Creating New Knowledge with Undergraduate Students: Institutional Incentives and Faculty Agency

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ABSTRACT Undergraduate students today face a more demanding and competitive labor market than their parents' generation. In response, some pursue double majors to signal breadth to potential employers and to improve their job prospects. Some students also realize that a strong signal of workplace readiness is acquiring in-demand skills through independent and collaborative research. In this article, four professors at an undergraduate-focused public university in the United States share their experiences working with undergraduate students on research, focusing on the "supply side" of student research training and mentoring. We discuss how institutions can support differently situated faculty members, who face different career incentives and constraints, to integrate undergraduates in their research. We also address the limits of what is possible for faculty-student research and suggest ways to overcome them.

Undergraduate students are under pressure to do more in college today than their parents' generation. The labor market is more demanding and competitive (Rogers 2021). In response, some students pursue double majors to signal their breadth of knowledge to potential employers and to improve their employment and earnings prospects (Del Rossi and Hersch 2008). Others participate in research to expand their skills and convey to employers that they are prepared to join the workforce. For example, among a range of workplace-relevant skills, data science is increasingly important for political science majors (National Academies of Sciences, Engineering, and Medicine 2018; Williams et al. 2021).[1] Now more than ever, students need in-class and out-of-class hands-on experiences.

One vehicle for helping students to acquire substantive knowledge and data and methods training is through mentored research with faculty members, which doubles as a high-impact practice for improving student retention and satisfaction (Gregerman et al. 1998; Jacobi 1991; Jordan-Zachery 2004; Kuh 2008). In addition, as described in the call for papers for this special issue, "a more competitive environment in and out of the university has created pressure for undergraduates to engage in projects that go well beyond a class exercise."[2]

While these points emphasize the "demand side" of undergraduate research training, this article focuses on the "supply side"—specifically, how colleges and universities can encourage and support faculty members to offer research opportunities to students. We also share different models of faculty-student collaboration that help both sides to maximize the benefits of the experience.

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doi:10.1017/S104909652300001X

We are four faculty members at an undergraduate-focused public university in the United States, at different stages of our careers—an assistant professor, an associate professor, and two full professors—and with different institutional responsibilities. We all work with undergraduate students on research, primarily through our respective labs. Importantly, our perspectives are gleaned from institutional roles that help us to understand the "big picture" of undergraduate research. We bring experience directing undergraduate labs, directing undergraduate academic programs, and leading centers that support collaborative research between faculty and students.

Our range of positions allows us to describe how institutions can support differently situated faculty members, who face different career incentives and constraints, to integrate undergraduate students into their research. The article also addresses the limits of what is possible for faculty-student research and suggests some ways to overcome them.

INSTITUTIONAL BACKGROUND

William & Mary, a top-10 US university for undergraduate teaching according to the most recent *U.S. News and World Report*,[3] provides a rich ecosystem for faculty-student research: an estimated 80% of students conduct research with faculty members by their senior year.[4] Central to this ecosystem is our institutional form: we are a small undergraduate-focused institution with few departments offering graduate degrees. Our department offers a BA in government. Some of us also contribute to interdisciplinary programs in international relations, public policy, and data science, so when we work with students on research, it typically is with undergraduates.

However, beyond *institutional form* is *institutional culture*: at our university, we believe that undergraduate students are exceedingly capable of contributing to scholarship and serving as collaborators. There are several "agents" of the university that purvey and support this belief, including the Charles Center for Academic Excellence, the Global Research Institute, the Reves Center for International Studies, and the Social Science Research Methods Center. Each agent provides funding, training, seminars to present research in progress, and other resources for faculty members and students to work together on research, on campus and in the field.

The Global Research Institute is a university-wide center that supports faculty-student teams that conduct collaborative work on global issues ranging from nuclear proliferation to foreign-aid effectiveness to transitional justice. The institute was created to catalyze, incubate, and scale research that can be sustained through external funding. Although it is a multidisciplinary institute, for historical reasons, it disproportionately supports research teams from the government department. Services include startup funding for new faculty members who commit to working with undergraduates, a student innovation funding window, assistance identifying funders, direct funding for student and faculty field research, collaborative space, seminars, and support to disseminate research findings. The institute currently supports 10 labs and makes seed investments in student and faculty ideas that have the potential to attract external funding.

Another example is the Social Science Research Methods Center. In addition to offering space conducive to brainstorming and lab meetings, the center houses facilities to secure expensive equipment, a computer lab where networked experiments can be programmed, and a suite that facilitates data collection through social-psychological experiments or focus groups. Moreover, the center sponsors the Omnibus Project—a student subject pool that operates every semester, with approximately 400 subjects. It allows faculty members and students to collect data from an online survey and in the lab. In the decade since the Omnibus Project was founded, dozens of students have collected data for honors theses and independent projects at minimal cost—that is, the faculty directors' time and financial support for the student research assistants (RAs) who manage it.

Our department awards modest, competitive funding directly to students, largely through the generosity of our alumni who have made donations for this purpose. We are able to offset the costs for students to present at professional conferences such as the annual meeting of the American Political Science Association. Several other entities on campus also provide funding directly to students to complete and present independent research projects (e.g., the Charles Center, the Global Research Institute, and the Arts & Sciences Dean's Office).

Any institutional support that exists to facilitate undergraduate research would be for naught without the individual actors who do the work: faculty members and, of course, students. There likely is a selection effect at work: we hire faculty who signal interest and ability to work with undergraduate students on research. This is amplified by the interactions that we have with one another. Senior faculty members who have experience engaging undergraduate students in their research encourage junior faculty members to do likewise. Senior faculty members also provide frameworks and advice for doing so.

NORMS AND INCENTIVES SUPPORTING FACULTY–STUDENT RESEARCH

On the one hand, this ecosystem creates permissive conditions for faculty-student research; faculty members can find a variety of support mechanisms. On the other hand, the culture also makes it difficult *to not do* these things (especially for pre-tenure faculty). If faculty members' research is not suitable for collaboration that can be scaled (e.g., as in the research labs described in the next section), this presents a potential problem for them. For example, research that is theoretical, formal, interpretivist, or in a language not taught at the university is difficult to conduct with undergraduates. However, because we conducted research as undergraduates, we are committed to mentoring them in a research context and have devised ways to work with students on some, if not all, aspects of our research.

However, beyond institutional form *is* institutional culture*: at our university, we believe that undergraduate students are exceedingly capable of contributing to scholarship and serving as collaborators.*

Specific incentives translate our institutional culture into tangible benefits for faculty members who conduct research with undergraduate students. One set of incentives is informal, including public praise from colleagues, administrators, and students. Because undergraduates need more training than methods

https://doi.org/10.1017/S104909652300001X Published online by Cambridge University Press

curricula typically provide, faculty members working—and especially coauthoring—with them must provide additional training. Positive feedback helps to sustain our extra time and effort. Nevertheless, over the years, many faculty members have worked with students who need only entry-level skills to become involved. Examples include conducting content analysis of text, categorizing legislative proposals, building sample frames, and collecting documents. These students then move up the research "value chain."

Moreover, William & Mary has advocated for increased access to research opportunities and to make access more equitable, in line with the argument advanced by Kuh (2008) and Murray (2017, chap. 8). In addition to groups who historically have been underrepresented in academia—women, students of color, and students with disabilities (Murray 2017, chap. 8)—our institution emphasizes the value of working with military veterans, neurodiverse students, and first-generation college students.

Intrinsic rewards are rarely enough, so we also have designed extrinsic incentives. One major incentive is the availability of funding specifically for mentored and collaborative undergraduate research. This motivates faculty members to pursue projects for which student assistance would be beneficial and through which students can extend their mentor's work. An example is specific funding allocated to support minoritized students, as with the William & Mary Scholars Undergraduate Research Experience program.

A second major incentive is our department's directed-research program. On the initiative of one of this article's authors, our department created a variable credit-bearing course that allows faculty members to be formally recognized for their teaching and mentoring of student research outside of a traditional classroom. Some faculty members do enough work with undergraduate students such that their work with students on research counts as part of their annual course load. Other faculty members earn a teaching release after they have accumulated enough credits over time by teaching through research.

A third incentive is rewarding faculty members for research conducted with students. Our merit, tenure, and promotion policies explicitly value faculty mentorship of student research. Although there is no formal rule that values coauthorship with students higher than coauthorship with peers, we do have an informal norm that values faculty coauthorship of research with students. Along with this norm is the recognition that working with undergraduate students on research involves mentorship, which can reduce research productivity. Our department norms and practices are rare; in other contexts, mentoring undergraduate research is undervalued in tenure and promotion processes (Hoyt and McGoldrick 2017).

According to an August 2022 poll, most faculty members in our department (82.4%) have engaged undergraduate students in research that led to a publication ($N = 17$ of 32 full-time faculty members, 28 of whom are in tenured or tenure-eligible positions).[5] Almost 60% of faculty members who responded have coauthored a peer-reviewed article with a current or former undergraduate student. The same percentage have co-presented with an undergraduate student at a conference, and slightly less than half (47.1%) have coauthored a non-peer-reviewed publication.

MODELS FOR ORGANIZING FACULTY–STUDENT RESEARCH

A healthy ecosystem encourages diversity. This biological analogy suggests that a thriving undergraduate research ecosystem (the combination of institutional structure, culture, and incentives) should facilitate a diverse set of means and approaches that correspond to individual faculty goals. In our department, there is not a "one-size-fits-all" model to foster faculty-student collaboration. Faculty members can use or modify a collaborative model appropriate to their research interests, methods, and work style.

Nevertheless, our labs share the following "essential characteristics" (Lopatto 2009, 25). Most fundamentally, faculty provide the structure. For example, students interested in development finance are encouraged to work with AidData and those interested in human rights are encouraged to work in the International Justice Lab or the American Bosnian Collaboration. For both faculty members and students to benefit the most from collaboration, alignment of substantive interests is vital. Also common to our labs, students read prior academic research, work independently and on teams with peers, have opportunities to share their work in written and oral formats, and receive pay or course credit for their work.

Another important commonality among the following lab models is inclusive recruitment. Students who have decided to attend our institution because of the undergraduate research opportunities offered are likely to approach us. However, we know that awareness of these opportunities and their value is not equally distributed across a first-year class. Students from socioeconomically disadvantaged backgrounds or who are the first in their family to attend college may be less likely to enter college with the intention of conducting research, and they may feel uncomfortable approaching professors. Racial, gender, and personality differences also affect the likelihood of a student reaching out to a faculty member (Becker, Graham, and Zvobgo 2021). Moreover, these same traits also can affect how visible a student's aptitude for research is to a faculty member. We all have had the experience of being impressed (and surprised) by the quality of a paper written by a student who is generally quiet in class.

To ensure that we do not reproduce inequities in our models for undergraduate research, we take proactive steps to recruit as widely as possible. One of our department colleagues created a "Guide to Undergraduate Research" that is posted on the department website, where students can read about different research opportunities and how faculty members select students. Using various campus listservs and via announcements in class, we advertise openings for research as widely as possible and to students in the early stages of their learning. Our current research students also spread the word within organizations that serve those who are from groups historically excluded from academia.

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The Ad Hoc Model

Perhaps the most conventional model for faculty-student research is the ad hoc model, in which faculty members recruit RAs to work on a specific project that they have already initiated and for which they could use student assistance, generally at an early stage of the research. RAs complete specific tasks, including a preliminary literature review, data collection, and data coding. In this way, they have direct experience with research, build skills for specific tasks, and contribute to a faculty member's portfolio. This also can provide a foundational experience for students to become more deeply involved in scholarship, including through participating in the faculty-mentored labs described below. One of our colleagues worked with undergraduate students in this way during his four-decades-long career; today, he counts a dozen former students who are now professors. RAs can be hired using funding from a grant or awarded academic credit through the directed-research option.

The Lab Model

Many faculty members in the Department of Government mentor and collaborate with students on research through labs, which take on different forms depending on the faculty member and the nature of the research. These labs vary on several dimensions: the stage at which they recruit students, the duration of a typical student's involvement, the parts of the project life cycle on which students work, and the extent to which students are working on projects outlined by the principal investigator (PI) versus projects driven by students' particular interests.[6]

For example, the International Justice Lab recruits students as early as their first year and offers them paid opportunities "to engage in research at all stages: theory building, research design, data collection and analysis, fieldwork, and writing" as they advance in the lab.[7] The "ideal trajectory" for students is to support the PI's existing research in their first year; collaborate on a research paper with the PI and one or two of their "cohort mates" in their second and third years; and, finally, conduct independent research (e.g., for an honors thesis) in their fourth year. Throughout, students are socialized into the political science discipline and profession, including through regular lab-organized presentations by faculty guest speakers. Multiyear opportunities like this produce "distinct personal, professional, and cognitive outcomes" for experienced student researchers, relative to novices (Thiry et al. 2012, 260). The International Justice Lab is concerned especially with recruiting, training, and retaining a diverse body of social scientists: those who will pursue academic careers and those who will pursue careers in policy, nonprofit organizations, and industry (Becker et al. 2021). Among other scholars of teaching and learning, Linn et al. (2015) found that students from groups historically excluded from higher education generally benefit most from faculty mentorship.

Another variation of the lab model uses course credit to incentivize students. In one example, research conducted by students in the American Bosnian Collaboration is embedded within a long-standing community-engagement project in Bosnia-Herzegovina that seeks to promote intercultural competence (Kasumagić-Kafedžić, Pickering, and Brown 2023).[8] This project provides opportunities for undergraduate students to engage in cross-cultural, community-based research overseas (Leadbeater et al. 2006). Because it was cofounded by a Bosnian and an American to meet the educational needs of youth in a postconflict community, the research is driven by problems in the local community. The research is student led and they are engaged in every stage of the project life cycle. Students are carefully selected, typically in their second or third year. They take a semester-long course in the spring, participate in summer teaching and data collection, and enroll in at least one semester of for-credit directed research in the following year. Students are mentored in the classroom and in the field by the lab director, Bosnian partners, and lab alumni. Following community-based research practices, the American Bosnian Collaboration prioritizes accessibility to local community members and posts coauthored papers on its website. Only selected research receives the attention needed for peer-reviewed publications.

Student Agency

Our labs vary substantially in terms of whether and when students design some aspect of a research project (Lopatto 2009, 25). For some Social Networks and Political Psychology (SNaPP) Lab projects, for example, students work toward the research director's vision. However, there then are opportunities for students to be "upgraded" to collaborators, where they demonstrate specific ownership over parts of a particular project and, when appropriate, to become coauthors. Students involved in multiyear projects are trained to pose workable research questions and to diligently use reproducible social science methods in pursuit of a significant discovery (Lopatto 2009, 25).

Research at Scale

The Global Research Institute hosts multiple labs that are sustained through external funding from private foundations or federal agencies (e.g., NukeLab; the Digital Inclusion and Governance Lab; and the Teaching, Research, and International Policy Lab).[9] But, only one lab, AidData, has scaled to the point that every year it provides hundreds of research opportunities for students; dozens of research reports and peer-reviewed articles; analyses for nongovernmental organizations, international organizations, and government agencies; and datasets that are public goods for researchers, journalists, and citizens. The Global Research Institute also generates millions of US dollars in research funding and indirect costs that are used to seed new research endeavors.

AidData was created in 2003 when an undergraduate student and three faculty members decided to write a book that built on the student's honors thesis and their own previous research. This led to a grant from the National Science Foundation (NSF) to build a better project-level dataset (Hicks et al. 2008), which resulted in hypotheses about the impact of aid transparency on development outcomes (Tierney et al. 2011) and then to a revolution in geocoding and engagement with the policy community. Many of the lab's signature research products are conceived, executed, and coauthored by faculty members who collaborate with current and former students. A recent idea from an undergraduate student led to the creation of the world's most comprehensive dataset of Chinese development-finance projects, and it has been used and cited in hundreds of peer-reviewed articles (Dreher et al. 2022).[10]

The type of student involvement at AidData has varied over time and across different projects. AidData currently supports eight PIs at the Global Research Institute, all of whom have different relationships with the undergraduate students on their

https://doi.org/10.1017/S104909652300001X Published online by Cambridge University Press

teams. Some use a highly differentiated division of labor in which students specialize in a single task for a semester or a year (e.g., geocoding, translation, and sector coding). In other cases, faculty members work intensively with one or two students to write policy reports, book chapters, and journal articles. Typically, students who coauthor and present research begin by collecting and categorizing data. Almost all students who work for AidData are paid from external grants and contracts.

Research Products

The preferred ends of knowledge vary among faculty members. For junior faculty, peer-reviewed journal articles and books are especially important. All of this article's authors have published peer-reviewed research with current or former students. In some cases, we also have published public-facing articles with our students, in outlets such as *Foreign Policy* and *The Washington Post*, by leveraging existing professional contacts.[11]

Students are unlikely to know the value of the end products of their research. The importance of different types of output likely varies alongside the wide range of postgraduation opportunities that students desire. Certainly, students who aspire to enroll in a PhD program are most eager to pursue a publication stemming from their undergraduate career. Not coincidentally, this is the type of student with whom we have been most successful in "carrying a publication over the finish line" after a student's graduation; it often is challenging to sustain collaborations with students after they are working full time in a setting in which publication is not incentivized.

However, unlike faculty members—for whom unpublished or non-peer-reviewed work might not be valued—students likely benefit from simply completing a project that generates knowledge. To this end, the Social Science Research Methods Center created a digital archive where students can submit their work in an indexable format so that both scholars and members of the public can access it through a Google search.

Even projects that do not result in publications are valuable to students. Many of our students and alumni report that their ability to speak about their research experiences during internship or job interviews has been beneficial. Describing their collaborative research experience can signal to potential employers their ability to work successfully on a team—often with teammates from diverse backgrounds—on complicated problems. Independent and collaborative research experiences convey initiative, motivation, and perseverance. Further along a student's professional trajectory, Murray's extensive review (2017, chap. 4) suggests that there are cognitive, affective, relational, and longer-term career benefits from conducting undergraduate research. Describing these benefits to students is one way to encourage them to engage in research when course credit is not possible or funding is not available. However, these types of incentives are likely—at least in the short term—to disadvantage students from marginalized backgrounds.

CHALLENGES

Norms, incentives, and models notwithstanding, there are challenges and limitations to conducting research with undergraduate students.

Student Recruitment and Retention

One challenge is recruitment and retention, especially for faculty members who intend to coauthor publications with students. Research is a long, iterative process. To be successful, faculty members must "[identify] the right students: individuals who have both the interest in and [...] the stamina for this type of work" (Zvobgo 2022, 742).

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Faculty Career Stage

In addition, at many undergraduate-focused universities, it is junior faculty members who have the most active and varied research agendas and therefore the most potential opportunities to work with students with different skill levels on research. Younger faculty members also may seem less intimidating or more relatable, which lowers the barriers for students to pursue a potential research opportunity. However, these same faculty members also are the most time pressured in the pace of their research output. All four authors agree that working with undergraduate students typically lengthens the research process.

Collaborating with undergraduate students involves more training and/or more intensive mentoring than with graduate students or peers; it often stretches an already-long research, writing, and publishing process. This suggests that the "safest" time for faculty members to coauthor with undergraduates may be after tenure—or at least when tenure seems secure. That said, many RAs can make otherwise impossible projects possible. One of this article's coauthors credits her lab with her ability to conduct experiments that drove an important arm of her research agenda. Therefore, perhaps junior faculty members need to be strategic in their decisions about working with undergraduate students, including them when the potential payoffs are high and excluding or delaying working with them when the potential payoffs are low.

Funding

Securing external funding is a challenge for research in general, but it often is even more challenging to obtain for collaborative research that substantially involves undergraduate students. Internal funding also is competitive and often only partial, particularly for research conducted overseas. There is no easy solution: in addition to their other responsibilities, faculty members often must submit multiple annual grant applications. We recognize

https://doi.org/10.1017/S104909652300001X Published online by Cambridge University Press

that at our institution, we benefit from the efforts of our colleagues in the past 40 years to create seed funding from alumni donations as well as from our two most recent deans, who provided unusually substantial startup packages that have been used to launch research labs. Both of these developments have strengthened the competitiveness of our external grant applications. More broadly, we applaud the NSF's efforts to better support the integration of students into research by recognizing the inclusion of undergraduates in funded projects as a way to have a "broader impact."

External Evaluation

Our department's most recent external evaluation praised the faculty for offering undergraduate research opportunities and characterized students' work with faculty members on research as a "very strong suit" of the department. As mentioned previously, this is significantly due to informal norms and institutional incentives. However, the department leaves it to individual faculty members in their tenure and promotion narratives to explain to external reviewers—who may not have experience conducting research with undergraduate students—the importance of this work in our institutional setting. This may create unevenness in assessments, which could be remedied by the department communicating to external reviewers its support of faculty-student research and explaining the commitment necessary to conduct it.

DISCUSSION

In summary, our university type, its efforts to develop an ecosystem through formal incentives and informal norms, and the initiatives of our department's professors and students have encouraged faculty members to engage undergraduate students in research. That said, our institution and department could do more to support faculty-student research collaboration, particularly by assisting faculty who feel overextended or lack sufficient funds and students who need greater access to opportunities.

As a first step in developing recommendations to address challenges to faculty-student research, we plan to gather data through a survey questionnaire that will be distributed to department faculty, students, and alumni. These surveys will more systematically capture the level and nature of undergraduate student involvement in research, faculty and student perspectives on the benefits and challenges of collaborative research, and suggestions for enhancing future opportunities.

ACKNOWLEDGMENTS

We thank the undergraduate students with whom we have worked. Their contributions strengthened our research and helped to create new knowledge about politics and policy. We also are grateful for the examples provided by our own research mentors and the many colleagues with whom we have developed, tested, and refined our models for collaborating with students on research. We appreciate our colleagues in the Department of Government at William & Mary, in our university community, and in the political science discipline who not only believe in the capacity of undergraduate students to engage in research but who also actively support undergraduate and faculty collaboration on research.

CONFLICTS OF INTEREST

The authors declare that there are no ethical issues or conflicts of interest in this research. ■

NOTES

1. Data science is a rapidly growing second major among government majors at William & Mary.
2. For the full call for papers, see cambridge.org/core/journals/ps-political-science-and-politics/announcements/call-for-papers/call-for-papers-special-issue-on-undergraduate-involvement-in-research.
3. For more, see https://news.wm.edu/2022/09/12/wm-remains-top-public-university-for-alumni-giving-in-u-s-news-rankings/.
4. Read more at https://www.wm.edu/research/studentresearch/index.php.
5. Faculty who responded to the survey may be more likely than faculty in the department to engage undergraduate students in research. As mentioned previously, we plan for a more comprehensive departmental survey.
6. See Baker (2023) for a list of undergraduate political science research labs in the United States.
7. For more on the International Justice Lab, see internationaljusticelab.org.
8. For more on the American Bosnian Collaboration Project, see wmbosniaproject.wordpress.com.
9. All 10 labs at the Global Research Institute are listed at wm.edu/offices/global-research/research-labs/index.php.
10. See Schneider (2020) for a detailed case study of AidData and its links to the policy community.
11. A reviewer asked how we identify journals that might be open to articles coauthored with students. None of us target specific journals based on the identity of our coauthors but rather on whether the substantive questions and empirical methods that we use in a particular project would be a good fit for a particular journal.

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