

The Lab as a Classroom: Advancing Faculty Research Through Undergraduate Experiential Education

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ABSTRACT

Both undergraduate students and faculty members face a challenging job market that requires innovative approaches to skill development and research products. Moreover, entrenched approaches to research and education reinforce traditional hierarchies, exclusionary norms, and exploitative practices. This article describes a lab-based pedagogical framework designed to support faculty research goals and student learning and, simultaneously, to attenuate patterns of historical exclusion. This approach leverages evidence-based best practices from experiential education, team-based workflows, an understanding of servant leadership, and “whole-person”-style mentorship models. We find that these tools advance faculty research goals (in terms of both quality and productivity), support

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student learning in ways beyond traditional undergraduate coursework, and disrupt patterns of historical exclusion. We provide qualitative evidence to support our model and discuss the hurdles and challenges still to be overcome.

Today, institutions of higher education face austerity pressures (Furstenberg 2021); shrinking numbers of tenure-track research faculty positions (Woolston 2021); a multiyear pandemic that necessitated new methods of instruction (Phillips 2021); and a growing realization about the ways that structural racism limits access to higher education and impoverishes the perspectives promoted in academia (Matias and Hope 2021). Amid the pressures to publish, do more with less, and adapt to changing student needs, faculty members have an obligation to help their students develop new skills and to increase diversity in the academy through mentorship.

As a team consisting of undergraduate, graduate, and faculty researchers who identify as women, BIPOC (Black, Indigenous, and People of Color), first-generation college students, and queer scholars (several of whom experience learning disabilities), we have implemented a collaborative research lab designed to confront these interrelated problems. Our pedagogical premise is that

The expectation that students interested in research should engage in unpaid research labor exacerbates these challenges and disproportionately excludes financially vulnerable students (who lack the resources to spend extracurricular time working without pay) from gaining experience that could dramatically expand their career opportunities.

faculty research goals, student experiential learning, and student well-being reinforce one another. Our lab-based model leverages evidence-based best practices in experiential education (Roberts 2015), builds collaborative research teams with a commitment to servant leadership, and strives for a “whole-person” approach to mentorship (Podger, Mustakova-Possardt, and Reid 2010). This enables an iterative, learn-by-doing, low-pressure environment in which mistakes are considered a necessary part of learning and students are better able to develop their research and management skills (Niiya, Crocker, and Bartmess 2004).¹ Moreover, faculty members can be actively involved in counteracting the canonical hierarchical relationships that often marginalize students from certain backgrounds (Jordan-Zachery 2004; Monforti and Michelson 2008).

This approach required a change in thinking about student compensation, student recognition, student well-being, and faculty members’ investment in student training. We counteract the approach to research as a zero-sum game—which often makes students feel exploited and depressed (Anonymous Academics 2018)—by building a fun, collaborative research environment that helps students to achieve their individual goals while advancing collective research efforts, compensating students fully for their work, and investing in their long-term skill development. These changes yield more rigorous, more innovative research output (Aikens et al. 2017) for faculty members as well.

BARRIERS TO ACHIEVING RESEARCH AND PEDAGOGICAL SUCCESS

Higher education remains centered around lectures and evaluation, even though experiential education yields improved educational outcomes (Eyler 2009; Roberts 2015). Traditional hierarchies (e.g., between faculty members and students) introduce communication deficiencies (Aikens et al. 2017; Widhiastuti 2012) and perpetuate inequality (Jordan-Zachery 2004; Monforti and Michelson 2008). Students functioning in typical research cultures often are fearful of making or admitting mistakes, which can introduce data errors, undermine student learning (Metcalfe 2017), and disincentivize student participation.

Established norms contribute to exclusionary pipelines that marginalize students from certain racial, cultural, and economic groups. The expectation that students interested in research should engage in unpaid research labor exacerbates these challenges and disproportionately excludes financially vulnerable students (who lack the resources to spend extracurricular

time working without pay) from gaining experience that could dramatically expand their career opportunities (Chemers et al. 2011).

PEDAGOGICAL APPROACH

We expect that students who feel supported, compensated, and personally invested will produce better research. Therefore, faculty research goals, student learning, and student well-being all reinforce one another. Our pedagogical strategy centers on three fundamental pillars: experiential learning (EE), team-based research guided by servant leaders, and a whole-person approach to supporting student researchers. This work requires a proactive commitment to counteracting the entrenched biases that exclude or marginalize students from certain racial, economic, and cultural backgrounds.

Experiential Education

EE replaces lectures and evaluation with a semi-structured, apprentice-style education that is highly successful (Christian, McCarty, and Brown 2021; Cook and Cutting 2014; DiConti 2004; Katula and Threnhauser 1999; Roberts 2015; Stehno 1986), despite faculty resistance (Erickson 2013). EE can facilitate student enjoyment and lifelong learning (Sibthorp et al. 2011), enhance critical thinking (Savage and Wehman 2014), retain student researchers (Monroe, Mailander, and Lima 2006), and support students from historically excluded backgrounds (Roberts 2018).

In our EE-based lab, students actively participate in every stage of the research process; assume more responsibilities as their competencies develop; and fill management roles that, in turn, cultivate learning-by-teaching, leadership experience, student investment in research output, and institutional memory.

Students from a relatively privileged background are more likely to have the preexisting skills, knowledge, and decorum that faculty members seek when hiring undergraduate researchers—that is, academia’s “hidden curriculum” (Jackson 1968; Margolis 2001). Our EE approach responds to individual students’ existing experience, skills, and interests to provide the unique training they need to grow as researchers.

Teams with Servant Leaders

Team environments based on trust and mutual benefit facilitate innovation (Fraga 2022; Salas, Reyes, and McDaniel 2018) and improve business outcomes (Collins 2009; Covey 1989). Despite the success of companies that famously cultivate teams, academia maintains relatively insular, individual “sink-or-swim” approaches to research. In contrast, academic research labs build supportive, collaborative teams guided by “servant leaders” (Patterson 2003; Van Dierendonck 2011)² who demonstrate their imperfections, solicit advice from students, apologize for mistakes (de Saint-Exupery 1943), and avoid “one-size-fits-all” management. Collaborative teams cultivate student creativity; establish “safe” environments to diagnose and address errors; enhance student learning, enjoyment, and retention; and ultimately improve research volume, quality, and innovation.

This approach can accommodate and benefit from participants who have diverse skills and experiences by expanding the pool of student participants and disrupting patterns of exclusion. Moreover, faculty servant leaders are accessible, help to demystify prestige, and present professional pathways as more attainable to all students.

Whole-Person Approach

The team-oriented model approaches each student researcher as a whole person with unique strengths, needs, interests, and career goals. Whole-person learning focuses on a person’s “identity, motivation, and higher-order dispositions” rather than their “specific capabilities and competencies” (Podger, Mustakova-Possardt, and Reid 2010). Relative to capability-focused learning, whole-person education models are more inclusive, yield greater skill acquisition (Hoover et al. 2010), and could safeguard against widespread (if unintentional) exploitation within academia (Anonymous Academics 2018). With a whole-person approach, students feel free to express their unique identities, are valued and supported, and connect with their colleagues.

IMPLEMENTATION

Our implementation strategy is designed to improve academic research output; improve student educational experience and professional preparedness; and upend academic norms and practices that unintentionally contribute to historical patterns of exclusion.

Experiential Education in Practice

We involve students in every phase of the research process, shifting their tasks as their skills develop. We give students

opportunities to incrementally accomplish unfamiliar tasks and support them as they learn, try, fail, adapt, and eventually succeed.

Consider, for example, one student’s research experience. The student began working in the lab as an undergraduate research assistant responsible for labeling tweets from a militant group. She had regular one-on-one meetings with her graduate-student supervisor, who encouraged her to ask questions about the coding ontology, identify problems and challenges with the coding schema, and suggest areas for improvement. When the student demonstrated an advanced understanding of the coding process, she began training and managing a team of five undergraduate coders. Eventually, her team wrote the first draft of a new coding ontology for publication, and each team member subsequently trained and supervised their own group of new coders. Team leaders had the opportunity to learn statistical programming software (R), clean the data that they had helped to generate, conduct basic analysis, and participate as coauthors in the research report. Each student acquired marketable professional skills (e.g., teaching, management, and presenting) and also developed advanced knowledge about the subject (civil conflict), the case (Syria), the theories and practices of social science hypothesis testing, the data-collection process, research strategies, and academic writing.

Collaborative Culture

Our work culture is centered on the belief that rigorous, innovative research is best achieved through supportive collaboration—versus competition and punishment—among people who feel happy and valued.

Displaying Imperfections and Celebrating Failures

To produce high-quality, accurate research with integrity, we first need student researchers to perform careful work and to feel comfortable communicating questions and errors. To establish these norms, faculty members and student leaders are encouraged to share their mistakes and failures. Second, we normalize (rather than punish) mistakes as part of the research and learning processes (Smith et al. 2006) so that students feel safe to identify and help remediate errors (which otherwise may go unaddressed), as described by the following student’s experience:

I learned a lot about personal accountability and how to make mistakes and find cooperative solutions for them. This lab values mistakes as a learning moment and that taught me a lot about how to take responsibility while not feeling shame (anonymous student evaluation, November 2020).

Third, we allow flexible deadlines to prevent students from producing suboptimal work. Fourth, we maintain informal, approachable communication styles that allow students to participate in whichever formats are most natural to them and to offer ideas for new and ongoing research. In addition to enhancing research integrity, these tactics improve student confidence and well-being.

Actively Supporting Student Well-Being

We conduct individual discussions with every student to understand their preferred working style, their unique needs to achieve their tasks, their long-term goals, and any personal circumstances that they want to share. We proactively support student mental health in light of personal circumstances and current events and

tragedies. For example, following the racially motivated police killing of George Floyd, we paid BIPOC-identifying students for one to two hours of self-care and non-BIPOC students for one to two hours of self-education about racial injustice.

We also introduce mechanisms for support and levity at the lab-wide level, including posting faculty members' "failure resumés" and student achievement "brags"; recognizing religious and cultural holidays, birthdays, and family milestones; hosting game nights and trivia contests; and creating space for students to share nonacademic skills and interests. According to one anonymous student review (March 2021): "No community is perfect but this one is really close!"

Compensation for Participation

Academic norms often expect students to conduct some degree of free research labor, and established funding parameters infrequently allow principal investigators (PIs) to pay students for time spent acquiring requisite research skills (Anonymous Academics 2018). These expectations can render certain students (e.g., those whose families are experiencing financial hardship) unable

date-generation parameters³; to aiding in the data-cleaning, analysis, and writing processes; to generating new research ideas or frameworks. Providing opportunities for student investment and coauthorship yields higher-quality data collection, deters mistakes and falsification, produces stronger research overall, contributes to students' skill development, buttresses the academic credentials of those from historically excluded backgrounds, and more accurately represents the entire landscape of intellectual contribution to a given research project.

Our goal is to recruit bright, engaged students—emphasizing enthusiasm and work ethic over experience and skill base—from our courses and via an application form without strict reference to existing skills. With full student buy-in, we can teach students what they need to know (e.g., data analysis and academic writing). We begin with course-credit options to acclimatize students to our expectations and culture, provide a foundation in data-collection and labeling skills, and then give those who are fully engaged the opportunity for a paid role. Because we emphasize a decentralized education model, students can teach and support other students, allowing faculty members to support more students without

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to participate in research, to feel unwelcome, to be embarrassed for lacking exposure to presumed knowledge and experience, to face financial hardship, to avoid pursuing research-related careers, and/or to consider leaving college. We contend that compensating students for their time can mitigate against perpetuating such inequalities (Chemers et al. 2011) and encourage all students to take their research tasks more seriously. We compensate students with pay from grants and federal work-study programs and/or course credit. We provide additional incentives via live computational coding sessions; writing tutorials; professional-development workshops (e.g., pursuing policy careers and applying to graduate school); and targeted support to prepare students for desired careers in academic, public policy, and industry sectors.

Student Investment in Research Products

We depart from prevailing norms that limit coauthorship and emphasize individual faculty ownership over research. Faculty members can remain intellectual drivers while providing adequate intellectual credit to their student researchers. The increase in social science coauthorship (Henriksen 2016, 2018; Metz and Jackle 2017) insufficiently extends to graduate students and rarely includes undergraduates. However, our students devote considerable research time and frequently make valuable intellectual contributions to our research projects. To incentivize student engagement and acknowledge their contributions, we cultivate noncompetitive teams in which all active participants who make specific intellectual contributions receive coauthorship on relevant research output. Intellectual contributions range from helping to develop and improve coding categories and other

becoming overburdened. This not only minimizes the costs to faculty members with limited budgets but also allows for the recruitment of students who might not have had the required skills for the role at the outset.

Hierarchy-Attenuating Mentorship

Multilevel and peer-mentorship networks streamline workflows, provide students with various mentor perspectives, and disrupt patterns of exclusion perpetuated by dyadic mentorship structures (Becker 2020; Becker, Graham, and Zvobgo 2021). We enable students to learn from one another, become mentors to newer lab members, and ask questions of entire teams. Graduate students model how to ask questions and frame responses. Slack (i.e., a collaborative workspace platform) channels connect students to problem solving and build peer relationships while also providing venues for PI input and comprehensive documentation of research decisions and processes.

EVIDENCE OF SUCCESS

Our approach has yielded a promising level of research productivity, research quality, and student retention. In four years, we have or are in the process of manually generating three major quantitative datasets from qualitative text-based data from social media and historical archives. Graduate and undergraduate students are coauthors of 10 working research articles based on the data collected; some articles currently are under review. Our approach to training coders achieves levels of intercoder reliability that exceed established social science standards. Student researchers have envisioned and implemented new approaches

to evaluating coder agreement. At the time of writing, we have involved 41 undergraduate students, 14 graduate students, and one postdoctoral researcher. The average undergraduate student remains involved in research for 16 months; 27% remain involved after graduation. Our multilevel approach to mentorship and a teams-based structure allows us to maintain this level of research output, student involvement, and student retention.

Student researchers report gaining academic and practical skills that they otherwise would not have acquired from college coursework or traditional faculty engagement. In an anonymous April 2022 survey, students reported developing significant writing, research, coding, leadership, communication, and other skills through lab activities. Students from historically excluded demographics reported receiving rare and much-needed support. Student evaluations of their lab experience ranged from “positive” to “life changing” (table 1).

ONGOING CHALLENGES

Several challenges remain for implementing an EE approach to academic research.

Disparate Research Objectives

Our lab primarily collects, codes, and analyzes observational data for quantitative analysis and qualitative process tracing. Researchers could deploy similar principles and tactics to accomplish other research tasks. Teams in experiment-based labs could brainstorm treatments and trial treatment arms and also consider ethical implications of experimental interventions. Computational

labs could host hackathons and work in coding teams to generate, test run, and clean code.⁴

Funding

Financing lab research and student compensation requires significant resources. External funding awards are exceptionally competitive, and access to internal university funding varies widely and has the potential to reinforce existing inequalities. (Our lab benefits from its location in a private university that has a significant endowment.). The EE approach has unique appeal to some potential funders, and faculty members may be able to use federal work–study programs to support qualified student researchers. Furthermore, other aspects of our pedagogical approach may be executable under the guise of more modest faculty startup funds, department support, and student course credit.

Institutional Buy-In

An EE model is likely to be most successful when it has buy-in across faculty members, departments, administrative leadership (e.g., department chairs and deans), and/or colleges and universities. In the absence of institutional buy-in, individual faculty members may need to spearhead new paths that deviate from established norms and expectations.

Entrenched Academic Systems

Some aspects of our proposed approach challenge conventional academic norms and assumptions. At times, our faculty leaders

Table 1

Selected Responses from April 2022 Anonymous Undergraduate Survey

What, if anything, have you learned in the lab that you otherwise would not have gotten from your undergraduate degree?

- “DR. GADE’S LAB CHANGED MY LIFE AND I HOPE IT CAN CHANGE OTHER STUDENTS’ AS WELL.” (*Original in all caps.*)
- “This lab has been the highlight of my academic career at Emory.”
- “I absolutely loved being a part of the lab. This was easily the highlight of my semester and I can’t wait to continue working in the lab. The environment, the people, and the professors contributed to making the lab an incredibly rewarding and enjoyable experience.”
- “For me, I was not familiar with the concept of academic writing until I joined the lab and was asked to contribute to an academic paper along with my peers. Though courses such as POLS 208 [Research Methods] and other required writing requirements for my major exposed me to academia, it was not until I had to actively take part in drafting a paper that I was able to truly experience something quite as exciting as this. I was also grateful that I was able to be a part of this lab through different means—first as a CLSS fellow, then as a work–study student, then as a summer part-time employee, and now as a directed research student. Due to my financial inability to work for credit the entirety of my four semesters in the O/R Lab, this structure allowed me the flexibility that I needed in order to stay with the lab for the duration of the entire data-collection process. It would have been otherwise impossible for me to continue working with the lab, particularly this project, and therefore the lab would have had to spend more time and resources training someone completely new for the same role. This would have also caused a fragmented data-collection system, possibly leading to incorrect rationales for different coding choices, making the entire process slow, ineffective, and incomplete. Furthermore, it would have stripped me of the opportunity to learn about the intricacies of social scientific research overall, for I could not have afforded to let go of my means of income for the sake of three course credits a semester.”
- “I have gained a multitude of skills from this lab that have helped me become a better researcher, student, and even (hopefully) land a job. Specifically, I have been part of every stage of the academic research timeline. I have learned (through the lab work itself) how to create and test an ontology, the process of writing a peer-reviewed paper, how to conduct individual academic research, and how to account for biases within different projects (by getting the chance to work on two projects). I have also learned many skills through the non-research parts of the lab. Through the network I have created, I have learned about the different career paths I can take and how to get there. Through the all-hands meetings, I have learned how to present academic research to a “committee.” And through the small lab op-ed projects, I have learned how to conduct scholarly writing for a general audience.”
- “Our R and op-ed sessions also taught me a lot about how to work with real-life data and better communicate ideas in writing, respectively. In academia, we write these long-winded papers, but actually coming to the point of communicating things to the general public is important and a skill we don’t often work on in regular classes.”
- “(1) Data collection, methodology, and research design (much more practical and applicable than [undergrad research methods] or the required research classes could ever teach). (2) RStudio (beyond [intro to stats] and continuing to practice those skills because I forgot them all since freshman year anyway). (3) Peer-review process and presentation skills (from weekly lab meetings). (4) Research writing skills (Dr. Gade actually allows students to participate in authorship, not just have them do simple tasks like writing lit reviews/annotated bibliography). (5) Lab-management/leadership skills (definitely not getting these from the classroom).”
- “As a young woman, having Dr. Gade and the many brilliant women in the lab be role models for me has been an invaluable lesson.”
- “I have gained skills in coding and been introduced to the world of political science research in a way that was nonthreatening but challenged me to grow.”

have faced skepticism and concern that investing in a multiple-researcher model squanders time and financial resources; that proactive undergraduate mentorship and/or commitments to diversity, equity, and inclusion detract from faculty progress; that extensive undergraduate involvement can undermine research quality and publication placement; and that this model is institutionally unsustainable. We anticipate that student demand for professional preparedness and the research success of emerging experiential labs (e.g., Vanderbilt University's Laboratory for Research on Conflict and Collective Action and the University of Southern California's Security and Political Economy Lab) eventually will assuage these concerns.

FOUNDING A LAB

There is no one correct way to establish a lab. Our approach involved recruiting a single student from a wide applicant pool and training that student during the summer. We then recruited a small cohort of students (i.e., five) in the fall of 2019, and the first student that we trained became the lead coder for the project, facilitating question-answering and intercoder reliability. By implementing the pedagogical approach described above, and with student engagement that shaped how the lab developed, these students excelled (including coauthoring this article!) and enabled the lab leaders to engage a broader coding team. We ran frequent within-lab evaluations, focusing on team building

When speaking to department leadership, faculty leaders found it helpful to emphasize how the lab supported their own progress toward tenure and promotion as well as recruitment of undergraduate majors. When speaking to institutional leadership, faculty leaders found it helpful to emphasize the contribution to student learning, diversity and inclusion initiatives, overlap with institutional priorities, and undergraduate experience on campus. Over time, we secured follow-up grants, achieved recognition of the lab as a federal work–study program, and are en route to approval as an EE program at our primary institution.

HOW THE LAB PREPARED STUDENTS FOR WHAT COMES NEXT

Our students have moved from the lab directly into think-tank roles, consulting positions, paid policy-relevant internships, law schools, and master's and PhD programs in political science. When they were asked, the student coauthors of this article highlighted the lab-provided skills that prepared them for these roles (table 2).

CONCLUSION

This article outlines a pedagogical approach and implementation strategy designed to accomplish three aims: (1) improve academic research output; (2) improve student educational experience and professional preparedness; and (3) upend aca-

Some aspects of our proposed approach challenge conventional academic norms and assumptions.

and retaining institutional memory among coders to minimize the need for retraining. As student coders assumed more responsibility and eventually data-analysis and coauthorship roles, we were able to generate institutional support through internal grants and bridge funding at our home institution. In addition, we received external grant funding for various aspects of our work—specific research projects, educational initiatives, and summer workshops—from the National Science Foundation, the Carnegie Foundation, the Academic Data Science Alliance, and the US Air Force.

democratic norms and practices that unintentionally contribute to historical patterns of exclusion. Building a collaborative, experiential approach to education and research that considers “whole people” and emphasizes servant leadership not only advances each of these interrelated goals but also cultivates an enjoyable, innovative research environment that inspires students to enter academic and research careers. Broader institutional change could make funding and supporting these programs more feasible. Until then, many (but not all) of the strategies highlighted in this article can be implemented by

Table 2

Student Authors' Statements About How the Lab Experience Prepared Them for a Post-Collegiate Career

- “The O/R Lab helped me cultivate numerous hard and soft skills that are transferable beyond academic research and into professional settings. As a recent Emory graduate, I easily navigated my first post-college position—working on a US Senate campaign—because of the communication, work ethic, and problem-solving skills that I developed during my time in the O/R Lab. On top of that, my practical research competency prepared me for one of the most important parts of my role, synthesizing a large amount of information into absorbable written reports.”
- “During this time, I discovered that training with compassion and providing a safe environment for direct reports, which aligns with the overall lab culture, is something that I wanted to be able to take with me into any career. The level of comfort, security, and personal buy-in someone feels while acclimating to a new work environment or skillset is imperative to their future success. Working in learning and development for a public relations firm, I have been able to continue acting within the core values I wanted to take away from the lab. In my current role as learning and development assistant, I manage the corporate learning platform. Open communication, systems knowledge, methodology, but, most of all, empathy, are at the heart of the work.”
- “Getting the chance to be a part of the O/R Lab gave me not only the opportunity to develop and improve skills such as qualitative coding, open-source research, and writing, but also allowed me to work alongside and assist faculty with onboarding new students. Having the ability to speak to leadership experience working on issues directly related to international affairs outside the classroom gave me a distinct advantage when I began my career, as the majority of political science courses lack the practical applications of skills that are required to pursue a career in foreign affairs outside academics.”
- “(1) Experience and knowledge with qualitative and quantitative methods that I wouldn't have experience with otherwise. (2) Experience on legitimate research projects without being told it is/should be hard.”

individual faculty members as they continue to find ways to overcome ongoing barriers.

ACKNOWLEDGMENTS

We gratefully acknowledge conversations with Emily Ritter (Vanderbilt University), the Security and Political Economy Lab (University of Southern California), and Geoffrey Wallace (University of Washington) that helped us to establish this lab. We thank Janice Fournillier and Charity Gordon (Georgia State University) and Kamal Carter and Debra Nealy (Step Ahead Scholars) for conversations that influenced deeply how we think about education pedagogy and the best ways to support students from backgrounds historically excluded from the academy. We are grateful to Noah Smith (University of Washington) and Diyi Yang (Georgia Tech), whose computer science labs and leadership styles influenced the founding of our lab. Any mistakes are our own.

SUPPLEMENTARY MATERIALS

To view supplementary material for this article, please visit <http://doi.org/10.1017/S1049096523000033>.

CONFLICTS OF INTEREST

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

NOTES

1. Similar approaches are gaining popularity in the social sciences (Becker 2020; Becker, Graham, and Zvobgo 2021; Bolsen et al. 2019).
2. Rather than continually measuring students to ensure that they belong, we view it as the role of leadership to provide the support required for students to be successful in the role for which we hired them. We ask students: "What do you need in order to achieve this task?" Then we work to provide it.
3. We observe undergraduate students to be particularly adept at helping faculty members—who often are removed from the details of the coding process—to tighten coding rules and create new coding categories that they may not have considered. Students also generate novel theoretical insights from across the observations that they personally coded.
4. For example, Data Science for Social Good programs (<https://escience.washington.edu/dssg>).

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