favorable job conditions such as pay, promotion, and job enrichment contribute more to one's perceived organizational support (POS; Eisenberger et al)
- We want to extend the idea of POS to students. If student feels supported and see its benefits, s/he may be more interested in engaging in undergraduate research

Research Questions



1. What student and faculty demographic and institutional characteristics contribute to student participation in UR?
2. What individual and institutional characteristics contribute to faculty member perceived value of participation in UR?
3. What demographic and institutional characteristics contribute to faculty member participation in UR?

Data Source



- *National Survey of Student Engagement (NSSE)*
 - 111,077 senior students
- *Faculty Survey of Student Engagement (FSSE)*
 - 39,699 faculty
- Respondents in 455 institutions that completed both NSSE and FSSE between 2007-2011

Sample: Students



- 19% have engaged in research with a faculty member
- 37% 24 years or older
- 83% enrolled full time
- 65% female
- 17% live on campus
- 30% in a STEM field
- 70% white

Sample: Faculty



- 57% spend at least some time researching with undergraduates
- 54% find UR to be important or very important
- 38% 55 years or older
- 47% female
- 27% full professor, 26% associate professor, 26% assistant professor, 22% lecturer
- 32% STEM field
- 77% white

Sample: Institutions



- 58% privately controlled
- 17% doctoral, 45% masters, 39% baccalaureate
- 9% highly/most competitive, 18% very competitive, 44% competitive, 29% non/less competitive
- 17% large (>10,000 students), 32% medium (3000-9999), 37% small (1000-2999), 12% very small (<1000)

Dependent Variables



NSSE

- Have you done work on a research project with a faculty member outside of course or program requirements?
(Done/Not done)

FSSE

- How important is it to you that undergraduates at your institution work on a research project with a faculty member outside of course or program requirements?
(Very important/Important/Somewhat important/Not important)
- How many hours do you spend working with undergraduates on research in a typical 7-day week?
(Zero hours/At least one hour)

Analysis



- A hierarchical linear model created for each research question
- Level 1 (student model): age, athletic participation, citizenship, enrollment status, first-generation status, fraternity/sorority membership, gender, grades, living situation, STEM/non-STEM, online learning, race, and transfer status
- Level 1 (faculty models): STEM/non-STEM, academic rank, age, citizenship, course load, earned doctorate degree, race, gender, and years spent teaching
- Level 2: Carnegie classification, control, selectivity, and size
 - Student model also included the institution's aggregate level of faculty importance placed on UR and the aggregate institution percentage of faculty that spend at least some time on UR



Selected Results: Student Participation

Students more likely to participate in UR (Level 1):

- In a STEM field
- Higher grades
- Fraternity/Sorority Member
- Younger than 24 years
- U.S. citizen
- Full-time enrolled
- Not first-generation
- Minority race/ethnicity
- Male
- Living on campus
- Non-transfer
- Non-distance/online education

Level 2	Coef.	Sig.
Carnegie: Master's	-.102	*
Selectivity: Highly Comp.	.224	***
Size: Medium	-.205	*
Size: Large	-.307	***
Aggregate Faculty Importance Placed on Research	.651	***
Aggregate Faculty Time Spent on Research	1.158	***

Selected Results: Faculty Results



More likely to spend at least some time on UR:

- Full professor
- Younger than 55 years
- Having a doctorate degree
- Minority race/ethnicity
- Male

- More competitive institutions

Find UR more important for undergraduates:

- STEM fields
- Full professor
- U.S. citizens
- Having a doctorate degree
- Minority race/ethnicity

- Highly competitive institutions

Discussion



- Findings reaffirm student and faculty reported interest in and perceived value from participation in UR
- UR participation is higher for students with better grades, enrolled full-time, and from highly competitive institutions
- compared to white peers, minority students report higher participation in UR, as do men, those who live on campus, and those who do not enroll in online education courses
- Consistent with findings by Hu, Kuh, and Gayles (2007), being in a large research university does not necessarily equate with higher participation rates in UR by faculty members or students.

Limitations



- Survey data does not allow us to match students to specific faculty
- Analyses limited to senior level students, but upper level students are most likely to be or have been involved in UR
- We did not control for engagement in other/multiple extracurricular activities
- All data are captured from self-report surveys. Generally, self-report data is reasonably accurate (Tourangeau, Rips, & Rasinski, 2000)

Implications



- Despite tighter budgets, investment in UR should continue; it is a beneficial activity for students and faculty members
- Continued investment in UR may also contribute to positive social exchange for students and faculty.
 - It may increased quality of work and study life
 - It increases students' skill in discovery-based learning
 - It may positively affect student and faculty satisfaction and retention

Questions Discussion

