

Evidence of Equity Practices in Teaching-focused Professional Development

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Entry-level college mathematics classes are often taught by graduate students (about 35%) and most graduate students (more than 90%) will teach at some point (Blair et al., 2018). Research indicates that college mathematics instructors in effective undergraduate programs, particularly novice instructors such as graduate students, benefit from well-structured teaching-focused professional development (TPD) (Connolly et al., 2016; Friedlaender et al., 2014; Gehrtz et al., 2022). Those responsible for offering TPD, including those who lead workshops, courses, and seminars as well as those who facilitate TPD as course coordinators, have come to be known as *Providers* of TPD (Bookman & Murphy, 2019; Braley et al., 2023). Providers have a critical role, yet little is known about what they provide in TPD for novice instructors (Yee et al., 2023, 2024). At the same time, institutions vary in structure and resources in ways that are consequential for TPD. This leads to the questions: What are local Provider practices in the TPD they design and implement? In particular, what is the evidence that TPD is offering opportunities to learn equitable and effective practices?

This poster reports on a national effort to identify equitable practices promoted by and used in novice instructor TPD. Poster attendees will participate in refining the research design for a new extension to the project.

The two driving research questions for the new work:

1. TPD Content: What opportunities to learn about effective use of equity practices for teaching undergraduates are novice college mathematics instructors offered in TPD?
2. TPD Processes: In what ways do current Providers of TPD attend to equity practices themselves in the design and delivery of activities, formats, and topics in TPD?

Project research is driven by social cognitive theory (Bandura, 1997) and aligned with the five perspectives on instructional practices in the Mathematical Association of America's *Instructional Practices Guide* (IPG, 2018): *classroom, design, assessment, equity, and technology*. As published, the topic of equity practices was an appendix in the IPG. Subsequent research and development have refined and specified equity practices in detail for college teaching and learning in sciences, technology, engineering, and mathematics (National Academies, forthcoming).

The focus of the poster is designing research for gathering evidence of equity practices for research question 1 on TPD Content. The first step in the extension project is the development of a short (15-minute) survey for Providers. The research goal is collecting evidence about the current opportunities novice instructors have in local TPD programs to develop knowledge, skills, and productive dispositions related to equity practices (e.g., student-centered and instructor-decentered types and uses of formative assessment, identifying and leveraging “productive struggle,” uses of roles in group activities). Given the time-constraint on the survey, it is especially important that items are written to gather information about Provider actions and actual in-use TPD formats, activities, and topics (rather than Provider or program intentions). Attendees will give feedback on potential survey items in support of design that will increase the feasibility of the survey to elicit information to address the two research questions.

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References

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.
- Blair, R. C., Kirkman, E., & Maxwell, J. (2018). *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States: Fall 2015 CBMS Survey*. Conference Board for the Mathematical Science
- Bookman, J. & Murphy, T. J. (2019). *MAA Invited Paper Session: Using research about teaching and learning to inform the preparation of graduate students to teach*. Joint Mathematics Meetings (Baltimore, MD).
- Braley, E., Bookman, J., Gehrtz, J. & Speer, N. (2023). A survey of programs preparing graduate students to teach undergraduate mathematics [paper]. In S. Cook, B. Katz, and D. Moore-Russo (Eds.), *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education*, Omaha, NE.
- Connolly, M. R., Savoy, J. N., Lee, Y. G., & Hill, L. B. (2016). *Building a better future STEM faculty: How teaching development programs can improve undergraduate education*. Wisconsin Center for Education Research, University of Wisconsin-Madison.
https://links.imagerelay.com/cdn/2210/ql/bb8ba5ac40984f4fa1121cbe01223940/Building_a_Better_Future_STEM_Faculty.pdf
- Friedlaender, D., Burns, D., Lewis-Charp, H., Cook-Harvey, C. M., & Darling-Hammond, L. (2014) *Student-Centered Schools: Closing the Opportunity Gap* (tech. report). Stanford Center for Opportunity Policy in Education.
- Gehrtz, J., Vroom, K., LaTona-Tequida, T., Martinez, A., and Rasmussen, C. (2022). Professional development and course coordination: One-time and ongoing supports. In E. Johnson, N. Apkarian, K. Vroom, A. Martinez, C. Rasmussen, & D. Bressoud (Eds.), *Addressing challenges to the precalculus II sequence through case studies* (pp. 45–54). MAA Press.
- Mathematical Association of America (2018). *Instructional practices guide*. Mathematical Association of America.
- National Academies (forthcoming). *Equitable and effective teaching in undergraduate STEM education: A framework for institutions, educators and disciplines*. Pre-print available <https://www.nationalacademies.org/our-work/equitable-and-effective-teaching-in-undergraduate-stem-education-a-framework-for-institutions-educators-and-disciplines>
- Yee, S. P., Hauk, S., LopezGonzalez, T., & Wang, J. (2023). College mathematics instructor professional development providers: Who are they? *School Science and Mathematics*, 123, 39-41. <https://doi.org/10.1111/ssm.12571>
- Yee, S., Wang, J., Hauk, S., & LopezGonzalez, C. (2024). National picture of Providers of collegiate professional development for teaching mathematics: Formats, topics, and activities [Contributed Report]. *Proceedings of the 26th Conference on Research in Undergraduate Mathematics Education*, Omaha, NE.