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## Undergraduate and Graduate Research and Creative Activities: Faculty's evaluation, time commitment and perceived barriers. A Practice Report

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### Abstract

*This study evaluates faculty's perception about research and creative activities conducted by both undergraduate and graduate students. Specifically, it examined the types of research and creative activities faculty are involved in, evaluated the time and effort involved in research and creative activities and reviewed the benefits for students and faculty engaged in research and creative activities. The findings outline some of the barriers faculty encounter in mentoring students but show that faculty members are aware of the benefits for students who engage in research and creative activities. However, they have difficulties promoting these activities due to paucity of time and resources.*

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## Introduction

While pursuing a higher education is very important, an ever growing body of research shows that what students do while pursuing higher education is potentially equally important to student success, i.e. student retention and graduation rates. High-Impact Practices (HIPS) are activities being integrated into universities, with student success as the primary focus. Educational research suggests HIPS increase student retention and graduation rates, with examples of HIPS including: (1) Research and Creative Activities (RCA), (2) First-Year Seminars and Experiences, (3) Common Intellectual Experiences, (4) Learning Communities, (5) Writing-Intensive Courses, (6) Collaborative Assignments and Projects, (7) Diversity/Global Learning, (8) Service Learning, Community-Based Learning, (9) Internships and (10) Capstone Courses and Projects.

Numerous universities are thus recommending RCA to students in all disciplines. The goal is to expose them to challenging questions and to induce a sense of excitement that comes from working on these questions. Since RCA is reliant on faculty involvement, this study evaluates faculty members' opinion of RCA through use of a four part survey. The remaining of this article includes a literature review, a description of our survey and a presentation of our findings. Limitations and suggestions for future research are presented in the conclusion.

## Literature Review

Research and Creative Activities (RCA) are broadly defined as collaborative interaction between a faculty mentor and student on a project, internship, activity, and/or course-based study that enables students to pose or work from a defined research question, employ techniques and methodologies that are appropriate and recognised by the discipline, and share the findings with others (Umbach & Wawrzynski, 2005). The three types of research

typically conducted are project-based, internship-based, and course-based research.

There are numerous benefits for students involved in research across all disciplines, but especially for those in academic disciplines of science, technology, engineering and mathematics (STEM) and those that are first-generation and/or low-income (Desai et al., 2008; Lopatto, 2007). Significant gains can also be accounted for by students in the social sciences and humanities (Ishiyama, 2002) and business (Gault, Leach, & Duey, 2010).

RCA allows students to better understand published works, learn to balance collaborative and individual work, determine an area of interest, and jump start their careers as researchers. Through exposure to RCA, many students continue on to graduate studies and faculty positions (Frantz, DeHaan, Demetrikopoulos, & Carruth, 2008). Students engaged in RCA also report personal benefits, i.e. learning new techniques and skills for career, networking with other scholars, and growing as a critical, independent thinker (Madan & Teitge, 2013).

Faculty involvement in RCA is worthy of examination because such involvement fosters the development of transferrable skills and themes that can be utilised by students in contexts outside of the academic realm. The barriers to faculty participation in student research practices are discussed in Cooley, Garcia, and Hughes (2008). The authors have observed that supervising undergraduate research can prevent faculty from conducting their own research. Brown (2001) reports that lack of time is one of the largest barriers for faculty mentoring student researchers.

## Methodology

### *The survey*

To evaluate faculty perception, we designed a survey that was adapted from the study by Buddie and Collins (2011) and the *University of California Irvine Faculty Survey*, with survey content and face validity scrutinised by a panel of faculty. The concept of face validity ensures that the survey adequately captures what the researcher is attempting to measure (Babbie, 2013). The survey was computerised in order to conserve time (maximum 15 minutes), to reduce cost, and to allow respondents flexibility as to when they could answer the questions (Lavrakas, 2008).

Administered in 2012, the survey was divided into four parts. Part one compared faculty involvement with undergraduate and graduate students. Part two looked at the amount of time faculty are devoting to support students. Part three appraised faculty's perceived benefits for students and for themselves for being engaged in RCA. Part four presented the barriers to mentoring as perceived by faculty, using a four point Likert scale to evaluate the significance of the results.

### *The context*

The studied university environment, California State University, San Bernardino, is home to 430 faculty and 18,000 students attending the College of Arts and Letters (A&L), the College of Business and Public Administration (CBPA), the College of Education (COE), the College of Natural Science (CNS), and the College of Social and Behavioral Sciences (CSBS).

### *The sample*

Those responding to less than 80% of the information requested were removed from the final analyses. Following the incomplete data elimination process, 65 of 430 (15%) were

deemed usable and were therefore analyzed. Respondents belonged to all five colleges on campus, 12 (18.46%) are from A&L, 13 (20%) from CBPA, 5 (7.69%) from the COE, 19 (29.23%) from the CNS, and 16 (24.62%) from the CSBS. Although our sample size was somewhat limited, this paper uses various statistical tests for data analysis rather than anecdotal evidence. As discussed by Groves (1990) and Hamilton (2003), response rates are more important when a study's purpose is to measure effects or make generalisations and less important if the purpose is to gain insight as in the case of this study.

## Findings

### *Types of research and creative activities (RCA)*

Table 1 presents and compares the Fisher's Exact Test (FET) and calculated probability level for different types of RCA in regards to both undergraduate and graduate students. For undergraduate students, the FET indicated statistically significant differences across colleges at the usual 5% level for experimental/field studies, group projects, laboratory projects, scholarly work in humanities/social sciences, and surveys/psychology experiments. For graduate students, the FET indicates statistically significant differences across colleges at the usual 5% level for the activities of scholarly work in humanities/social sciences and surveys/psychology experiments. A post-hoc z-test shows that faculty in CNS and CSBS devote more time supporting undergraduate students than colleagues in other colleges.

**Table 1: Types of RCA conducted by faculty**

RCA Types	Undergraduate		Graduate	
	Fisher's exact value	p	Fisher's exact value	p
1. Clinical projects	2.79	0.334	2.37	0.538
2. Design projects	1.96	0.646	3.57	0.285
3. Experimental/field studies	11.28	0.007*	5.37	0.135
4. Group projects	10.25	0.015*	3.27	0.353
5. Individual projects	3.27	0.359	3.56	0.318
6. Laboratory projects	15.95	0.000*	6.07	0.092
7. Literature review and analysis	4.58	0.206	3.31	0.356
8. Scholarly work in humanities/social sciences	19.77	0.000*	15.9	0.000*
9. Theses/dissertations/senior term papers	4.8	0.188	4.24	0.234
10. Surveys/psychology experiments	15.49	0.000*	14.8	0.000*
11. Others	2.76	0.403	2.06	0.828

\* Significant difference at 5% level. Others include website reports, video game creation, screenwriting, software development, computer modelling, and independent study papers.

### *Time invested by faculty*

To evaluate the amount of time spent on RCA, we proposed the following statement: "During this 2011-2012 academic year, I plan to spend approximately \_ hours per week working with research and creative activities." Interestingly, faculty devote a similar amount of time assisting undergraduate and graduate students with 60.5% of faculty stating they spent three or more hours assisting graduate students and 56.3% of faculty stating they spent the same amount of time assisting undergraduate students.

### *Number of students supported by faculty*

Faculty were asked to approximate the number of students they worked with and to compare this number with the number of students they mentored two years ago. Results show that there is no significant difference between colleges and the number of undergraduate and graduate students supported by faculty.

### *Perceived benefits for students and faculty engaging in research and creative activities*

Faculty were asked to rank benefits, shown in Table 2, on a four point Likert scale ranging from strongly disagree to strongly agree. For undergraduate students engaging in RCA, faculty provide the highest rating for the benefit of drawing conclusions and critically analyzing information (3.25). As far as graduate students are concerned, faculty give the highest rating for drawing conclusions and critically analyzing information (3.29), and utilising technology and computer programs (3.29). The result of a one-way ANOVA that compares faculty opinion towards the benefits of RCA for students does not yield significant results.

**Table 2: Faculty ratings across colleges for benefits of RCA**

Students participating in RCA show improvement in:	Mean	
	Undergraduate	Graduate
Communication skills	3.18	3.17
Drawing conclusions and critically analysing information	3.25	3.29
Defining and solving problems	3.22	3.24
Innovative thinking	3.09	3.1
Working independently	3.03	3.21
Getting along with those who have different attitude, opinions, and backgrounds	3.2	3.15
Understanding and applying research methods/creative activities	3.11	3.25
Utilising technology and computer programs	3.22	3.29
Understanding the link between academics and their future careers	3.03	3.19

\* Significant at a 5% level

Faculty were asked to rate five perceived benefits for themselves in their participation in RCA on a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Findings (Table 3) show that faculty have lower perceived benefits for themselves than for students. The statement “understand the importance of research or creative activity as an integral component of the student’s education, regardless of his/her career” is ranked the highest by faculty (2.71) while “my teaching methods” (2.38) is ranked the lowest. A one-way ANOVA done for comparison of faculty-perceived benefits across colleges reveals a statistically significant difference for the criteria “Understanding the learning needs of students.”

### *Barriers to research and creative activities*

A majority of the faculty cite lack of time and institutional support as the main barriers for engaging in research and creative activities. Some of them stated, “It is a lot of extra work on a very full plate ...”, “... no support for time involved”, and “... insufficient support by university”. Some respondents indicated that students are not adequately prepared for research activities and suggested offering courses to prepare students to be successful researchers.

**Table 3: Faculty ratings for benefits for them by engaging in RCA**

Faculty find that they improve in the following areas:	Mean
Understanding the learning needs of students	2.52
Understand the types of preparatory skills and/or courses that students need before doing research	2.67
Understand the importance of research or creative activity as an integral component of the student's education, regardless of her/his career	2.71
My teaching methods	2.38
My own research projects or my personal creative activities	2.39

## Conclusion and impact

The engagement of university faculty is the cornerstone element if institutions of higher learning want to reap the benefits of engaging students in RCA. By presenting the perceived benefits and problems, limitations, and challenges that inhibit faculty's ability to successfully conduct RCA with students, we anticipate that discussions of new methods to facilitate RCA will ensue.

This study provides evidence that, given the right incentives, faculty are more willing to support students' research and creative activities. Recognition at campus events, recognition on campus webpage, monetary awards, course release time, etc., can be offered as incentives to encourage faculty involvement. We also recommend that faculty tenure and promotion decisions should be linked to their involvement with students' research and creative activities.

Notice that this study has some limitations, i.e. the impact of non-responses or limited sample sizes. Despite these limitations, valuable information regarding faculty can be used to shed light on the beliefs faculty have regarding RCA. Additional studies should be longitudinal to detect changes in faculty perception.

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