REFLECTIVE ESSAY

Undergraduates as course creators: Reflections on starting and sustaining a student-faculty partnership

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We reflect on our student-faculty partnership to create a new sophomore seminar at Brown University, "Precision medicine or privileged medicine?: Addressing disparities in biomedical research." As undergraduates, Brooke Spencer and Katerina Tori developed the five most critical components of this course: (a) learning outcomes, (b) weekly topics and readings, (c) assignment designs, (d) active learning strategies, and (e) approaches for student agency. Unlike some Students-as-Partners (SaP) experiences, there was no umbrella initiative or administrative sponsor that supported our student-faculty partnership from first ideas through course implementation. The partnership between Brooke, Katerina, and faculty member Robert Campbell arose instead from chance contacts and shared interests. It had to overcome funding setbacks, uncertainty about continuity, and constraints due to our other priorities.

The seminar course puts students in the driver's seat to explore problems with the inclusiveness of biomedical research and innovation. It introduces the research enabling precision medicine, the evolving role of patients as partners in this research, and the persistent inequities in who is included and benefits from this research (Campbell et al., 2018). Students also explore the role of "soft skills," such as emotional intelligence in building trust and engaging communities. The overall purpose is to help sophomores explore possibilities for improving the science and social impact of biomedical research.

In this essay, we reflect on how our partnership became one of pedagogical co-design. We have structured it around three factors that were critical for our partnership success: shared purpose, respect and accessibility, and roles and responsibilities. These factors are based on our experiences and a meta-analysis of partnership success metrics in our discipline, the Patient-Focused Medicines Development's *Book of Good Practices* (Deane et al., 2019). In the following sections we explain the relevance of each factor to our SaP experience. In our conclusion, we include the student partners' assessment of the extent of partnership they felt in creating the course components.

SHARED PURPOSE
Shared purpose requires early involvement of partners in shaping the project's aims and outcomes (Deane et al., 2019). In our partnership, we experienced rapport and a sense of shared purpose in our very first student-faculty meetings, which rapidly progressed to co-synthesis of ideas for the course components. Our shared purpose motivated us to work for

each other and persevere through setbacks along the course creation journey. In our first set of reflections, we introduce aspects of this journey and share impressions from our first SaP encounters.

Robert

After teaching graduate courses, I was eager to develop a course for students at an earlier stage of their education—ideally sophomores looking to explore connections between STEM and other disciplines as they chose an academic concentration. This was intimidating, since my previous teaching was tailored to graduate students with advanced knowledge that they could apply to complex problems in drug discovery and health care. An article on co-design of course syllabi (Hudd, 2003) inspired me to consider engaging students in new course creation. But I had no funding and no connections to undergraduates.

At that time (January 2017), Brooke sent me an introductory email asking about research opportunities for an Undergraduate Teaching and Research Award (UTRA). I entered our first meeting full of ideas for a "how-to" course on biomedical innovation and precision medicine and quickly saw Brooke had valuable insights about teaching undergraduates. Then, as she confidently shared ideas from her courses and reading, something unexpected happened. We started synthesizing a different vision for the course, one based on our shared interests in people and communities who are overlooked by biomedical research and inequities in who benefits from biomedical innovation. As we stepped out of our meeting, Brooke expressed how students might embrace our ideas, saying, "I think this course would be very 'Brown.'" It was the relevance for undergraduates I wanted to achieve.

Our UTRA proposal was rejected, but it provided the perfect roadmap in a successful September 2017 application for a community-engaged course development grant. By the end of 2017, I had backing to develop the proposal for Brown University's College Curriculum Council. But I was struggling to manage the breadth and depth of course content and could not see a way to ensure an equitable opportunity for sophomores with limited biomedical course experience.

Then I was introduced to Katerina. It was quickly clear that her undergraduate experience could help the course fit diverse curricular paths and student interests. In response to my concerns on how to support students with limited biomedical course experience, Katerina made a powerful suggestion: "Maybe the students can do that." She described how students could help present aspects of the readings and lead discussion at the start of class. We synthesized an approach to empower groups of sophomores to obtain questions from classmates and build inclusive learning activities. This increased student agency and made the learning outcomes more achievable.

Brooke

I first contacted Robert as a sophomore looking for a summer research opportunity. When I read Robert's online biography discussing his biomedical research experience, I made the serendipitous assumption that he had a lab at Brown. He did not, but suggested we meet anyway. I was intimidated to meet with a faculty member without a clear project in mind; however, Robert's conversational tone and enthusiasm put me at ease. It quickly became clear that we had overlapping interests; for example, we both had been drawn to a specific article

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about how health outcomes are often determined more by one's zip code than one's genetic code (Graham, 2016).

Beyond sensing a unique opportunity to become involved in course development, I was interested in creating a class which bridged the science of research with the societal context of public health—I had only ever seen these topics discussed in isolated spheres. The strong sense of a shared mission for the course was essential for maintaining the partnership over the two years it took to move from initial conversation to the first semester.

Being involved from the initial ideation helped me feel confident in my role as co-creator of the course. Neither of us came into the partnership with a fixed goal in mind: the initial course concept was developed through several brainstorming sessions and frequent email exchanges. Once we did have a vision for the course—an opportunity for students to ask critical questions and propose opportunities for change—we could remain focused when we inevitably experienced setbacks such as having our initial funding proposal rejected.

Katerina

I got involved in the course during the spring of my senior year at Brown University after having developed and delivered a first-year course on introducing biology to students who might not necessarily be science majors. After working on this biology course, I wanted to get involved with sophomores. I indicated to the Dean of Biology that I was looking for a student-faculty partnership, and she introduced me to Robert during January of my senior year.

After meeting Robert, it became clear that I could have an active role in our partnership when he constantly made space for me to propose ideas. I was lucky that the main idea had already formed when I joined this project. During our first meeting, we agreed that establishing learning outcomes, diversity and inclusion, and student agency through transformative understanding of problems were the unifying goals of our partnership. We wanted students to drive questions and ideas to change research in a safe environment for intellectual risk taking. However, there was space for each one of us to redefine our role to what we were passionate about—in my case, student learning. Thus, we incorporated student-led discussion of readings to offer a safe space for students to express themselves and draw on their diverse backgrounds.

RESPECT AND ACCESSIBILITY

Respect and accessibility involve seeing all partners' perspectives "as equally important to that of other professional or authoritative stakeholders" (Deane et al., 2019). Each step in the course development involved intense work under deadline pressure, necessitating that we also respect our partners' time, effort, and work-life balance.

Brooke

I initially felt very uncertain about what this partnership dynamic would look like; it was my first interaction with a faculty member in which I was not in the role of student. What useful insights could I bring when I knew next to nothing about the complex issues presented in our course? Robert's experience working on interdisciplinary teams outside of academia proved to be a significant strength. Besides providing a real-world perspective on research challenges, he embraced the idea that each team member brings expertise to the table.

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Throughout the partnership, Robert valued my perspective and frequently prompted my input. By the time I was serving as a TA for the course, I felt comfortable pushing back on certain aspects of assignments—"I don't think this assignment should be graded," or, "This is too much reading for one week"—and proposing alternatives.

I believe the day-to-day structure of our partnership contributed to my sense of being a true co-designer. For example, we always met in non-hierarchical meeting spaces such as the lobby of the biology department building. Rather than feeling like I was a student coming to learn from a professor—a one-way dissemination of information—I was able to contribute my own knowledge and expertise in these more collegial spaces.

Katerina

Though rewarding, entering an already established partnership was challenging primarily because I did not want to jeopardize the existing vision. I wanted to translate everything Brooke and Robert had put together into the best way for students to be agents in their own learning. Our partnership was one of respect and accessibility, a fact that also drove the attitude we each adopted in class. This allowed me to expand on what Robert and Brooke started and realize my own ideas. From our first meeting, it became apparent that my perspective was valued and I had the freedom to propose and follow through with changes. The course adapted every time new ideas came about from our partnership without being confined by rules set by the faculty. Project meetings were scheduled to accommodate everyone's schedules and were mutually run, with Robert often stepping back and making space for Brooke and me to share first. Meetings were adapted to participant priorities and always respected participant workload. The adoption of Google Docs to track ideas, draft proposals, and plan out the syllabus furthered accessibility and transparency and allowed us to share ownership of a common document.

Robert

I entered work with Brooke and Katerina eager to learn from their experience and perspectives. To do this I needed them to feel confident in the value of their ideas and safe to communicate concerns or setbacks. I also needed to show respect for their time, since as students they had challenges and priorities bigger than our project. When I realized I would be fifteen minutes late for my first meeting with Katerina, I immediately offered to reschedule. When the initial funding proposal with Brooke was rejected, I immediately shared the disappointing news since it compromised her options. When funding was secured in December 2017, I immediately offered Brooke the opportunity to resume involvement in the project.

ROLES AND RESPONSIBILITY

Roles and responsibility involve "equitable working practices that ensure . . . opinions and expertise are . . . incorporated where possible" (Deane et al., 2019). In this section, Brooke and Katerina discuss how they proactively made innovations to transform the quality of the course.

Katerina

We each were empowered with autonomy and had specific roles and responsibilities, but we were always asked to provide feedback to our partners. I tried to draw on both my teaching and research experiences to help students both excel and make connections between class materials. I focused my initial involvement in the course around choosing weekly topics and review questions to enhance session facilitation. My research background allowed me to choose appropriate papers and devise questions to help students better understand them. My involvement with university mentoring programs allowed me to bring insights into active listening, especially when trying to facilitate constructive learning discussions on divisive topics. This helped me address concerns expressed by Robert about his inexperience with in-class discussions of sensitive topics. I engaged the university's ombudsperson to help us with active learning strategies to embody empathy and respect for diverse positions in our class community.

We believe that a critical part of SaP is encouraging students to draw on their past course and extracurricular experiences to better connect with other students. We shared our expectations in order to be able to craft our roles and responsibilities.

Although I had served as an undergraduate teaching assistant (UTA) for lab-based courses, a big challenge was finding ways to do things differently with a new audience and goals. It was hard not to adopt the same quantitative and scientific way of teaching I was used to. Watching Robert and his way of teaching was very helpful in this respect. During my time as a TA for the course, we continued actively adapting the course to the needs and interests of the students participating in it. It was hard to manage the time component needed to contribute as much as possible to the course while also studying and working. What mattered most is that we established flexibility and understanding as key tenets of our partnership, which allowed for us to creatively, rather than anxiously, co-create.

Brooke

My initial involvement involved determining the content scope and learning outcomes for the course. I remember an early meeting where Robert and I met in an empty classroom and wrote down our ideas on the board. After the meeting, I used the VALUE rubrics from the Association of American Colleges and Universities (Rhodes, 2010) to determine the learning outcomes that I felt would be most important for students. These included statements about critical thinking, civic engagement, and ethical reasoning. Accessing this educational language helped turn my vague ideas into a concrete document which I could share with Robert and adapt for the UTRA proposal. This was also helpful when later creating rubrics for writing assignments and the final course project.

During the first semester of the course in Fall 2018, I found myself in an unfamiliar role as I took on new responsibilities as a UTA. My insecurity regarding my lack of teaching experience and expertise meant that I often didn't feel confident leading group discussions, preferring to talk to students in small groups or individually. It was more difficult to have equality in the partnership during the semester than it had been during the course creation process, since I often struggled to manage my involvement with my own academic responsibilities.

My challenge to embrace my role as an instructor turned out to be an opportunity for growth. During Fall 2018, I enrolled in a teaching methods class and became a UTA for an introductory immunology course. As the semester progressed, these experiences increased my comfort in the classroom. I learned that I felt most confident when I was drawing on my own educational experiences to inform both my instruction and course design decisions. For example, since I had previously enjoyed flexible projects, I advocated for student agency in the subject and format of their final project. This led to creative, non-traditional projects such as a graphic novel, poetry collection, and photography series.
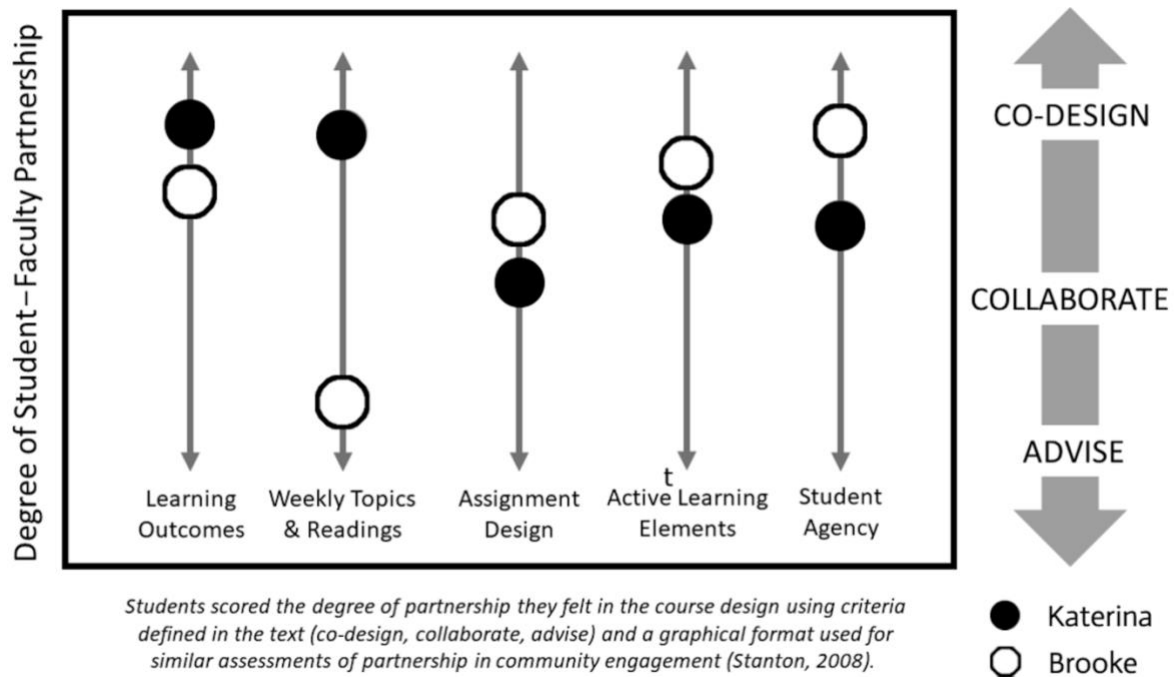
Robert
In our first meeting Brooke and I chose a backward design approach. I gave her the AACU VALUE rubrics to consider (Rhodes, 2010). Two weeks later I felt a great boost of confidence in the course as I read what Brooke distilled as its key learning outcomes and community engagement context. In my first meeting with Katerina I encouraged her to suggest major changes to the flow of the course. A week later I felt relief and delight as Katerina presented a new order of topics and readings that would better support the learning outcomes. The student partners' ability to see the big picture, deliver on details, and focus on outcomes made it easy to share power throughout the course creation. Their transformative contributions were at the same level as my best collaborators and team members.

When we transitioned to teaching the course, I struggled to maintain this level of power-sharing with Brooke and Katerina. We had prioritized space for the course students to co-lead weekly discussions, and my focus shifted to engage students taking the class at the expense of attention to my partners. In retrospect, I should have done more to help my partners (and the other TAs) take fulfilling roles in this student engagement.

CONCLUDING REMARKS
We hope that our reflection encourages readers to reflect on their own partnerships, whether they arose through formal SaP programs or informal encounters. To aid in this reflection, we adapted a basic framework for measuring community engagement (Stanton, 2008), which encourages partners to consider the degree of shared power for decisions, actions, and roles within the partnership. As an example, the two student partners analyzed their power to develop the products of our partnership—the experiences and learning environment for students in the new course (see Figure 1). Brooke and Katerina scored the level of student-faculty partnership they experienced for each of the course components using definitions we base on Deane et al. (2019):

- **Co-design**: Students partners are actively involved in all decisions. Their ideas and recommendations for course components were incorporated to the maximum extent possible.
- **Collaborate**: Student partner ideas and preferences are taken into consideration and they understand how their input influences decisions.
- **Advise:** Student partners provide input, preferences, and feedback but are not actively engaged in designs or decisions.

Figure 1. Framework for reflecting on power sharing within SaP

Students scored the degree of partnership they felt in the course design using criteria defined in the text (co-design, collaborate, advise) and a graphical format used for similar assessments of partnership in community engagement (Stanton, 2008).

Our partnership was built on shared purpose, respect, and openness to adaptive roles. We had to meet the requirements of multiple stakeholders—the biology program, College Curriculum Council, two funding centers, and ultimately the sophomores who enthusiastically embraced the intersection of STEM, humanities, and social justice. The uncertainty of the course design process put us on equal ground, as it was a new experience for everyone involved. Success required us to be vulnerable and supportive in ways that led to self-growth as well as the growth of our partnership. In the end, we shared ownership while discovering roles that suited our strengths.

ACKNOWLEDGEMENTS

NOTE ON CONTRIBUTORS

Robert Campbell *was a volunteer Adjunct Associate Professor of Molecular Pharmacology, Physiology and Biotechnology at Brown University during 2013-2020. He worked for three decades leading drug discovery and development in industry and is also a Whitman Associate at the Marine Biological Laboratory in Woods Hole*.

Brooke Spencer *graduated from Brown University in 2019. After working as a research assistant at the Ragon Institute of MGH, Harvard, and MIT, she is now a strategy development coordinator at a public health nonprofit in Philadelphia, PA*.

Katerina Tori *graduated from Brown University in 2018 and is currently a medical student at the Medical College of Wisconsin. Her aim is to use precision medicine and evidence-based medicine to further her medical practice*.

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