



Student Research Engagement Examples, Data, and an Agenda

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**John Douglass and Shelva Hurley (UC Berkeley)
SERU Consortium**



A Holistic Approach to Student Learning Outcomes?

- **In the Traditional Classroom and Expectations+**
- **Also Outside the Classroom - the varied opportunities and activities students engage in, including research engagement and public service.**
- **Question: How do they interrelate to foster creative minds and adaptable skills?**

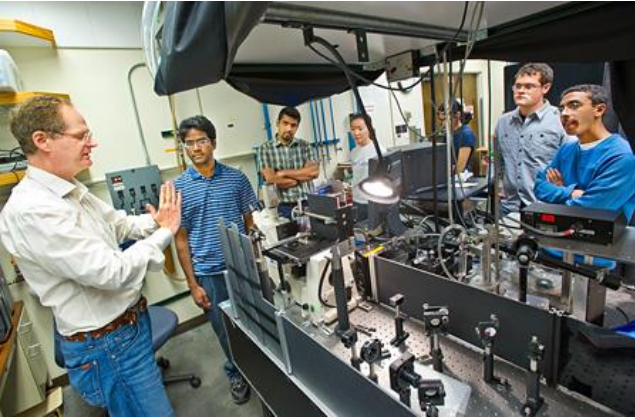


Promoting UG Research Engagement

A Movement at US Universities

- **MIT** is credited with starting the first formal program as early as 1969, the Undergraduate Research Opportunities Program. Other institutions, like CalTech, also developed similar efforts, **but all focused on the hard sciences and engineering.**
- The **1998 Boyer Report** broadened the interest of research universities to create campus-wide, disciplinary and interdisciplinary programs across the spectrum of academic fields
- **Federal agencies** such as the Fund for Improvement of Postsecondary Education (FIPSE) and the National Science Foundation's Research Experiences for Undergraduates (REU) program providing funds to campuses.
- **All the SERU universities have campus-wide offices** to support this activity, and many academic departments have programs. The University of North Carolina, for example, established a campus-wide Office of Undergraduate Research in 1999.

Research Engagement: Benefits?



- **Skills development** - including data collection, computation, analysis of findings, and communication of results.
- **Positive attitude** - habits, and intentions, including research ethics, perseverance, and professionalism.
- **Guiding/Influencing career plans** - including postgraduate studies.
- **Networking opportunities** – exposure to the world of active learning and potential career paths.



Research Engagement

UC Berkeley Example

- **The Office of Undergraduate Research**

Offers students diverse opportunities to become engaged in Berkeley research. Weekly workshops help undergraduates get started in research and in writing proposals.

- **Undergraduate Research Apprentice Program (URAP)**

Undergraduates can apply for semester or year-long opportunities to gain skills working on faculty-led research projects; more than 1200 students from all majors participated last year!

- **SMART Program**

Administered by the Graduate Division, the SMART Program enables doctoral students to provide mentored research opportunities for undergraduate students at UC Berkeley. Graduate mentors who work under the guidance of a faculty adviser will each receive a stipend of \$5,000. Each undergraduate mentee will be funded in the amount of \$3,500 for approximately 200 hours of work. In addition, graduate students receive training in mentoring through a spring seminar, Mentoring in Higher Education (GSPDP 301), offered by the Graduate Division. The program also provides \$1,500 funding for research supplies and conference travel.





Research Engagement

UC Berkeley Example

- **Summer Undergraduate Research Fellowship Program (SURF)**

The SURF/L&S program allows undergraduates to spend the summer doing concentrated research in preparation for a senior thesis or other major capstone research project. Currently limited to students in the College of Letters and Science, 50 fellows receive \$3250 stipends to cover basic living expenses for two summer months.

- **Summer Research Opportunities for Underserved Undergraduates**

The Summer Research Opportunity Program (SROP) at UC Berkeley was established to promote access to graduate education for undergraduates who have been educationally or economically disadvantaged, or who may not have had exposure to the academic environment of a research university.

- **Haas Scholars Program (for all majors)**

The Robert and Colleen Haas Scholars Program at the University of California, Berkeley funds financial aid eligible, academically talented UC Berkeley undergraduates from all majors to engage in a sustained research, field-study, or creative project in the summer before and during their senior year at Berkeley.



Research Engagement

So how well integrated is it into expectations and opportunities?

What evidence do we have of the benefits related to learning and other outcomes?



Data from 15 SERU Campuses 2010 On-line Census Survey

University of California

Berkeley

Davis

Irvine

UCLA

Merced

Riverside

San Diego

Santa Barbara

Santa Cruz

Rutgers University

University of Michigan

University of Minnesota

University of Oregon

University of Pittsburgh

University of Texas

Figure 2. Overall Research Participation

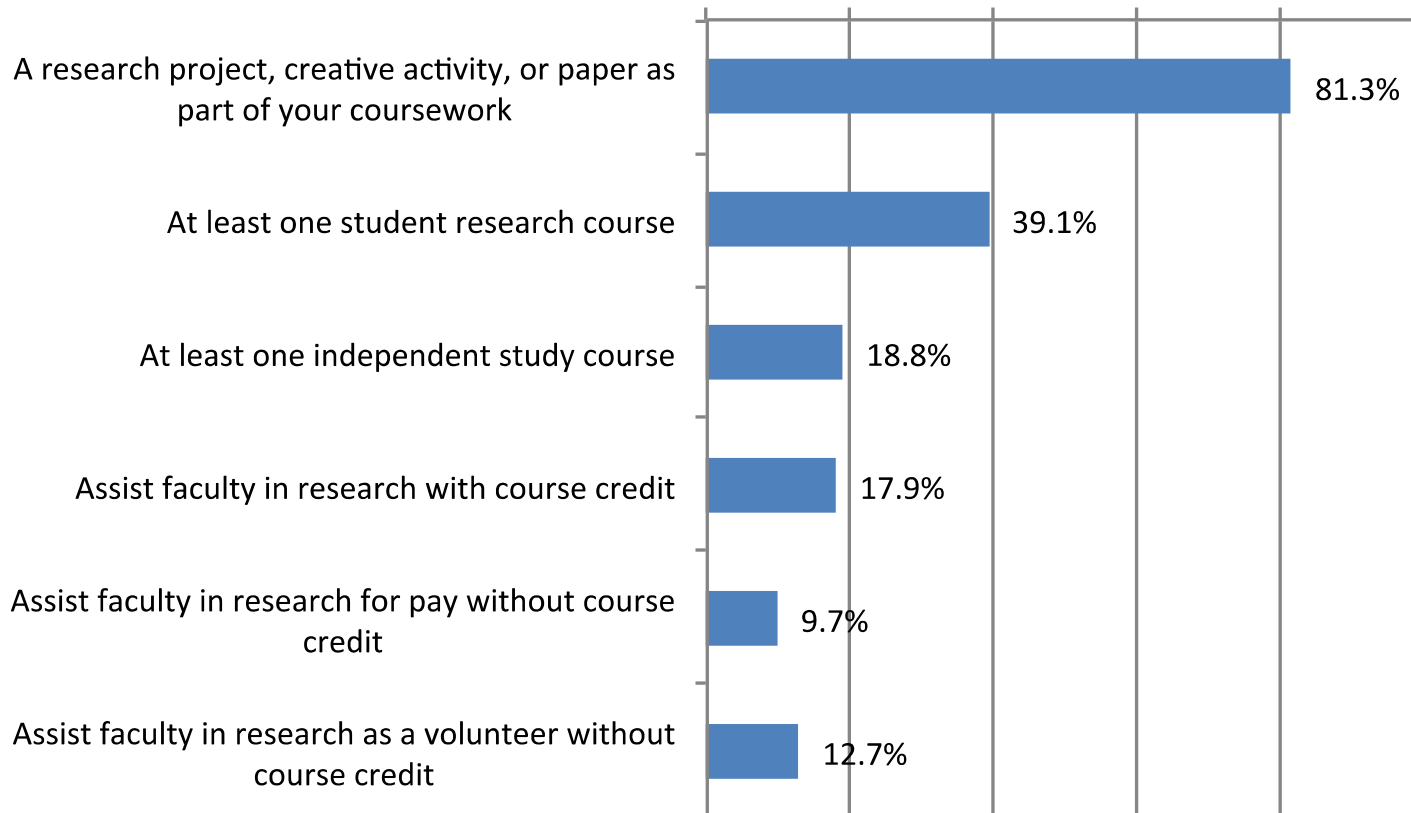


Figure 3. Research Participation by Lower and Upper Division

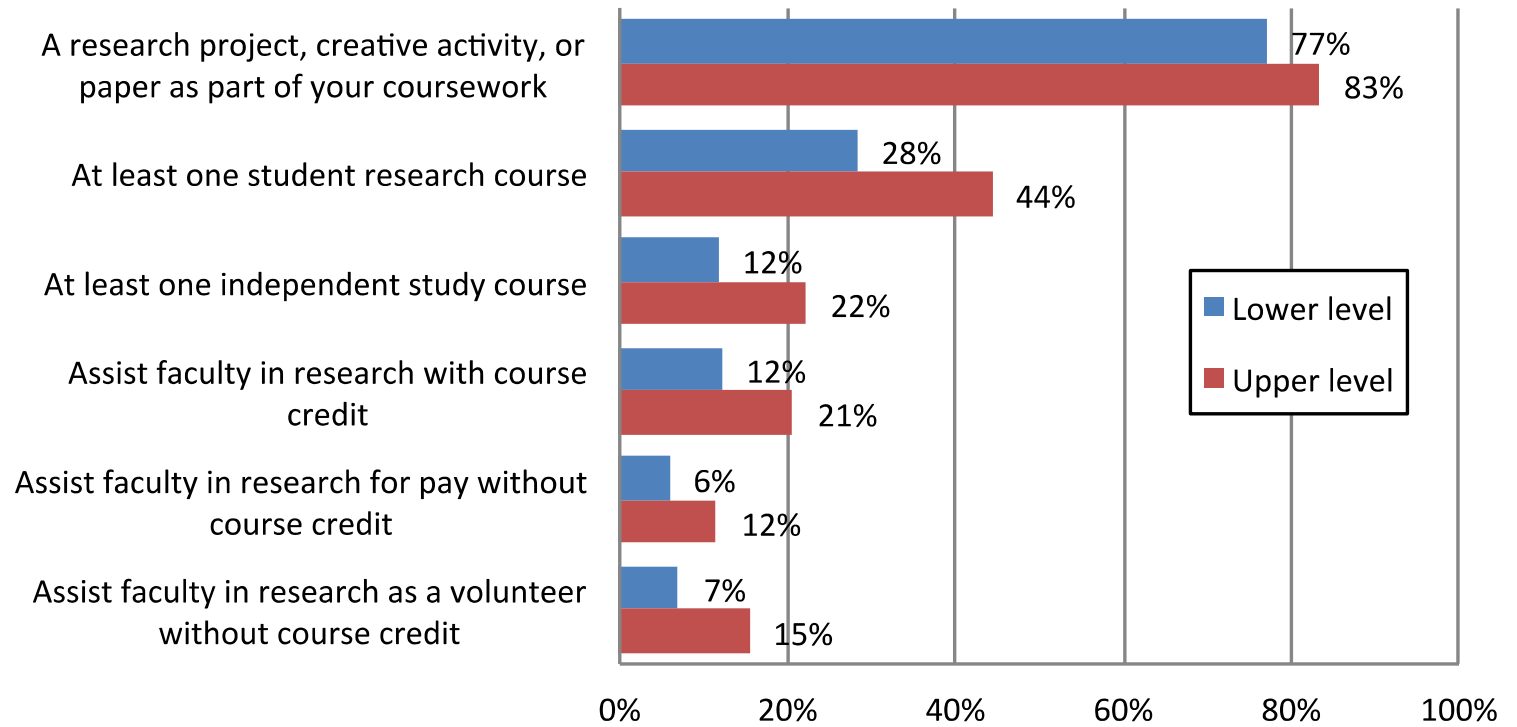


Figure 4: Research Participation by Broad Disciplinary Areas

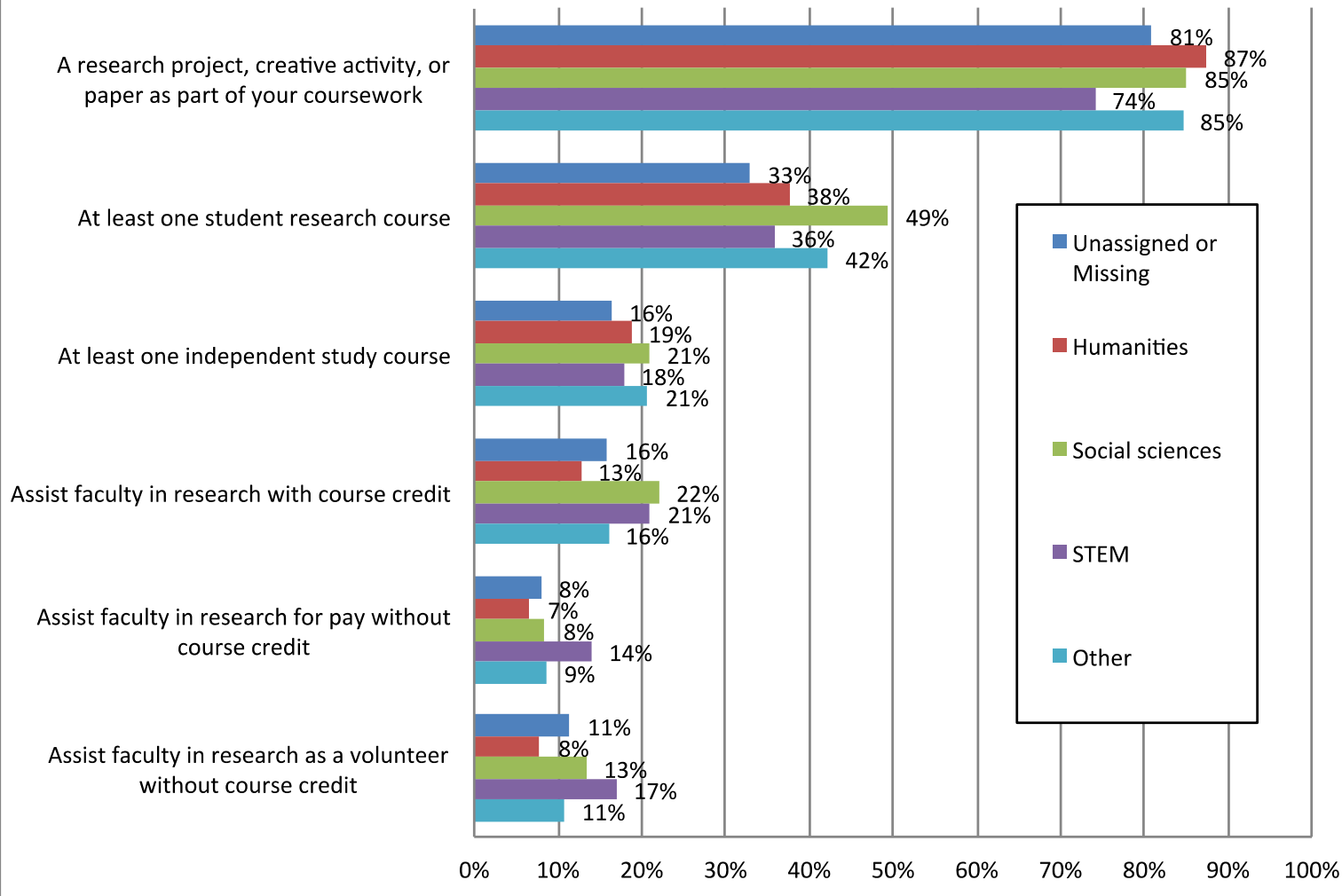


Figure 11: Research Participation by Aspiration

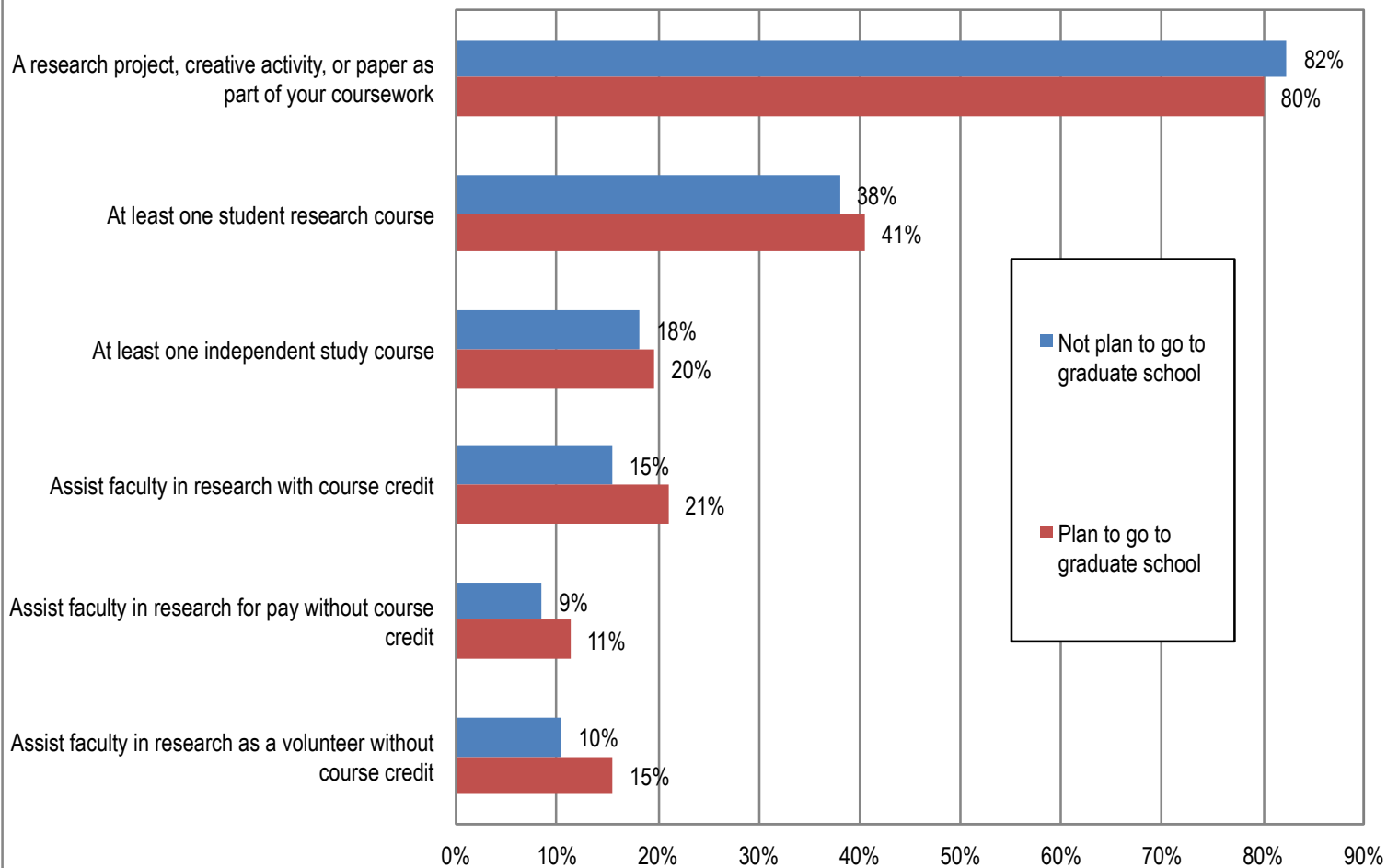


Figure 12: Correlation of Research Engagement with Other Forms of Academic Engagement

| | Satisfaction with Educational Experience | Current Skills Self-Assessment (Nonquantitative) | Engagement with Studies | Campus Climate for Diversity | Quantitative Professions | Use of Time (Academic and Employment) |
|-------------------------------|--|--|-------------------------|------------------------------|--------------------------|---------------------------------------|
| | <i>Beta</i> | <i>Beta</i> | <i>Beta</i> | <i>Beta</i> | <i>Beta</i> | <i>Beta</i> |
| Research: Assist Faculty | 0.028 *** | 0.039 *** | 0.334 *** | -0.017 *** | 0.030 *** | 0.130 *** |
| Research: Conduct Research | 0.075 *** | 0.115 *** | 0.330 *** | -0.007 | -0.014 ** | 0.044 *** |
| Humanities | 0.070 *** | 0.071 *** | 0.085 *** | -0.027 *** | -0.255 *** | -0.002 |
| Social Sciences | -0.011 * | 0.030 *** | -0.051 *** | -0.038 *** | -0.143 *** | -0.046 *** |
| Stem | -0.038 *** | -0.065 *** | -0.092 *** | 0.007 | 0.144 *** | 0.032 *** |
| Plan to go to grad school | 0.050 *** | 0.051 *** | 0.066 *** | 0.040 *** | 0.065 *** | 0.027 *** |
| Upper class level | 0.037 *** | 0.102 *** | 0.040 *** | -0.079 *** | -0.080 *** | 0.163 *** |
| Female | 0.012 ** | 0.016 *** | -0.042 *** | -0.011 * | -0.119 *** | 0.042 *** |
| Asian | -0.146 *** | -0.136 *** | -0.063 *** | -0.015 * | 0.027 *** | -0.045 *** |
| White | -0.007 | 0.015 * | 0.063 *** | 0.064 *** | 0.015 * | 0.011 |
| African American | -0.022 *** | 0.019 *** | 0.028 *** | -0.034 *** | 0.007 | 0.017 *** |
| American Indian | -0.011 * | 0.002 | 0.009 * | -0.003 | -0.009 * | 0.000 |
| Other_race | -0.017 *** | 0.003 | 0.024 *** | 0.003 | 0.003 | 0.008 |
| Unknown Race | -0.040 *** | -0.009 | 0.007 | -0.001 | -0.007 | -0.008 |
| SAT | 0.036 *** | 0.021 *** | -0.045 *** | -0.031 *** | -0.043 *** | -0.055 *** |
| Family income | 0.037 *** | 0.078 *** | 0.038 *** | 0.057 *** | 0.049 *** | -0.063 *** |
| Parental Education | 0.043 *** | -0.002 | 0.033 *** | -0.001 | -0.054 *** | -0.001 |
| International Student | -0.034 *** | -0.057 *** | 0.017 *** | -0.001 | 0.028 *** | 0.005 |
| Model Adjusted R ² | 0.056 | 0.088 | 0.276 | 0.023 | 0.192 | 0.063 |

RESEARCH ENGAGEMENT



Key Findings

RESEARCH ENGAGEMENT

- Research engagement outside of the traditional classroom is widespread at SERU campuses.
- BUT NOT AS PERVASIVE AS WOULD BE BENEFICIAL TO STUDENTS AND THE INSTITUTION.
- Research engagement is correlated with self-reported learning gains across many areas, but especially in areas of field knowledge (the Major), presentation and communication skills, and research skills, plus Higher levels of satisfaction about educational experiences, better time use . . .



Key Findings

- **However, not all research activities are created equal.**

Our SERU study identified two different types of research:

- Those research activities mainly involve assisting faculty research.
- Those mainly involve conducting independent and personal research.



Key Findings

- Among the two research activities, **participating in student research course is more effective than independent studies in enhancing student learning.**
- Among the three activities involving assisting faculty research, **assisting faculty research as a volunteer without credit tend to be connected to higher level of gains than for credit and for pay.**
- **Research activities that involve active learning contribute more to student learning.**



Recommendations

RESEARCH ENGAGEMENT

- **Academic Program Review** - SERU Campuses should use provide regular reports on undergraduate research engagement, and include such reports in Academic Program/Department reviews.
- **Add to General UG Requirements** - Require two or more non-classroom forms of research engagement, perhaps depending on the field of the major and discipline.
- **More Active Learning Opportunities in the Classroom** – SERU Campuses and Faculty should incorporate active learning techniques (that focus on research in the discipline) into introductory courses, particularly in STEM fields that have been found to correlate with persistence.

