"IT'S A DIFFERENT MINDSET HERE": FACILITATION CHALLENGES IN A PRACTICE-BASED PROFESSIONAL DEVELOPMENT

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In this paper we examine how facilitators' prior experiences as mathematics teachers frame their work when facilitating a practice-based professional development (PD) for the first time. We focus on the experiences of a novice facilitator of StoryCircles, a professional learning process in which teachers collectively script and visualize a problem-based lesson, arguing about their rationales for different decisions connected to discussions of students' work. We situate the challenges the facilitator encountered by identifying the expectations that were not met while she was facilitating and offer possible connections to the PD design. We close by suggesting a perspective to account for facilitation challenges.

Keywords: Problem-Based Learning; Professional Development; Teacher Educators.

Background and Theoretical Framing

In recent years, research on the facilitation of professional development (PD) programs has received growing attention due to facilitators' key role in the implementation of educational initiatives (Rösken-Winter et al., 2021). Within this emerging field, scholars have discussed the preparation of facilitators (Lesseig et al., 2017), their knowledge and practices (Borko et al., 2014; Karsenty et al., 2021), and facilitators' professionalization processes (Schwarts et al., 2021). When referring to novice facilitators who are also practicing mathematics teachers, the main difficulties described in the literature are related to their limited capacity to lead in-depth discussions with teachers (Borko et al., 2014) and to the complex navigation between their multiple identities as facilitators, teachers, and colleagues (Knapp, 2017). PD facilitators find it difficult to gauge the extent of their involvement in managing participant discussions (Lewis, 2016) and they struggle to enact their ambitious goals when designing and implementing activities (Jackson et al., 2015). Overall, these results support the argument that "being a good teacher does not necessarily imply the ability to help others develop their teaching" (Even, 2005, p. 334). In spite of this work, there is still much to learn regarding the underlying factors that constrain facilitators working in the context of practice-based PD. In particular, it is important to understand in what ways complexities of the activity of facilitation rather than deficits of the facilitators themselves, might account for difficulties observed.

This paper seeks to frame the challenges of facilitation as rooted in facilitators' implicit expectations about learning in practice-based PD settings. For that purpose, we refer to facilitators' challenges in the context of the PD triangle offered by Carroll and Mumme (2007, see Figure 1). This triangle embeds the well-known instructional triangle (Cohen et al., 2003), including its claims about the interconnections between the different components of instruction, into the facilitators' level. The PD triangle includes the three vertices: the facilitator, the teachers (hereafter, referred to as participants or practitioners), and the practice of teaching and learning mathematics in the place of the content (see Figure 1). As in the case of the instructional triangle,

we can hypothesize this PD triangle to be situated in environments, particularly the institutional environments that enable practitioners to participate. This framing allows us to situate facilitators' expectations with respect to the other components of the PD environment. The expectations we are interested in refer to how and what participants are supposed to learn (participants-practice arrow), and the facilitator's role with respect to this learning (how the facilitator relates to practice, or the facilitator-practice arrow, and how the facilitator relates to the participants, or the facilitator-participants arrow). We hypothesize that facilitators' years-long experiences as practicing mathematics teachers who have also participated in PD inform these expectations and influence facilitators' practices in ways that are not always discernible for them and for developers of PD environments.

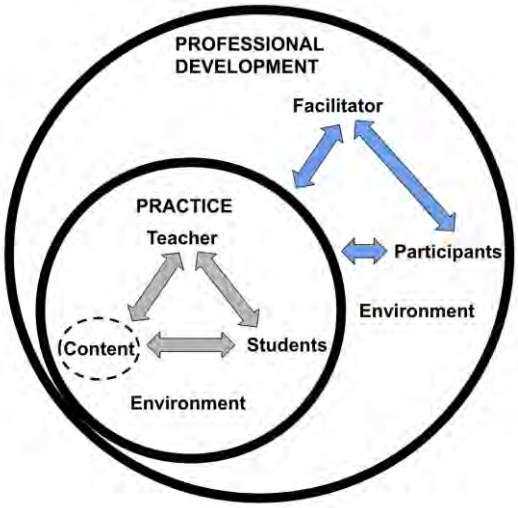

Figure 1. The PD triangle (adapted from Carroll & Mumme, 2007, p. 11)

This paper focuses on facilitation in a practice-based PD, where practitioners "learn in and from practice" (Cohen & Ball, 1999, p.18) by collaboratively inquiring on artifacts of practice, analyzing them and arguing about them. In such settings (i.e., ones that center on practitioners' reflections and where there is no specific content to be taught), the facilitator's role as a moderator of practitioners' discussions is even more complex (Schwarts et al., 2021). In this context we ask, how do facilitators' expectations based on their prior experiences shape their work facilitating a practice-based PD?

Context: The Story*Circles* process

The context of this study is Story*Circles* (Herbst & Milewski, 2018), a process of teacher collaboration that aims to engage practitioners in collective scripting, visualizing of, and arguing about a problem-based lesson. Story*Circles* has evolved over its various iterations, but it has consistently maintained the goal of having practitioners represent their practice through storyboarding a collective lesson (see Brown et al., 2021; Milewski et al., 2018, 2020 for examples). Inspired by Japanese lesson study (see Herbst & Milewski, 2018), the main design concepts of Story*Circles* include opportunities for rapid prototyping of lessons and a user-centered design (Herbst & Milewski, 2020). Thus, the discussions that are at the core of Story*Circles* position practitioners as experts and support them in talking with one another about their rationale for making certain, sometimes competing, decisions in the classroom.

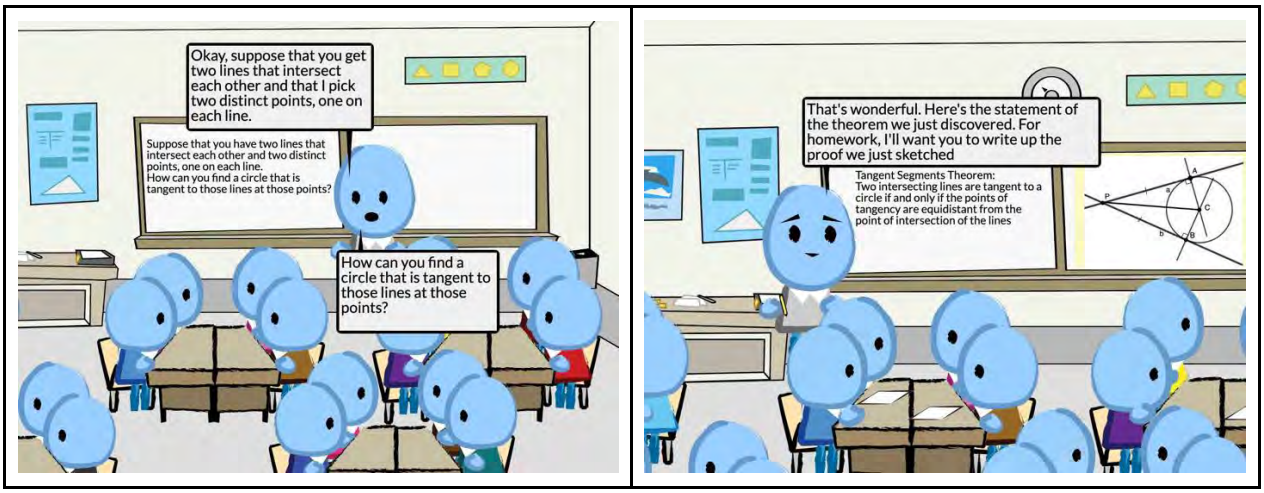

Figure 2. Scenes at the beginning and the end of the Tangent Circle lesson (© 2021, The Regents of the University of Michigan, used with permission)

In the iteration of Story*Circles* considered in this report, that took place between February and April 2021, secondary geometry teachers engaged over six weeks in discussions focused on a problem-based lesson aimed at introducing the tangent segments theorem. This lesson starts with the posing of a problem (see Figure 2, left) and ends with the statement of the instructional goal of the lesson (Figure 2, right). The lesson is illustrated in a storyboard using cartoon characters to represent a teacher and their students. Given the problem and the instructional goal of the lesson and one potential instantiation of the lesson provided to them in advance, participants started this Story*Circle* at the visualization phase, annotating what the provided version of the lesson looked and felt like to them and inserting comments where they thought the teacher might have done something differently. During six weeks they prototyped alternatives to those moments including alternative moves to manage whole class discussions and review students' work. Participants were expected to collectively argue about alternative ways in which the teacher could have handled events in the lesson, scripting the alternative scenes, which would also be storyboarded and visualized. As they scripted potential instantiations of how the lesson might unfold, it was expected they would engage in argument about decisions the teacher would make in the lesson. Connecting it to the role that experimentation plays in Clarke and Hollingsworth's (2002) model of teachers' professional growth, Milewski et al. (2020) have described Story*Circles* as "virtual professional experimentation" (p. 624). During Story*Circles*, practitioners worked on the different segments of the lesson in a combination of synchronous and asynchronous activities. These different forms of interaction permit practitioners to dedicate time to tinker with particular moments in a lesson and consider alternative ways of handling various contingencies that might arise in an instance of the lesson.

The avowed goal of each cycle of Story*Circles* is to produce a representation of a collaboratively developed lesson. Although the particulars of the entire design of Story*Circles* are beyond the scope of this paper, we describe three different design features unique to the present iteration of the Story*Circles* design. First, participants were not expected to attend every synchronous meeting – each participant was scheduled to attend only three or four out of six such meetings, so every synchronous meeting included a subset of participants (and not always the same people in each subset). Second, the meetings were not intended to build on one another; instead, each of them focused on a specific segment of the lesson. Third, by design, the facilitator

is not responsible to use the software to prototype the lesson scenes the participants propose; rather two assistants (undergraduates skilled in the storyboarding software) are present in every synchronous meeting. These storyboarders represented suggestions participants made in real time during discussions. The resulting storyboards served as collective artifacts the participants could use to visualize what the lesson looked and felt like so as to argue about decisions the virtual teacher had made later on and possibly occasioning new scripting or revisions.

Method

This study is part of a five-year research project focused on teachers' learning about discussion-based teaching of Algebra and Geometry lessons. The facilitators for the 2021 iteration of Story*Circles* were practicing secondary school teachers in their content area. For Geometry, the facilitator was Quincy, an experienced teacher who had been a participant in a previous iteration of Story*Circles*, and this was her first time facilitating the work. Fourteen participants took part in this cycle.

Data collection and analysis

To identify how the facilitator's prior experiences in teaching and professional development framed her management of the Story*Circles* process, we searched in our records for evidence that her expectations were not being met. This approach builds on the idea that individuals' tacit expectations can be revealed through their reactions to deviations from customary practices (Herbst et al., 2011). The data corpus for the 6-week cycle includes, among other things, recordings and transcriptions of six synchronous meetings and follow-up debriefs (6*90 minutes). Using thematic analysis (Braun & Clarke, 2006), records were inspected for evidence that the facilitator's expectations were not fulfilled. This evidence included moments during facilitation or in the follow-up debriefs in which the facilitator expressed (using statements or gestures) surprise, confusion, conflict, discomfort, or puzzlement. We also searched for the sources of these expressions as could be inferred from the facilitator's expression (e.g., when she said "It's a different mindset here, having help", we inferred that her expectation to work individually, rather than have storyboarders representing the lesson that participants script, is related to her classroom experience in which she does not have assistants). After the identification of these moments, they were organized according to themes and were mapped to highlight the interrelations between the facilitator's expectations, the experiences that were likely to shape those expectations, and the design principles of Story*Circles*.

Findings

The following are two prominent themes from the analysis that are representative of the facilitator's expectations.

Theme 1: The traditional turn taking that animates the PD triangle

The first theme illustrates the facilitator's difficulty in adjusting herself to work in collaboration with the storyboarders and to manage time. To illustrate this difficulty, we provide some more details on the work of storyboarders during PD discussions. Story*Circles* synchronous meetings usually open with a question that the facilitator poses about a scene in the lesson at hand (for example, "Are there things that the teacher might say in their introduction of that student work?", Turn 242, second meeting). While participants raise alternatives, the storyboarders create images that represent the participants' suggestions and incorporate them into the representation of the lesson (see example in Figure 3). These images are an essential component of the argumentative process in Story*Circles* since they provide a shared

representation on which participants can argue. However, after Quincy's facilitation of the first meeting, she reflected that the use of these new images was in fact overwhelming for her:

> So I guess the part that I felt most awkward about was like transitioning between that, and then like jumping down to the depictions [...]. Partly I was worried like I… did I give them [the storyboarders] enough time to depict before jumping down? so I was stalling on that a little bit (Turns 546-547, first meeting debrief).

This quote reveals the facilitator's difficulties in managing a discussion while simultaneously considering the materials the storyboarders were creating and the time they needed to create them. In addition, she mentions that moving between slides and referring to ad-hoc ideas was "awkward". She expressed similar feelings two weeks later, after the third meeting:

> Not sure how to like really utilize what you guys [talking to the storyboarders] are doing on the depicting, like I can see you're like going crazy, I don't know if I need to like just dive into the depiction earlier (Turn 601, third meeting debrief).

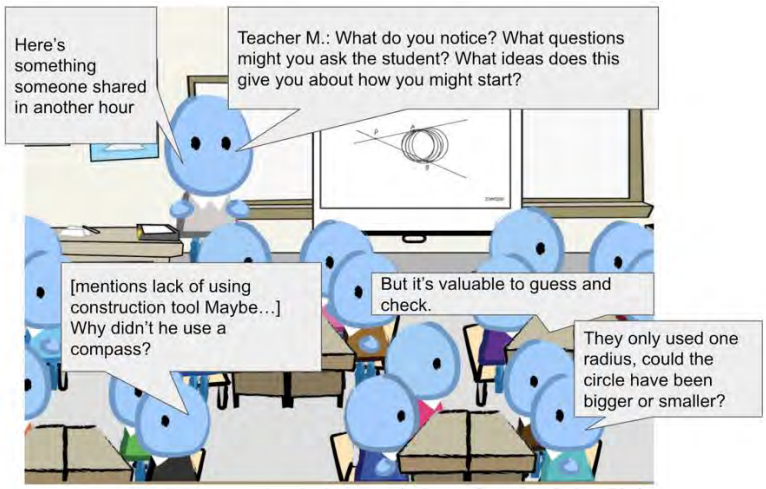

Figure 3. Image created by the storyboarders during the third synchronous meeting (© 2021, The Regents of the University of Michigan, used with permission)

Beyond knowing when to use the images, another source of tension for Quincy was how to use them: In this meeting, the storyboarders represented almost every comment made by participants. Doing so resulted in many new images, illustrating different pathways in the lesson, that Quincy felt obliged to "utilize". All of the above evidence points to Quincy's expectations of having control, both on the timing and on the mediation and interpretation of participants' contributions. This claim is supported by another comment made in the debrief of the third meeting, where Quincy compared facilitation to teaching:

> When I'm teaching off of the Google slides right now, like every day, I'm in control of them or I'm having the students interact with them, so it's very [...] It's a different mindset here, having help (Turn 681, third meeting debrief).

These moments suggest that Quincy's expectation of having full control is informed by her experiences as a mathematics teacher, used to working individually ("It's a different mindset here, having help", Turn 681). That is, "having help" is something she is unaccustomed to, and perhaps, at that moment, she felt that the work of the storyboarders did not help her at all. This

challenge points to a disruption in the traditional turn taking between teachers and students (e.g., McHoul, 1978), or between facilitators and participants. In the latter case, the facilitator is commonly the only one who is responsible for the interpretations of the participants' contributions and their mediations with the PD content. Even if participants raise unexpected ideas, the facilitator knows (even if only tacitly) that it is her job to address them. However, in Story*Circles*, the participants' ideas are also interpreted by the storyboarders. The expectation that her facilitation role is similar to that of a teacher seemed to activate in Quincy the expectation that her job included managing more interactions—namely ensuring that: (1) participants' ideas are explicit enough for the storyboarders to depict, (2) the storyboarders have accurately captured participants' ideas. In addition, as described above, she appeared to take responsibility for pacing the discussion according to the time depicting took, even though storyboarders were not part of the conversation. It follows that even for practitioners who are familiar with managing discussions and allocating turns of talk, facilitating a Story*Circles* discussion is a challenging task as it may involve a decreased sense of control. We posit that such disruption, although challenging for facilitators, is an important feature of the learning environment offered in Story*Circles*: It requires participants to explicate their arguments, specify them, and explain how they relate to previous comments. That is, because the participants are able to see their own and others' contributions represented visually in real time, the participants are in an environment in which they have greater opportunities, and perhaps feel more accountable, to engage with and reflect on one another's comments. This, along with the facilitator's prompting, recruit participants' attention to others' arguments, and sharpens the ways they communicate and argue about their practice. For the facilitator, however, it adds layers of complexity.

Theme 2: The agreed-upon goal of the meetings

The second theme alludes to the ways the facilitator envisioned the goals of Story*Circles,* which were sometimes in conflict with the program design and the participants' goals. This tension was manifested in Quincy's goal to improve the storyboarded lesson in a certain way, including her expectation to build on previous meetings while doing so. As mentioned above, a main design feature of Story*Circles* is that only subsets of the enrolled participants engage in each synchronous meeting. Accordingly, all but one of the participants who attended the second synchronous meeting had not been present in the previous meeting. Quincy planned to work in this meeting on part of the lesson where the students were stuck and the teacher redirected them by discussing with them pre-selected students' work, as had been decided by the group who participated in the first meeting. However, when she asked the participants which pieces among the pre-selected student work they would like to present, they did not answer her question, but instead wanted to work on improving the beginning of the lesson. The facilitator, while surprised by this initiative, followed the participants' lead. Nonetheless, in the end of the meeting, she told the participants:

> I sort of… I mentally… I guess [I] was expecting to pick up the conversation where we left off with a totally different group of people, and maybe that wasn't the most realistic expectation. You guys brought different ideas to tonight, and so we had a little different conversation (Turns 540-541, second meeting).

The facilitator's expectation was to continue visiting the lesson chronologically picking up where it had been left by participants the prior week, however, the participants in this second week might not be ready to deliver to that expectation inasmuch as they had not necessarily reviewed what the prior week's group had done. Quincy followed the participants' ideas,

although her expectation had been that the participants would go along with her goal, and contribute to the group's common attempt to improve the lesson. When reflecting on this meeting, she noted that, "I just didn't expect it with adults, for some reason" (second meeting debrief, Turn 703), "it" refers to the derailing from the original plan. This expectation is also evident in the following reflection, taken from the debrief of the fourth meeting:

> Project leader: So you started saying that you were worried at the beginning, what do you mean? (Turn 553, fourth meeting debrief).
>
> Quincy: Well, when they were like "we don't do proofs".[...] Oh well, that's the premise of this lesson. If we're not gonna play that game I don't know where we're going. But they came around, I think it was nice that Quintin [one of the participants] could help bring everybody in (Turns 554-557, fourth meeting debrief).

This statement indicates that Quincy was disrupted by the participants' divergence from the path she envisioned (i.e., discussing proving), which suggests that she had in mind the expectation that their scripting of the lesson during the meeting should contribute to the direction that had been set in the prior meeting ("If we're not gonna play that game I don't know where we're going"). This highlights a tension present in Story*Circles* and related to the role of the lesson as a motif for the work (representing the lesson is the avowed goal of the activity) but not the outcome of activity (learning with and from colleagues is the outcome of the activity). Along those lines, the lesson serves as a resource that enables participants to learn how to work together and communicate on their practice, under the premise that the lesson itself can evolve in multiple ways, each having its own merits, and participants can ponder on their decisions without being encumbered by the expectation to enact best practices. The facilitator's uneasiness with the takeover by the participants showed that she expected to be able to maintain alignment between the avowed goal and the expected outcome, as a teacher usually does. Interpreting this tension with the PD triangle, the facilitator seemed to take for granted the equivalence between avowed goal (which refers to content) and expected outcome (which refers to having conversations and arguments about practice among colleagues) and found that equivalence disrupted by the participants' desire to construct yet an alternative lesson. We hypothesize that her expectations may stem from her experience as a teacher who is used to having students agree with her on the purposes of lessons.

Discussion

Above we described two implicit expectations a facilitator had when leading Story*Circles* for the first time. These results corroborate previous findings about facilitators' difficulties to lead PD activities (Borko et al., 2014; Jackson et al., 2015; Jacobs et al., 2017). The method used in this study shows that such challenges can stem from the expectations facilitators bring with them from their prior experiences as mathematics teachers in the classroom and as participants in other PD programs. Although some of the disruptions described above (such as the presence of storyboarders) represent idiosyncratic characteristics of Story*Circles*, situating them in the PD triangle (Carroll & Mumme, 2007) allows us to generalize into broader themes. That is, the first theme illustrated a disruption in the communication among participants and facilitator about practice, while the second showed disruptions in the facilitator-practice edge of the triangle. We highlight that both disruptions were features of the original design, aiming at defamiliarizing practice in a way that would encourage practitioners to collaborate (Herbst & Milewski, 2020). StoryCircles is not purposefully designed to disrupt facilitators, yet the observation that

disruptions happened offers insights into how the innovative nature of practice-based PD programs is complicated and cannot be simplified to a train-the-trainer model. The analysis above leads us to suggest that the implicit expectations the facilitator held, which surfaced only when she facilitated Story*Circles* for the first time, point to implicit norms that shape facilitating and participating in PD settings. These norms are related to the instructional norms that are obtained in mathematics classrooms. The analysis suggests that teachers-become-facilitators carry with them the norms of the instructional triangle as they strive to make sense of the activity of running professional development. The facilitator's implicit expectations seem to align to the expectations instruction imposes on classroom teachers and that have been described using the theory of the didactical contract (Brousseau, 1997; Herbst, 2003).

This framing can help situate and explain the challenges of novice facilitators, by revealing the complexity involved in the work of facilitation. In the same way that improvement or change in teaching is bounded by regularities that are difficult to depart from (Herbst, 2003), we showed how facilitators' practices are constrained by implicit expectations that exist even if they are at odds with the explicit design of the intervention. These results can contribute to the current discussions on issues of fidelity, integrity, scaling up, and implementation (e.g., Jacobs et al., 2017; Karsenty, 2021): Rather than assuming that the PD design principles and goals are transparent for facilitators, that all they need is training and good will to implement PD programs with fidelity, this study shows that considerations of implementation require attending to the background expectations teachers-become-facilitators bring with them to the job. The same capacities and experiences that give them street credibility to lead practice-based professional development can hamper their capacity to manage practitioners' learning of practice.

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References

Borko, H., Koellner, K., & Jacobs, J. (2014). Examining novice teacher leaders' facilitation of professional development. *Journal of Mathematical Behavior, 33,* 149–167.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Brown A., Stevens, I., Herbst, P., & Huhn, C. (2021). Confronting teachers with contingencies to support their learning about situation-specific pedagogical decisions in an online context. In Hollebrands, K., Anderson, R., & Oliver, K. (Eds). *Online Learning in Mathematics Education*. (pp. 291-316). Springer Cham.

Brousseau, G. (1997). Foundations and methods of didactique. In G. Brousseau, *Theory of didactical situations in mathematics: Didactique des Mathématiques 1970–1990* (N. Balacheff, M. Cooper, R. Sutherland, & V. Warfield, Eds. and Trans.). Kluwer Academic. (Original work published 1986).

Carroll, C., & Mumme, J. (2007). *Learning to lead mathematics professional development*. Corwin Press.

Cohen, D. K., & Ball, D. L. (1999). *Instruction, capacity, and improvement (CPRE Research Report Series RR-43)*. Consortium for Policy Research in Education, University of Pennsylvania Graduate School of Education.

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, *52*(2), 119–142.

Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education*, *18*(8), 947-967.

Even, R. (2005). Integrating knowledge and practice at MANOR in the development of providers of professional development for teachers. *Journal of Mathematics Teacher Education*, *8*(4), 343–357.

Herbst, P. (2003). Using novel tasks to teach mathematics: Three tensions affecting the work of the teacher. *American Educational Research Journal*, *40*, 197–238.

Herbst, P. & Milewski, A. M. (2018). What StoryCircles can do for mathematics teaching and teacher education. In R. Zazkis, & P. Herbst (Eds.), *Scripting approaches in mathematics education: Mathematical dialogues in research and practice* (pp. 321–364). Springer.

Herbst, P. & Milewski, A. M. (2020). Using StoryCircles to inquire into the social and representational infrastructure of lesson-centered teacher collaboration. In H. Borko, & D. Potari (Eds.), *Teachers of Mathematics Working and Learning in Collaborative Groups: Proceedings of the 25th ICMI Study* (pp. 629–639). University of Lisbon. http://icmistudy25.ie.ulisboa.pt.

Herbst, P., Nachlieli, T., & Chazan, D. (2011). Studying the practical rationality of mathematics teaching: What goes into "installing" a theorem in geometry?. *Cognition and Instruction*, *29*(2), 218–255.

Jackson, K., Cobb, P., Wilson, J., Webster, M., Dunlap, C., & Appelgate, M. (2015). Investigating the development of mathematics leaders' capacity to support teachers' learning on a large scale. *ZDM – Mathematics Education, 47*(1), 93–104.

Jacobs, J., Seago, N. & Koellner, K. (2017). Preparing facilitators to use and adapt mathematics professional development materials productively. *International Journal of STEM Education*, *4*(30). https://doi.org/10.1186/s40594-017-0089-9.

Karsenty, R. (2021). Implementing professional development programs for mathematics teachers at scale: What counts as success? *ZDM – Mathematics Education*, *53*, 1021–1033. https://doi.org/10.1007/s11858-021-01250-5.

Karsenty, R., Pöhler, B., Schwarts, G., Prediger, S., & Arcavi, A. (2021). Processes of decision-making by mathematics PD facilitators: The role of resources, orientations, goals and identities. *Journal of Mathematics Teacher Education*. Advanced online publication.

Knapp, M. C. (2017). An autoethnography of a (reluctant) teacher leader. *The Journal of Mathematical Behavior, 46,* 251–266.

Lesseig, K., Elliott, R., Kazemi, E., Kelley-Petersen, M., Campbell, M., Mumme, J., & Carroll, C. (2017). Leader noticing of facilitation in videocases of mathematics professional development. *Journal of Mathematics Teacher Education*, *20*(6), 591–619.

Lewis, J. M. (2016). Learning to lead, leading to learn: How facilitators learn to lead lesson study. *ZDM – The International Journal on Mathematics Education, 48*(4), 527–540.

McHoul, A. W. (1978). The organization of turns at formal talk in the classroom. *Language in Society*, *7*(2), 183–213.

Milewski, A. M., Herbst, P., Bardelli, E., & Hetrick, C. (2018). The role of virtual spaces for professional growth: Teachers' engagement in virtual professional experimentation. *Journal of Technology and Teacher Education*, *26*(1), 103–126. Retrieved from https://www.learntechlib.org/p/181094/

Milewski, A. M., Herbst, P. G., & Stevens, I. (2020). Managing to collaborate with secondary mathematics teachers at a distance: Using storyboards as a virtual place for practice and consideration of realistic classroom contingencies. In Ferdig, R.E., Baumgartner, E., Hartshorne, R., Kaplan-Rakowski, R. & Mouza, C. (Eds.) *Teaching, technology, and teacher education during the COVID-19 pandemic: Stories from the field*. (pp. 623–630). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/p/216903/

Rösken-Winter, B., Stahnke, R., Prediger, S. & Gasteiger, H. (2021). Towards a research base for implementation strategies addressing mathematics teachers and facilitators. *ZDM – Mathematics Education*, *53*, 1007–1019.

Schwarts, G., Pöhler, B., Elbaum-Cohen, A., Karsenty, R., Arcavi, A., & Prediger, S. (2021). Novice facilitators' changes in practices: From launching to managing discussions about mathematics teaching. *The Journal of Mathematical Behavior*, *64*, 100901.