



Gatekeeping of Emerging Discipline-Based Education Researchers

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Abstract: Discipline-based education research (DBER) is a field which attracts many faculty who are not previously trained in education research. As part of a grant to improve the Professional development for Emerging Education Researchers (PEER) program, we conducted interviews with 27 emerging discipline-based education researchers to better understand their experiences and needs entering the field. These interviews included mostly emerging DBER faculty who were not traditionally trained in education research. Many of our participants have experienced gatekeeping during their journey into DBER. Using Barzilai-Nahon's Theory of Network Gatekeeping as a theoretical lens, we discuss some of the negative impacts of gatekeeping on emerging DBERers. We also discuss the importance of a welcoming community in reducing the negative impacts of gatekeeping.

Introduction

The traditional route into academic positions, particularly within STEM, is typically well-defined. Academics complete a graduate program and perhaps post-doctoral work, and then move into a faculty position. For many academics, the work they do in graduate school and in a post-doc prepares them for the duties they will perform as faculty. This preparation is predominantly research-focused, but may also include preparation for postsecondary teaching. Much time and effort has then been dedicated to understanding and supporting faculty in developing teaching skills (Caffarella, 1999; Dancy et al., 2019; Henderson et al., 2011). Less time has been spent, however, on understanding faculty's development as researchers.

This traditional pathway is increasingly common in discipline-based education research (DBER): institutions hire faculty whose graduate training is in DBER and whose research expectations are DBER-centered. However, research on tenure-stream DBER faculty shows that many do not follow this pathway into education research. Instead, faculty move into education-focused positions without significant prior background (e.g., science faculty with education specialties (SFES) discussed by Bush et al., 2017). Emerging DBER faculty often feel unprepared for research in education, or find themselves lost and anxious as they try to engage with education research. These struggles are only magnified for emerging DBER faculty whose appointments do not explicitly include DBER or whose appointments are outside of the tenure stream (and therefore are excluded from SFES studies).

We discuss the perceived gatekeeping faced by emerging DBER faculty examined as part of a study we conducting on new and emerging discipline-based education researchers in STEM. As new members of the education research community, these emerging DBERers find themselves daunted by the task of engaging with the education community. Many of them have experiences which negatively impact their engagement, however many of them also discuss experiences which have supported their move into education research. Here we discuss some of those experiences and call upon the education research community to consider how we might reach out to and include these new and emerging DBERers.

Theoretical Framing

This work originates from exploratory research around the needs of emerging DBERers. Attempting to understand the barriers emerging DBERers face when trying to engage with education research, as well as the supports that have helped them along their journey, we have previously offered recommendations to better support emerging SFES (Hass et al, 2021). Here we extend this work by discussing perceived gatekeeping faced by emerging DBERers when trying to engage with discipline-based education research and the community surrounding it (in the sense of a community, or collection of communities, of practice cite Wenger). The people within this community can be thought of as forming a network of researchers.

We use Barzilai-Nahon's Theory of Network Gatekeeping (TNG) (Barzilai-Nahon, 2008) as a theoretical lens to analyze and discuss gatekeeping within DBER. Barzilai-Nahon originally produced their theory of network gatekeeping in the context of information science. The theory is designed as an

interdisciplinary theory of gatekeeping intended to unite the disparate research across disciplines, and provides a well-defined and precise framework for assessing gatekeeping in a wide variety of contexts (Barzilai-Nahon, 2009). Several important features of the TNG were utilized in this study.

The *gate* is a point of entry (physical or conceptual) through which a person or their ideas (the *gated*) must pass to join the DBER network (community) (Barzilai-Nahon, 2008). *Gatekeeping* is the process of controlling passage through the gate. *Gatekeepers* are those who are responsible for deciding who or what can pass through the gate. The TNG also provides four attributes of the gated to explain the ways gatekeepers prioritize allowing entry of the gated (*gatekeeping salience*): power in relation to the gatekeeper, information production ability, relationship with the gatekeeper, and alternatives in the context of gatekeeping. We used these attributes in data analysis to categorize identified themes.

In the context of our work, emerging DBER faculty are the gated, while we the DBER community serve, in various capacities, as both the network emerging DBER faculty wish to join and the gatekeepers of that network. The alternatives available to emerging DBER faculty, and the relationships they may have with the DBER community, can vary strongly based on personal experience; this will become an important part of our discussion later. Finally, while emerging DBER faculty are all capable of engaging in the DBER research process (which is *producing information* in our context), within the context of the TNG producing information does not necessarily mean that information can be shared (controlling information flow, of course, is the role of the gatekeeper).

Methods

This study is being conducted as part of a larger grant to improve the Professional development for Emerging Education Researchers (PEER) program (Franklin et al., 2018). The study focuses on the needs of emerging DBER faculty as they attempt to engage with education research. As part of this study, we interviewed 27 emerging DBERers, including both PEER participants and people who have not participated in PEER. Our interviewees are 23 faculty, but also include 3 graduate students and post-doctoral researchers, as well as one high school teacher working on their Master's degree. These emerging DBERers have a very wide range of experiences and backgrounds, including senior tenured faculty in non-education subdisciplines, new faculty, and people moving into academia from other career paths.

We conducted semi-structured interviews, about one hour in length with each of our participants. Six of our PEER-Chicago workshop participants were interviewed both before and after the workshop. These interviews focused on the participants' experiences becoming involved in DBER, their career experiences, and their research goals and projects (in various stages of maturity) in DBER. We were particularly interested in the challenges participants faced and things that had supported them in overcoming those challenges, as well as their thoughts on their identity and place within or adjacent to DBER.

The first author conducted an initial analysis of the transcripts to find interviews where the interviewees had a clear discussion of their experiences navigating entry into the DBER community and gatekeeping (or lack thereof) that they had experienced. Afterwards we focused on an initial thematic analysis of 12 interviews. The second author examined these themes, and agreement was reached between the two authors through discussion and refinement of themes. In this paper we will present the most prominent themes we have found. We

Results and Discussion

As DBER has become more prominent in several fields within STEM, statements have arisen establishing DBER and defining what it is. According to a 2012 report from the National Research Council, DBER "investigates learning and teaching in a discipline using a range of methods with deep grounding in the discipline's priorities, worldview, knowledge, and practices. It is informed by and complementary to more general research on human learning and cognition" (p.9). Henderson et al. (2017) describe DBER as "[seeking] to develop evidence-based knowledge and practices that improve teaching and learning in the science, technology, engineering, and mathematics (STEM) disciplines" (p.1). The American Physical Society's statement on Physics Education Research (PER) (2019) describes DBER as being "both objective and experimental, it has established publication and dissemination mechanisms, and Ph.D. students trained in this field are recruited to establish new programs".

Here we present three themes, each of which is grounded in the four attributes of the gated as defined in the TNG (Barzilai-Nahon, 2008). The aforementioned statements highlight what does and does not count as discipline-based education research, and serve as the basis for gatekeeping within our field. They also reflect our first theme: participants feel underqualified for DBER. Participants largely frame their underqualification as a lack of technical know-how or a lack of credentials. The statements in the preceding



paragraphs strongly emphasize the technical nature of DBER, and the APS statement (2019) in particular highlights the significance of a Ph.D. Among our participants there are those who voice concern over not having a Ph.D. or post-doctoral research experience in the subject. For instance, Cole (chair of a mathematics department) said: “here’s [the interviewer] working on his PhD to be able to do this kind of research” and continues “I also think that research should be done by professional researchers, right?” These participants are capable of engaging in DBER scholarship (TNG, *information production ability*), however their perceived lack of qualification acts as a barrier to entry into the DBER discourse (TNG, *gatekeeping*). It is also important to note that a lack of credentials (be that a lack of Ph.D., postdoc, publications, job title, etc.) represents a significant lack of power relative to established members of the DBER community (TNG, *power in relation to the gatekeeper*).

Among emerging DBERers we interviewed, those who were primarily educators discussed feeling alienated within DBER. Often educators feel out of place, or excluded by established researchers in DBER (TNG, *relationship with the gatekeeper*). This manifests often through the extensive use of jargon, and the undervaluing of educators’ experiences and observations in a research context. For instance, Alex (assistant professor of mathematics) described conversations with researchers at the Research in Undergraduate Mathematics Education (RUME) conference: “I have a lot of intuition that I feel comfortable talking about, and sometimes the RUME scholars are like, ‘but this is the only thing that’s been studied and because people have thought about this way in the past, this is sort of how the conversation has to go’”. Rebecca (associate professor of mathematics) recalls attending a different DBER conference: “When I talked to people, they said, ‘oh, you sound like someone who’s very interested in education research, but you don’t use any of the correct terms or phrases.’” Her lack of jargon and terms marked her as an outsider, and left her feeling alienated. Although both Alex and Rebecca, who are experienced STEM educators, have many ideas (TNG, *information production ability*), their relationship with researchers in DBER is an outsider-insider relationship, which constrains their ability to share those ideas (TNG, *gatekeeping*).

Sometimes community control of ideas is even more explicit, and emerging researchers may simply be shut out of the conversation entirely (TNG, *power in relation to the gatekeeper*). For instance, Rebecca, when talking about her research at RUME recalls being told by a researcher: “‘oh assessment, that was popular in the ‘70’s. No one’s doing that now.’” For many emerging DBERers, their relationship with the DBER community is one of outsiders and insiders, and so they receive perfunctory feedback on their ideas, or even outright dismissals, making it difficult for them to continue to engage with the community and disseminate their research ideas (TNG, *gatekeeping*).

While we documented existing barriers to entry in the DBER field, many participants also discussed positive encounters within the community. When discussing what supports they need to successfully become involved with DBER, all 27 emerging DBERers agreed that closer relationships with existing community members are key. Developing relationships with established community members gives emerging DBERers channels for constructive feedback on their work, as well as mentorship and peer support (Hass et al., 2021). Samuel (graduate student in Physics Education Research) said: “I’ve been in physics education research for probably about three years and we have a DBER group on campus that I’m in with other people, and I’ve found these to be enjoyable, effective places where I can learn about education research.” It may also grant emerging DBERers allies with more power within the DBER community. Madison (associate professor of physics) talked about a researcher who is part of a well-established and recognized physics education research group “I’ve been working with [Hillary] out of [Pseudonym U]. I worked with her group for like three years on advanced lab” when discussing her DBER community and people who support her in her DBER efforts. Having relationships with people in the DBER community boosts the ability of emerging DBERers to enter the DBER community, both by helping them develop recognized and valued skills, and by boosting their confidence and access to community members.

Conclusion

There is clear evidence of gatekeeping in DBER, both within public statements about the field and within the lived experiences of emerging DBERers documented as part of this study. Gatekeeping can have a serious negative impact on people who are trying to move into the field. Emerging DBERers are capable of producing information relevant to the field, and are interested in participating in DBER discourse. However they lack power within the field to make their ideas heard, and they also lack relationships with established members of the DBER community which could help them rearticulate or imagine their ideas in a way that the community finds acceptable.

In order to minimize the negative impact of gatekeeping within DBER, we encourage community members to make space for emerging DBERers by being mindful and providing constructive feedback. This

invites emerging DBERers to begin participating meaningfully in community discourse, rather than being shut out of it. Opening up collaborations will help emerging DBERers to build relationships with established DBER community members. Finally, valuing the ideas and experiences that emerging DBERers bring to the discussion as educators can reduce the impact of power differentials on emerging DBERers.

References

- American Physical Society. (2019, Nov 8). *Research in Physics Education*. https://www.aps.org/policy/statements/99_2.cfm
- Barzilai-Nahon, K. (2008). Toward a theory of network gatekeeping: A framework for exploring information control. *Journal of the American society for information science and technology*, 59(9), 1493-1512.
- Barzilai-Nahon, K. (2009). Gatekeeping: A critical review. *Annual Review of Information Science and Technology*, 43(1), 1-79.
- Bush, S. D., Stevens, M. T., Tanner, K. D., & Williams, K. S. (2017). Origins of Science Faculty with Education Specialties: Hiring motivations and prior connections explain institutional differences in the SFES phenomenon. *BioScience*, 67(5), 452-463
- Caffarella, R. S. (1999). Professional development for faculty: A conceptual framework of barriers and supports. *Innovative Higher Education*, 23(4), 241-254.
- Dancy, M., Lau, A. C., Rundquist, A., & Henderson, C. (2019). Faculty online learning communities: A model for sustained teaching transformation. *Physical Review Physics Education Research*, 15(2), 1–23. <https://doi.org/10.1103/PhysRevPhysEducRes.15.020147>
- Franklin, S. V., Sayre, E. C., & Kustus, M. (2018). PEER: Professional-development Experiences for Education Researchers, in *Proceedings The Collaborative Network for Engineering and Computing Diversity Conference*, Crystal City.
- Hass, C. A. F., Hancock, E., Wilson, S., El-Adawy, S., & Sayre, E. C. (2021) Community Roles for Supporting Emerging Education Researchers, *2021 Physics Education Research Conference Proceedings [Virtual Conference, August 4-5, 2021]*, edited by M. B. Bennett, B. W. Frank, and R. E. Vieyra, doi:10.1119/perc.2021.pr.Hass.
- Henderson, C., Beach, A., & Finkelstein, N. (2011) Facilitating change in undergraduate STEM instructional practices: An analytic review of the literature. *Journal of Research in Science Teaching*, 48(8), 952-984.
- Henderson, C., Connolly, M., Dolan, E. L., Finkelstein, N., Franklin, S. V., Malcom, S., Rasmussen, C., Redd, K., & St. John, K. (2017). Towards the STEM DBER Alliance: why we need a discipline-based STEM education research community. *International Journal of STEM Education*, 4(14). <https://doi.org/10.1186/s40594-017-0076-1>
- National Research Council (2012). Discipline-based education research: understanding and improving learning in undergraduate science and engineering, S. R. Singer, N. R. Nielsen, & H. A. Schweingruber (Eds.), Washington, DC: The National Academies Press).
- Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.

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