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Analyzing Peer Interaction as Asynchronous Online Professional Development Scales Up to Include More Teachers

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Abstract: This study examines how participant group size affected peer interactions in an asynchronous online professional development as it scaled from a small (8) to a larger (91) participant pool. Analysis of the discussion forums indicated that transactivity was higher in the larger iteration during discussions around classroom implementation. Analysis of participant interviews indicated that access to diverse perspectives on implementation was particularly important to participants, which may have supported collaboration in the larger iteration.

Introduction

With a growing number of teachers accessing professional development (PD) in asynchronous online contexts (e.g., Parsons et al., 2019), online PD designers must be able to provide participants with collaborative learning opportunities that play a critical role in knowledge-building processes and sustained improvement of teaching practices (Desimone & Garet, 2015). One design characteristic that warrants further attention is the size of the participant pool in an asynchronous online learning platform. While smaller group sizes (i.e., fewer than 10 participants) can support effective learner interaction (e.g., Akcaoglu & Lee, 2016), larger participant pools may alleviate concerns around the immediacy of responses and may make it easier for participants to find peers that share relevant classroom experiences (e.g., Frumin et al., 2018). In this study, we examined how the nature of peer interaction in discussion forums differed between two iterations of the same online PD for high school Biology teachers as it scaled from 8 to 91 participants. We ask the following questions: (1) how does peer discourse manifest differently in online discussion forums as asynchronous PD scales up to engage more teachers; and (2) what factors contribute to those differences?

Methods

Both iterations of our online PD were conducted on the edX platform and were designed to take participants approximately 40 hours over the course of 6 weeks. The first iteration (Iteration 1) was offered in July and August 2018 and consisted of eight teachers. The second iteration (Iteration 2) was offered in July and August 2019 and consisted of 91 teachers posting at least once in the discussion forum. Few alterations were made between the two iterations of the PD. More information about the PD and its participants can be found in Yoon et al. (2020).

In both iterations, participants were asked to participate in discussion forums with open-ended prompts that scaffolded discourse. These prompts were categorized as "implementation" (i.e., considering topics in reference to past or future classroom implementation), "content" (i.e., considering topics or ideas reflectively), or "collaboration" (e.g., "read and reply to a few of your peers' posts"). Both iterations contained 55 discussion board prompts. For Iteration 1, the prompts resulted in 694 coded utterances. For Iteration 2, the prompts resulted in 6138 coded utterances. Using a transactivity coding scheme to measure instances of peers operating on and interacting with each other's reasoning, discussion posts following each prompt were qualitatively coded from 1 (lowest levels of transactivity) to 5 (highest levels of transactivity). We conducted equal variances t-tests on each of the three prompt categories to determine if the nature of transactive discourse varied between Iteration 1 and 2. More information about the prompts and the transactivity coding procedure can be found in Yoon et al. (2020).

Interviews were conducted with eight Iteration 1 participants and ten Iteration 2 participants. These interviews used the same semi-structured interview protocol to probe participants about their overall PD experience and their interactions with peers. Interviews were qualitatively analyzed for comments that elucidate the ways that the larger number of participants in Iteration 2 may have impacted participants' overall ease of discussion and social presence, access to diverse and relevant perspectives on classroom implementation, and peer responsiveness relative to Iteration 1. A more comprehensive analysis and discussion of these interviews will be detailed in future publications.

Findings

Transactivity analysis

The average transactivity scores (with standard deviation) for Iterations 1 and 2 can be found in Table 1.

Table 1: Average transactivity score of each iteration by prompt-type (standard deviation in parentheses)

Prompt Type	Iteration 1	Iteration 2
Implementation	2.51 (0.86)	2.75 (1.01)
Content	2.66 (0.96)	2.66 (1.01)
Collaboration	2.91 (1.06)	2.99 (1.07)

The average transactivity scores for implementation prompts were significantly greater in Iteration 2 than in Iteration 1 ($t(2649) = 4.003$, $p < .0001$). However, we found no significant differences in transactivity for prompts categorized as content ($t(2162) = .081$, $p = .936$) or collaboration ($t(2025) = .876$, $p = .381$) between the two iterations. This indicates that there was significantly more transactive discourse between teachers following implementation prompts in Iteration 2 when compared with Iteration 1. No difference in transactivity was found between the iterations following content prompts or collaboration prompts. These findings were corroborated with findings in the interviews that are briefly discussed in the next section.

Analysis of interview transcripts

The majority of teachers interviewed across both iterations of the PD (14 of the 18 interviewees) discussed the importance of accessing contextually-relevant guidance for implementing the PD curriculum in their own unique classrooms. In seeking this guidance, 11 of the 18 interviewees mentioned that they turned to the discussion forum for support and insights on implementation from peers. As one teacher describes, "it was really neat to be able to hear how some of the teachers are implementing things in their classroom… that was, I thought, very impactful."

Despite the value that teachers placed on these discussions, the small size of the Iteration 1 cohort seemed to act as a barrier. According to five of the eight teachers in Iteration 1, the PD's small participant pool and asynchronous nature meant teachers were rarely working in the same forums simultaneously, making ease of discussion and peer responsiveness a challenge. Additionally, according to two participants, the limited number of perspectives in the PD made discussions of implementation difficult. One teacher explained. "the [student] age-level matters, the demographic matters, the learning levels matter. If I could have known [teachers working] in a similar context to me then maybe a relationship could have been built there."

For Iteration 2 teachers, there appeared to be greater success in accessing relevant perspectives on implementation in the discussion forum. In this iteration, seven of the ten interviewees described benefitting from peer discussion to better understand implementation concerns, with three of those seven describing these discussions as exceedingly valuable. As one teacher described, "It was very, very informative for me to see all the different perspectives [in the discussion forum] and how we could take the same lesson and play with the crosscutting concepts." Another teacher described how the sheer diversity of perspectives on implementation in Iteration 2 was valuable. According to her, "even if I was reading somebody who taught a younger grade level for instance, I could foresee some ways that I might scale that up to fit in my high school classes."

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