# BOARD #166: Student Pedagogy Advocates: Enhancing Teaching and Learning Through Student-Faculty Partnerships (WIP)

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I hold a Ph.D. in Engineering Education and an M.S. in Computer Science, focusing on integrating computational thinking into pre-college education. My experience includes developing and implementing engineering and computer science curricula and actively participating in professional development for teachers to establish inclusive and innovative learning environments. At Purdue University's Center for Instructional Excellence (CIE), I work as a postdoctoral researcher, collaborating on faculty development, mentoring undergraduate students, and supporting curriculum initiatives.

I advocate for increased participation in STEM fields. Alongside my primary research, I am interested in human-computer interaction, AI in education, educational robotics, and user experience (UX) design, focusing on how technology can improve teaching and learning for all learners.

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## Introduction

In an effort to enhance teaching and learning, our Student Pedagogy Advocates (SPA) program fosters student-faculty partnerships grounded in Self-Determination Theory (SDT) and Student-Centered Learning practices. Student partners, also known as Student Pedagogy Advocates (SPAs), attend a specific class where they are not enrolled for an entire semester. During class time, they observe aspects that could directly impact student learning experience, including interactions between the instructor and students, teaching style, forms of communication and expectations, types of activities, and how students engage with the class. Through varied observation methods and discussions with enrolled students, they work with the instructors to create more student-centered learning environments. In this paper, we analyze interviews with instructors and student partners (SPAs) to explore the effects of these partnerships in STEM classes at a large research-focused public institution. The study aims to answer the following research questions: (1) *How do STEM instructor teaching practices change related to working with a student partner?* (2) *What effects does serving as a student partner have on students in a large research-focused STEM institution?*

## Literature Review

Reviewing the existing literature to understand the significance of student-faculty partnerships in enhancing teaching and learning is essential, as it provides a foundation for developing innovative approaches that can improve educational outcomes. This review aligns with the paper's objectives by providing a foundation for the innovative approach presented in our program.

Influential research by Freeman et al. [1] and Theobald et al. [2] established the importance of student-centered learning environments focused on active learning broadly defined. Drawing on SDT, Bonem et al. [3] refined our understanding of teaching practices to highlight that courses in various structures can support effective student learning by meeting students' three basic psychological needs for autonomy, competence, and relatedness [4].

Paralleling this research, initial student-faculty partnership programs emerged in the US, UK, Canada, and Australia [5]-[8]. The study focused on these programs, primarily looking at student and faculty outcomes without strongly emphasizing classroom practice [9]. Additional research has focused on effectively running programs [10], [11] and the potential to change institutional cultures to enhance belonging and equity [12].

Less research has focused on the impact of participation on students in classrooms with partnerships or specific teaching methods that emerge from partnerships. Additionally, with the roots of many of these programs at smaller liberal arts-oriented institutions—Bryn Mawr College

and Elon University, as two leaders—STEM classes and engineering programs, particularly, have received insufficient attention.

**Methods**

The Student Pedagogy Advocates program follows a students-as-partners model established in the Bryn Mawr Students as Learners and Teachers program [13]. Each student works directly with a faculty member throughout the entirety of a course, attending at least one class session each week (in most cases in our program, they attend all class sessions). Additionally, they meet with the instructor outside of class, either weekly or biweekly, and meet in groups with peers and program facilitators for mentorship, reflection, and guidance. Students are recruited primarily by word of mouth. This includes recommendations from instructors, students in the program, and staff members who work directly with students and have attended presentations about the program (including our academic success center, academic advisors, and cultural center staff). When students express interest, we interview them to help them understand the program. We have never rejected a student applicant interested in working with the program. We follow a minimal training approach, including resources developed by students in the Learning Management System to share ideas, resources, and lessons they have learned. Most training and development happen through collective meetings, peer guidance, program administrator feedback, and discussions in a Slack group. Faculty recruitment occurs through communications from our teaching and learning center, regular presentations at campus teaching and learning scholarship events, and word of mouth through staff and students in the program. Faculty also meet with program administrators to learn about the opportunity and ask questions. Students are paid hourly for their time worked, and faculty receive no incentive.

Most students begin the semester observing with a tri-column table approach, where they document the time of observation, what they observed in fact, and their reflection on what they observed. In some cases, students continue observations using this approach throughout the semester. In other cases, we adapt to different approaches based on the goals of the instructor and the student partner. One common approach involves mapping classroom discussions [13], which can be done by hand, where students draw a diagram of the room and lines detailing the flow of conversation by individual, group, or quadrant, depending on the class size and space. Based on questions they want to explore and initial observations, they sometimes use a variety of colors and symbols to refine further the information a map provides. Some students do this mapping in spreadsheets and document types of discussions, or add other elements. Combined with regular meetings and conversations with instructors, these approaches allow for refinement and iteration. For example, in one meeting, they may focus on where an instructor stands in the classroom; in another, they may focus on the impact of different types of questions or prompts given to the class. Many students also develop hybrid or alternative approaches to note-taking. We have also introduced the COPUS [14] and PAITE [15] classroom observation protocols, but they have generally expressed little interest in applying them. Students also collect input from peers

enrolled in the class through formal and informal discussions and mid-semester feedback surveys.

**Data Analysis**

Our analysis focuses on how the program impacts both instructor practices and the learning and experience of students in the class. To do this, we use a mixed-methods approach. For the instructors and students in the program, we conduct interviews. We interview instructors at the beginning and the end of the semester and students only at the end of the semester. We deploy a quantitative survey for students attending the class based on self-determination theory that explores the learning climate, basic psychological needs, satisfaction, and motivational profile. In our theoretical framework, we hope that the interviews will reveal the adoption of student-centered learning practices. We also expect that the qualitative data will demonstrate greater satisfaction with basic psychological needs, resulting in greater student success, as demonstrated throughout the literature. Through the interviews, we are also interested in the effects of participation in a program such as this on students who serve as partners. In this poster, we focus on the initial qualitative analysis, considering the following research questions: 1) *How do STEM instructor teaching practices change related to working with a student partner?* (2) *What effects does serving as a student partner have on students in a large research-focused STEM institution?*

**Preliminary Findings**

The preliminary results highlight several benefits for faculty and students. Faculty members noticed an improvement in their teaching strategies after receiving feedback from student partners, leveraging the quality of their classes. For example, Dr. Luna Rivers mentioned that Zoe's suggestions helped her adopt a more proactive behavior toward change whenever she notices a need for improvement, helping her to understand student perspectives better. As a result of the student partnership, Dr. Clarke could see better group accountability during projects and found his lectures more engaging. Faculty also reported moving around the classroom more and adding more active elements to their sessions. From a student participant's standpoint, they felt their confidence and problem-solving skills improved, encouraging them to be more autonomous and proactive in their role as a student partner. Another student learned more about their passions and built strong connections with faculty, which enabled them to take on a role of support and guidance. Overall, these findings highlight the mutual benefits of student-faculty partnerships and the outcomes in improving teaching and learning experiences.

## Conclusion

*Adaptation of the program to a STEM-focused environment*

This is an ongoing study, and we will continue to expand it to additional classes from various disciplines and with diverse structures (e.g., number of students, lecture, lab, flipped classroom). We will also begin analyzing quantitative data to see how student perceptions in these classes fit and align with the instructor's and the SPA's perceptions. Because the program is ongoing and iterative, we will also refine the training and development of Student Pedagogy Advocates in response to these findings.

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## References

[1] S. Freeman, S. L. Eddy, M. McDonough, M. K. Smith, N. Okoroafor, H. Jordt, and M. P. Wenderoth, "Active learning increases student performance in science, engineering, and mathematics," *Proc. Natl. Acad. Sci. U.S.A.*, vol. 111, no. 23, pp. 8410–8415, 2014. doi: 10.1073/pnas.1319030111.

[2] E. J. Theobald et al., "Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math," *Proc. Natl. Acad. Sci. U.S.A.*, vol. 117, no. 12, pp. 6476–6483, 2020. doi: 10.1073/pnas.1916903117.

[3] E. M. Bonem, H. N. Fedesco, and A. N. Zissimopoulos, "What you do is less important than how you do it: the effects of learning environment on student outcomes," *Learn. Environ. Res.*, vol. 23, pp. 27–44, 2020. doi: 10.1007/s10984-019-09289-8.

[4] R. M. Ryan, *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York, NY, USA: Guilford Press, 2017.

[5] C. Bovill, A. Cook‐Sather, and P. Felten, "Students as co‐creators of teaching approaches, course design, and curricula: implications for academic developers," *Int. J. Acad. Dev.*, vol. 16, no. 2, pp. 133–145, 2011. doi: 10.1080/1360144X.2011.568690.

[6] M. Healey, K. E. Matthews, and A. Cook-Sather, *Writing About Learning and Teaching in Higher Education*, 2020. doi: 10.36284/celelon.oa3.

[7] E. Marquis et al., "Navigating the threshold of student–staff partnerships: a case study from an Ontario teaching and learning institute," *Int. J. Acad. Dev.*, vol. 21, no. 1, pp. 4–15, 2015. doi: 10.1080/1360144X.2015.1113538.

[8] K. E. Matthews, A. Dwyer, L. Hine, and J. Turner, "Conceptions of students as partners," *High. Educ.*, vol. 76, no. 6, pp. 957–971, 2018. doi: 10.1007/s10734-018-0257-y.

[9] L. Mercer-Mapstone et al., "A systematic literature review of students as partners in higher education," *Int. J. Students Partners*, 2017.

[10] A. Cook-Sather, *Engaging Students as Partners in Learning and Teaching: A Guide for Faculty*. San Francisco, CA, USA: Jossey-Bass, 2014.

[11] A. Cook-Sather, M. Bahti, and A. Ntem, *Pedagogical Partnerships: A How-To Guide for Faculty, Students, and Academic Developers in Higher Education*. Elon, NC, USA: Elon University Center for Engaged Learning, 2019.

[12] A. Cook-Sather, *Co-Creating Equitable Teaching and Learning: Structuring Student Voice into Higher Education*. Cambridge, MA, USA: Harvard Education Press, 2022.

[13] S. Abbot, A. Cook‐Sather, and C. Hein, "Mapping classroom interactions: A spatial approach to analyzing patterns of student participation," *To Improve the Academy*, vol. 33, no. 2, pp. 131–152, 2014.

[14] M. K. Smith, F. H. Jones, S. L. Gilbert, and C. E. Wieman, "The Classroom Observation Protocol for Undergraduate STEM (COPUS): A new instrument to characterize university STEM classroom practices," *CBE—Life Sci. Educ.*, vol. 12, no. 4, pp. 618–627, 2013.

[15] T. M. Addy, H. Younas, P. Cetin, F. Cham, M. Rizk, C. Nwankpa, and M. Borzone, "The development of the protocol for advancing inclusive teaching efforts (PAITE)," *J. Educ. Res. Pract.*, vol. 12, p. 5, 2022.

**Appendix**

Examples of the Impact and Outcomes of the Student Pedagogy Advocates Program on Faculty and Students

| **Stakeholder** | **Benefit/Outcome** | **Quote/Example** |
|---|---|---|
| Faculty | Improved teaching methods based on feedback from SPAs | "Zoe challenged me to tweak things and not get stagnant, which was really helpful." -Dr. Luna Rivers |
| Faculty | Enhanced understanding of student perspectives and classroom dynamics | "Having Zoe as a liaison provided insights from students that they might not feel comfortable sharing directly." - Dr. Luna Rivers |
| Faculty | Better group dynamics and accountability in collaborative projects | "It helped me scaffolding group accountability processes at the start of group projects."- Dr. Daniel Clarke |
| Faculty | Enhanced teaching methods by increasing mobility to engage students | "He helped me move around the classroom more." - Dr. Abigail Sullivan |
| Faculty | Enhanced engagement and energy at the beginning of classes | "Based on the SPA's feedback I introduced more active components into lectures, especially at the start of classes." - Dr. Daniel Clarke |
| Faculty | Encouraged continuous improvement and responsiveness to student needs | "Consistently gauging levels of engagement and identifying points where it drops off." - Dr. Daniel Clarke |
| Student partner (SPA) | Increased self-confidence and problem-solving skills | "I never saw myself as a problem solver, but reflecting on my observations and figuring things out helped me take initiative and solve problems." - SPA 1 |

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| Student partner (SPA) | Gained self-awareness and understanding of personal passions | “I learned a lot about my passions and gained self-confidence in talking to people” - SPA 2 |
| Student partner (SPA) | Built strong relationships and supported faculty development | “We built a really strong bond... I was able to be there as sort of a guide and a support for them (the instructor).” - SPA 3 |