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Using a tool that assesses teachers' experiences of collaborative professional development to inform and improve facilitation

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Developing the complex practice of facilitation requires participation in a professional community and the use of tools that make key aspects of facilitation concrete. We report on an ongoing empirical analysis of how professional development (PD) facilitators¹ used a tool designed to provide insight into teachers' perceptions of aspects of mathematics PD that prior research has linked to teachers' learning. Findings indicate that the tool, when used in a professional community, can support facilitators to inquire into and make decisions about their facilitation practice, and to assess whether changes in facilitation result in improvement.

Keywords: Facilitators, professional development, tools.

Skillful facilitation of collaborative professional development (PD) focused on ambitious mathematics teaching is complex work (e.g., Prediger et al., 2019; Sztajn et al., 2017). Facilitators must support teachers to engage in authentic inquiry focused on mathematics, students' learning and experiences, mathematics teaching, and relations among these elements (e.g., Jaworski, 1994; Lefstein et al., 2020). Further, they must support teachers to deprivatize their practice for collective inquiry (e.g., Little, 2002), view the PD as relevant to their own instructional contexts (e.g., Putnam & Borko, 2000), and see themselves as valued members of the group (e.g., Grossman et al., 2001).

Given these demands, a critical issue for the field concerns supporting facilitators' ongoing learning and improvement of their facilitation practice (Krainer et al., 2021). Developing complex practice, like facilitation, requires *participatory* as well as *material supports* (Wenger, 1998). Facilitators deepen their practice by co-participating in a professional community with others focused on investigating and experimenting with targeted forms of practice; tools play an important role in making concrete what is valued in the intended forms of practice (van Es et al., 2014).

In this paper, we report on an ongoing empirical analysis of how PD facilitators used a tool our team designed to support facilitators to inquire into and make decisions about their facilitation practice. To our knowledge, few tools currently exist to support facilitators to *assess* and *improve* their ongoing

¹ Our use of the term *facilitator* in this manuscript denotes a mathematics teacher educator who supports the learning of practicing teachers.

practice. We focus on the case of a facilitator in a supportive context to “evoke images of the possible” (Shulman, 1983, p. 495) for using this tool to inform facilitation.

A practical measure of collaborative professional development.

We focus on facilitators’ use of a tool that was designed as a *practical measure* (Takahashi et al., in press). Distinct from research or accountability measures, practical measures are intended to support practitioners in quickly gathering data about processes they want to inquire into and improve. Key characteristics of practical measures include that “what is being measured is meaningful to its users,” administration of the measure and analysis of resulting data is “minimally burdensome,” and “data collection and analysis processes are timely” (p. 9). Users administer practical measures at multiple timepoints as part of inquiry cycles to assess whether deliberate changes to their practice result in desired improvements, and to set goals for their future work.

Our team developed a practical measure of collaborative PD that takes the form of a teacher-facing survey and that assesses teachers’ perceptions of aspects of mathematics PD that prior research has linked to teachers’ learning. The measure takes teachers three to five minutes to complete and can be used across a range of PD contexts. It was designed to make connections between teachers’ experiences and facilitators’ practice visible and available for inquiry with others.

To develop the measure, we first identified key aspects of PD that research indicates make a difference for teachers’ learning opportunities. One aspect concerns the *discussion practices* employed by a group of teachers. This includes the extent to which teachers feel able to share and revise emergent thinking, press one another for reasoning/evidence, and challenge ideas (Lefstein et al., 2020). A second aspect concerns teachers’ *deprivatization of practice*, or the extent to which teachers open their own teaching practice for inquiry and see value in doing so (e.g., Little, 2002). A third aspect concerns *relevance*, or the extent to which teachers experience the PD as responsive to and possible in their own instructional contexts (e.g., Putnam & Borko, 2000). A fourth aspect concerns teachers’ sense of their *membership in the community*, or whether teachers feel valued in the group (e.g., Grossman et al., 2001). See our team’s annotated measure (Practical Measures, Routines, & Representations, 2021) for elaboration on each of the aspects in relation to research on teachers’ learning.

We then generated initial survey items that assess the critical features of each aspect of PD. After generating these items, we engaged in 18 cycles of design, analysis, and revision to ensure that the items assessed what they were designed to measure and that they communicated well and were meaningful to teachers and facilitators. In each cycle, researchers observed a PD session and generated field notes specific to the focus of each item. The then-current measure was administered to teachers at the end of the session. The research team then conducted cognitive interviews with three to five teachers, in which they asked the teacher to explain their response choices and probed the teacher’s interpretations of the items. Further, after each session, researchers shared the resulting data with facilitators to understand their interpretations of the items and whether they perceived the data as helpful for informing their practice. They then conducted a qualitative analysis of the various forms of data, resulting in revisions to the survey, including eliminating, adding, and/or modifying particular items. This process resulted in ten survey items (see Table 1).

Table 1: Overview of the practical measure of collaborative PD

Key aspects	Teacher-facing survey items
Discussion practices	<ol style="list-style-type: none">1. I feel like I can share a <i>mathematical idea</i> I am unsure about with this group of teachers and leaders. <i>○ Yes ○ No</i>2. I feel like I can share an <i>idea about teaching</i> I am unsure about with this group of teachers and leaders. <i>○ Yes ○ No</i>3. I feel like I can ask others to elaborate on an idea with this group of teachers and leaders. <i>○ Yes ○ No</i>4. I feel like I can push back on an idea with this group of teachers and leaders. <i>○ Yes ○ No</i>
Deprivatization of practice	<ol style="list-style-type: none">5. In today's session, I felt like I could share something I'm wondering about my own teaching (examples: a question, a dilemma, a challenge). <i>○ Yes ○ No</i>6. I would be open to sharing the following with this group of teachers and leaders: (Select all that apply.)<ul style="list-style-type: none"><input type="checkbox"/> <i>an anecdote about what my students said or did</i><input type="checkbox"/> <i>an anecdote about something I said or did when teaching</i><input type="checkbox"/> <i>samples of my students' written work (examples: exit tickets; photos of students' work)</i><input type="checkbox"/> <i>a math task or activity</i><input type="checkbox"/> <i>video of my students solving problems</i><input type="checkbox"/> <i>video of my teaching</i><input type="checkbox"/> <i>I would not be open to sharing any of the above.</i>7. I would be open to inviting members of this group of teachers and leaders to join a lesson of mine. <i>○ Yes ○ No</i>
Relevance	<ol style="list-style-type: none">8. Today's session was relevant to my work as a teacher. <i>○ Yes ○ No</i> If yes, what did you find relevant? If no, why not?9. I feel ready to try something I learned today in...<ul style="list-style-type: none"><i>○ All of my math classes ○ Some of my math classes ○ None of my math classes</i>If applicable, what are you planning to try?If applicable, in which classes are you hesitant or not ready to try something, and why?
Membership in community	<ol style="list-style-type: none">10. In today's session, I felt like my ideas were valued. <i>○ Yes ○ No</i>

Methods.

In the 2019-2020 and 2020-2021 school years, facilitators administered the measure in 18 PD sessions across 10 distinct contexts. In this paper, we focus on how one PD facilitator, Reina, used the measure to inform her ongoing work with a middle-grades mathematics department. Specifically, we ask: How does a facilitator use the measure to inquire into and make decisions about their facilitation practice? Reina's use was of special interest because she worked for an extended time with a consistent group of teachers and was engaged in professional inquiry about her practice with other facilitators. Her use provides "images of the possible" (Shulman, 1983, p. 495) for use of the measure in a supportive context to set goals and assess whether deliberate changes resulted in the intended improvements.

Research context.

Reina worked for an organization that provided ongoing, job-embedded mathematics PD to districts and schools around the USA, with a focus on supporting teachers' development of ambitious pedagogical practice and content knowledge (Lampert et al., 2013). The organization's leaders provided ongoing, structured opportunities for facilitators, like Reina, to inquire into and further deepen both their facilitation practice and teachers' learning.

As of 2020-2021, Reina had facilitated teacher PD for three years; two years as an instructional coach in a school district and one year as a facilitator with the PD organization. Prior to this, Reina worked as a secondary mathematics teacher for 28 years. During 2019-2020 and 2020-2021, Reina facilitated PD for a five-person mathematics department at a middle school in the Northwest USA. In 2019-2020, the PD focused on leading whole-group mathematics discussions; in 2020-2021, given COVID-19, the five-session PD sequence focused on how to lead discussions during virtual instruction.

Data sources.

During the 2020-2021 school year, Reina administered the measure at the end of Sessions Two (March) and Five (May). Members of our team attended these sessions, took field notes, and collected artifacts, including teachers' responses to the practical measure.

Interviews with Reina serve as the primary data source for this analysis. After both Sessions Two and Five, members of our team conducted a one-hour semi-structured interview with Reina, in which she interpreted teachers' survey responses. The PD organization's two leaders also participated in the interview. These interviews focused on understanding Reina's interpretation of teachers' responses and modifications she considered making to the facilitation of future sessions. The interview following Session Five involved looking at teachers' responses to the surveys from Session Two and Session Five, side-by-side. In addition, we conducted a follow-up semi-structured interview with Reina two weeks after Session Five that focused on understanding her background, facilitation goals, and perspectives on how, if at all, the measure informed her work.

Data analysis.

Qualitative analysis focused on how Reina interpreted teachers' survey responses and identified goals for her practice. We first generated an initial codebook assessing the range of ways facilitators used the practical measure to inquire into and make decisions about their facilitation practice, based on analysis of Reina's interviews as well as those of another set of facilitators from the broader data set. Our team then used an iterative coding process in which we independently applied codes from the codebook to Reina's interviews, discussed and resolved disagreements in our coding, modified the codebook where necessary, and then returned to the transcripts to update our coding to reflect changes to the codebook. Lastly, we turned to the follow-up interview to further understand Reina's decision-making and to triangulate with what we had identified as the range of uses of the measure.

Results.

Reina used the practical measure to inquire into and make decisions about her facilitation practice in four ways: to (1) provide insight into critical and otherwise hidden aspects of teachers' perspectives

and experiences; (2) prompt reflection on key aspects of the PD; (3) prompt ideas for a change in the preparation for or facilitation of an upcoming session; and (4) consider whether deliberate changes to her facilitation practice resulted in desired improvements. Given space limitations, we focus on two examples selected purposefully to illustrate this range: Reina’s interpretation of teachers’ responses to Survey Item 9 after Session Two, and to the same item after Session Five.

Example 1: Gaining new insight into teachers’ perspectives and experiences, prompting reflection on key aspects of the PD, and prompting change.

In each of the five sessions, Reina facilitated the teachers’ engagement in a mathematics task and their discussion of mathematics ideas. She then facilitated their discussion of instructional strategies for facilitating whole-group discussion in their virtual classrooms, and teachers met in small groups to plan for an upcoming lesson. During Session Two, Reina led a 1.5-hour virtual session focused on supporting students to share rough draft thinking by using “discussion frames,” sentence starters to scaffold students’ sharing in discussion. Reina administered the measure at the end of the session, and all six teachers present (the five department members and a student teacher) completed the survey. The next day, Reina, the PD organization’s two leaders, and members of our research team met for an interview.

Reina’s interpretation of teachers’ responses to Item 9 is illustrative of three uses of the measure. As shown in Figure 1, half of teachers indicated that they only felt ready to try something in some of their math classes following the session. Reina read their responses to the follow-up prompts on the survey (What are you planning to try? In which classes are you hesitant to try something and why?) and said, “that [the use of discussion frames] is not applicable in classes just blows me away, you know?” She emphasized this surprised her given that the teachers eagerly participated in the session. She then reflected on her facilitation, saying:

Those comments ... are concerning to me, because I apparently haven’t pressed that this is good teaching and good teaching happens every day ... it’s not something that we pick and choose. ... I need to focus on that with this group – that this is good for all [students]...

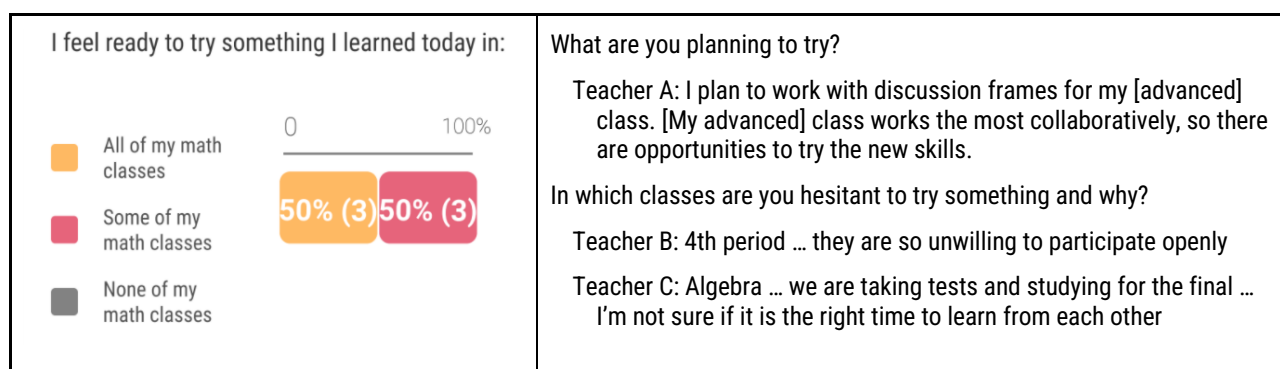


Figure 1: Teachers’ responses to Item 9 in Session Two (n = 6), with select open-ended responses

As evidenced here, Reina used teachers’ responses first to *gain insight into critical and otherwise hidden aspects of teachers’ perspectives and experiences*. She interpreted the selected open responses as indicating that some teachers saw ambitious instructional practices as appropriate only for some classes or under some circumstances. Second, she used the data to *prompt reflection on key aspects*

of the PD, in this case her own facilitation. She focused especially on the extent to which she had supported teachers to connect the PD focus to “good teaching” which “happens every day.”

In addition, we see evidence that she used teachers’ responses to *prompt change in her planning for and facilitation of a subsequent session* (“I need to focus on that with this group – that [good teaching] is good for all [students]”). Reina described the changes she made in the follow-up interview. One key change concerned engaging teachers in discussing key excerpts from *Principles to Actions: Ensuring Mathematical Success for All* (NCTM, 2014). She described discussion prompts she had posed to teachers: “What are we doing when we don’t provide deep rich math conversations and we exclude kids from those? What are we doing to their futures as mathematicians?” Another key change concerned her framing of the mathematical tasks teachers engaged in during the PD sessions as providing access for their students. For example, she described saying the following to the teachers as she introduced a task:

[This task is] set up in ways that allow students to stop and think privately, share their ideas in a small group, and then come together and share the groups’ ideas or individual ideas out loud. It gives [students] more access and more comfort.

Reina modified Sessions Three, Four, and Five to account for what she learned. In what follows, we illustrate Reina’s interpretation of the resulting change in teachers’ responses.

Example 2: Assessing whether changes in facilitation resulted in improvement.

During Session Five, Reina and the mathematics department met again virtually for 1.5 hours. They focused on learning an instructional routine aimed at supporting students’ argumentation. Reina administered the measure at the end of the session, and all five teachers present completed the survey. Two days later, Reina, the PD organization’s leaders, and researchers met for another interview.

In this example, we see Reina use teachers’ responses in a fourth way: *to assess whether deliberate changes in her facilitation practice result in desired improvements*. Consider Reina’s interpretations of the change in teachers’ responses to Item 9 from Session Two to Session Five (Figure 2).

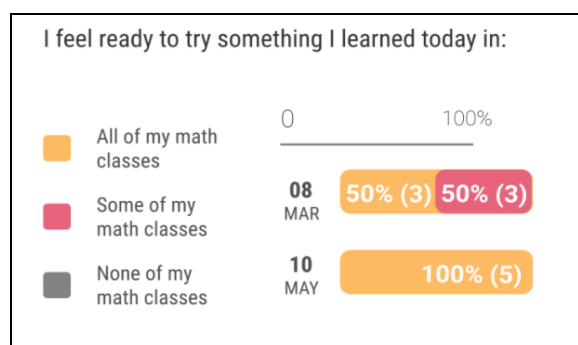


Figure 2: Teachers’ responses to Item 9 in Sessions Two (08 MAR; n = 6) and Five (10 MAY; n = 5)

In seeing that in Session Five all five teachers indicated they were ready to try something in all their math classes, Reina said:

... I’m almost relieved to see that change ... It looks like we’ve reached a little more to [teachers] believ[ing] that they will implement this with all students, in all classes.

Reina used the longitudinal data to assess the changes she had made between Sessions Two and Five: engaging teachers in discussion about their role and responsibility, and carefully framing mathematics tasks as providing access to students. She regarded the shifts in teachers' responses as indicating that the changes she made to her planning and facilitation of the PD resulted in desired improvements, namely, that teachers increasingly viewed ambitious instructional practices as appropriate for all their students.

Discussion and conclusions.

We have provided an image of how a facilitator used a practical measure of collaborative PD designed to provide insight into teachers' perceptions of aspects of mathematics PD that prior research has linked to teachers' learning. Findings indicate that the facilitator used the measure to inquire into her facilitation practice and set goals for her future work. These findings contribute to the burgeoning literature on PD facilitators' learning by highlighting the potential of using a particular tool to inform facilitators' practice, and by association, the improvement of PD.

While these findings suggest the potential value of this tool, it is important to attend to key features of the context in which the facilitator interpreted teachers' responses. An important question for future research concerns the *routine of interacting* with the tool – the “patterned ways of engaging together” (Coburn & Russell, 2008, p. 217) which guide conversations about facilitation practice. For example, it is likely that questions posed in the sense-making interviews (“What do you notice about teachers' responses to this item?” “Why do you think teachers responded the way they did?”), as well as interjections from the PD organization's leaders, impacted the focus and quality of Reina's interpretations of teachers' responses. In future analyses, we plan to analyze the relationship between the role of the PD organization leaders and Reina's use of the data, and the extent to which the range of Reina's uses of the measure is evident in other facilitators' interpretations in other contexts. Understanding a range of uses of the tool will inform the design of supports for facilitators' learning.

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