Building Local Capacity for Facilitating Professional Learning to Support Accessible Math Instruction

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September 26, 2024

Author Note

This paper was developed with funding from grant #U411B180037 from the U.S. Department of Education. The contents of this paper do not necessarily represent the policy or views of the U.S. Department of Education, nor do they imply endorsement by the U.S. Department of Education.

Suggested Citation: Moeller, B., Duncan, T., Schoeneberger, J., Hitchcock, J., & McLeod, M. (2024, September). *Building local capacity for facilitating professional learning to support accessible mathematics instruction*. Paper presented at the annual research conference of the National Council of Teachers of Mathematics, Chicago, IL.

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Abstract

This study examines how a mathematics professional learning (PL) program can contribute to building the capacity of local facilitators to implement PL designed to make high-quality instruction accessible to all students. Thirty-one local facilitators were trained in the use of the Math for All PL program and implemented it over one school year. Findings based on survey and observation data show that with appropriate support, local facilitators were able to implement the program with high fidelity, and program use contributed to their comfort and preparedness for facilitating PL. Facilitators who varied in recent PL experience benefited differently from the PL and support they received. These findings have implications for preparing and supporting local facilitators and for future research.

Introduction

Within school districts, the responsibility for providing professional learning (PL) and support to help teachers deepen their knowledge and skills about teaching mathematics often rests with local facilitators, such as curriculum coordinators, staff developers, coaches, or teacher leaders. Local facilitators often have established, ongoing relationships with teachers and schools and are familiar with school district priorities; this allows them to provide sustained and contextualized support. Yet, local facilitators themselves need PL and resources to keep up with evolving standards and research on teaching and learning. To address this need, a number of PL programs have been developed in the U.S. over the past two decades. These programs are well-specified (some are published) and include resources such as activities and materials for teachers, teacher outcome measures, and descriptions of facilitator roles that enable staff other than the developers to lead implementation (Borko, 2004). Examples of such programs include *Developing Mathematical Ideas* (Shifter et al., 2017), *Learning and Teaching Geometry* (Seago et al., 2017), and *Math for All* (MFA, Moeller et al., 2012). PL program design tends to incorporate research-based practices for teacher PL and K–12 education. As such, they hold promise for contributing to the PL of the facilitators themselves (van Es & Sherin, 2017), and for guiding local facilitators in translating research into practice and scaling up evidence-based practices to teachers and their students. Linking research and practice, especially in the service of improving the equity of mathematics education, has been identified by NCTM as a pressing issue for the field (Aguirre et al., 2017). This paper reports findings from an ongoing study that examines the experiences of local facilitators in implementing an intensive, well-specified mathematics PL program, *MFA*.

Overview of the *MFA* Program

MFA supports teachers of grades K–5 in making high-quality mathematics accessible to all students, including those with disabilities. It is designed to equip teachers with skills in using a neurodevelopmental framework (NDF, e.g., Barringer et al., 2010; Fuller & Fuller, 2021) to (a) analyze mathematical tasks, (b) develop student learning profiles, and (c) adapt mathematics lessons in ways that make them accessible to all students while maintaining the original goals of the lesson. During the 40-hour program, teachers participate in five workshops in which they learn about different parts of the NDF and use them to analyze video case lessons and to adapt and reflect on their own lessons. *MFA* is designed for both general and special education teachers, and an integral part of the PL is the collaboration between the two. *MFA* includes a variety of resources to support facilitators in its implementation, including a facilitator guide, a website that provides access to video case materials, digital versions of handouts, presentation slide decks for each workshop session, and a participant book.

MFA has been extensively piloted and field-tested, but in our prior research the developers of the program facilitated the PL. Here we report on current research, which investigates the role that local facilitators can play in implementing the program. We present initial findings addressing the following research questions: (1) How do local facilitators implement *MFA* and what is the fidelity of implementation? (2) In what ways does *MFA* contribute to facilitators' learning?

Theoretical framework

Research suggests that facilitators play a key role for the success of well-specified PL programs (Borko, 2004; Fennel et al., 2017; Hjalmarson & Baker, 2020; LeFevre, 2004; Remillard & Geist, 2002). There is growing recognition that studying facilitators' use of innovative programs involves understanding facilitators' processes for constructing the enacted PL curriculum and the role that PL resources play in it (Hjalmarson & Baker, 2020; Remillard & Geist, 2002). Implementing an innovative program is not simply a matter of picking it up and using it. Instead, it involves interpretation of new and unfamiliar ideas about teaching and learning. According to the literature (e.g. Jacobs et al., 2017), there are at least two layers of complexity in using an innovative PL program: (a) working with unfamiliar ideas about children's mathematical learning, and (b) new approaches for supporting teacher learning. Facilitators must assume an active role, rather than passively managing the program. They must understand the goals of the program and how to use the resources provided to achieve these goals (Seago, 2007). Further, they must use this knowledge to establish a community of learners and to structure learning experiences for that community (Borko et al., 2011). They also must be able to use the program flexibly to respond to participants' needs and local contexts (Remillard & Geist, 2002). The challenge is to do so with fidelity. Drawing on the implementation research literature (e.g., Gage et al., 2020), we defined fidelity in terms of adherence to the published program, dosage, quality of delivery, and participant responsiveness.

Methods

Sample. The results reported here are based on data collected from the 2021–2023 cohort of local *MFA* facilitators. Thirty-one local facilitators participated for two years. Ninety percent of the facilitators were female (n=28), and 80% (n=25) had at a decade or more of classroom teaching experience. The sample was almost equally split between facilitators who had not led any PL during the past two years (n=15) and those who had led one hour or more PL during the past two years (n=16; number of hours ranged from 1–10 hours to 60-99 hours). To prepare for the implementation of *MFA*, local facilitators participated in a 12-hour online summer institute in which they learned about the program, discussed key content, issues of facilitation, and acceptable ways of adapting the program. The institute was led by the developers of the program, who served as coaches to the local facilitators. A second eight-hour online summer institute was held between the first and second year. Over the course of the two-year implementation period, program developers worked with the local facilitators to plan and debrief teacher workshop sessions. During the first year of implementation, program developers led the PL workshops for teachers, providing local facilitators with the opportunity to experience the PL alongside the teachers. During the second year of implementation, pairs of local facilitators took over the facilitation of the workshops for teachers.

Measures. A 40-item pre-survey designed to understand facilitator characteristics and their views around facilitating PL on teaching mathematics to diverse learners (i.e., comfort, preparedness) was administered prior to implementation. A 28-item post-survey was administered at the end of the second year and included additional questions about facilitators' experience with implementing *MFA*, and what they had learned from the experience of implementing the program (RQ 2). Survey items were a mix of open-ended questions, frequency ratings, Likert-scaled attitudinal questions, and background questions.

Observations of workshop sessions led by teams of local facilitators were conducted multiple times by program developers. The program developers recorded their observations by responding to a structured observation form via SurveyMonkey. Drawing on the literature on fidelity of implementation (Gage et al., 2020) the observation form was designed to collect data about the implementation of key workshop elements, changes that the facilitators made and reasons for those changes, the dynamic between co-facilitators, individual facilitators' use of various moves associated with effective facilitation, and teachers' participation and teachers' engagement in the session. The observation data was used to address RQ2. Based on their responses to these detailed questions, program developers also completed summary ratings for key dimensions of fidelity of implementation (i.e., adherence to PL goals and content, quality of facilitation, and participant responsiveness). The observation form consisted of 61 items and included open-ended questions, Likert-scaled ratings of the quality and fidelity of implementation, checklists of changes made and reasons for those changes, and low-inference assessments of evidence for specific behaviors. The program developers completed observation forms for a total of 29 unique workshop sessions during the second year of the implementation period. The agreement between observers for a subset of the fidelity ratings was 71%.

Analytic Methods. Quantitative data were analyzed using descriptive (means, standard deviations, frequency counts) and inferential statistics (t-tests). Responses to open-ended questions in the surveys and observation forms were coded thematically by a researcher who was blind to the identity and role of the facilitators.

Results

Fidelity of Implementation (FOI). FOI was rated on several different three-point scales (ranging from 1=low to 3=high). For the most part, local facilitators followed the program guide books and slide decks closely. Average ratings for key dimensions of fidelity was consistently high, including adherence (2.6, SD=0.69), maintaining goals of PL (2.5, SD=0.84), quality of facilitating discussions (2.9, SD=0.31), quality of delivery (2.9, SD=0.23), and participant responsiveness (2.7, SD=0.45).

Observed Adaptations. The facilitators did make some changes as they implemented *MFA*, but many of these did not undermine the goals of the PL and interfere with FOI. The most common adaptations were shortening one or more activities (69%) and making changes to the slide decks (52%). Observers were asked to infer the reasons for changes, and the most common reasons for making changes <u>during</u> the workshop were time limitations (28%) and wanting to make connections to the local context (14%). Reasons for making changes <u>in advance</u> of the workshop were most commonly related to time limitations (41%).

Observed Facilitation Behaviors. Observers also rated facilitation behaviors on a three-point scale (Not evident, Somewhat evident, Fully evident). The local facilitators displayed many of the behaviors associated with high quality of facilitation, but there were a few behaviors that were less evident. These included connecting activities to the bigger picture of the PL and/or the district context, making connections among participants ideas, allowing for wait time, and asking follow-up questions to help deepen discussions.

Facilitators' Learning (RQ2)

Learnings about Accessible Math Instruction. In the post-survey, the facilitators were asked to describe two or three things that they learned about making high-quality mathematics instruction accessible to all students. The most frequently reported responses for the sample overall were (a) differentiation can meet the needs of all students (36%), (b) using the NDF (29%), and (c) the importance of understanding the demands of tasks (29%).

We also observed differences between the more and less experienced facilitators. The more experienced facilitators most frequently reported learning about (a) using the NDF (38%), (b) the importance of understanding the demands of mathematical tasks (31%), and (c) the importance of considering both students' strengths and their challenges (25%). The less experienced facilitators most frequently reported learning about (a) that differentiation can meet the needs of all students (67%), and (b) the importance of understanding the demands of mathematical tasks (27%).

Learnings about Facilitating MFA PL. The most frequently reported responses overall were (a) the value of teacher collaboration (26%), (b) understanding of the NDF and how to use it to support colleagues (19%), and (c) the importance of planning and reviewing content before presenting (19%). We again found differences among facilitators, with more experienced facilitators most frequently reporting learning about (a) the value of teacher collaboration (25%), (b) the importance of planning and reviewing content before presenting (19%), and (c) the importance of providing sufficient time for teacher team collaboration (19%). The less experienced facilitators most frequently reported learning about (a) the NDF and how to use it to support their colleagues (27%), and (b) the value of teacher collaboration (27%).

Comfort and Preparedness for Conducting Facilitation Activities. Pre-to-post changes in facilitators' comfort and preparedness with facilitating *MFA PL* were assessed using paired t-tests. Overall, there were statistically significant, positive changes in facilitators' reports of comfort (pre $M=3.56$, $SD=0.87$; post $M=4.18$, $SD=0.71$; $t(30)=3.69$, $p \leq 0.005$) and preparedness (pre $M=2.76$, $SD=0.93$; post $M=4.21$, $SD=0.66$; $t(30)=7.42$, $p \leq 0.005$).

Significance

Our findings suggest that a well-specified PL program like *MFA* can play an important role in building the capacity of local facilitators to implement evidence-based PL to support teachers' efforts to make mathematics instruction accessible to learners with diverse strengths and challenges. With the support of published program materials and implementation support, local facilitators learned new content and practices about differentiating mathematics instruction for students in grades K–5, and about facilitating PL on this topic. We found that local facilitators were successful in providing teachers with intensive PL, and fidelity of implementation was high.

Our research also revealed differences among local facilitators in how they benefitted from the program materials and the PL they received. The differences were associated with experience of facilitating PL and mirror those reported by others (Borko et al., 2014) and in our previous research (Moeller et al., 2022). The learning reported most frequently by the more experienced facilitators was more focused on facilitating PL (the pedagogy of the PL), whereas the learning reported most frequently by the less experienced facilitators was more focus on mathematics instruction for children (the content of the PL). These findings have implications for preparing and supporting local facilitators for the implementation of a well-specified PL program. Local facilitators who have different levels of prior experience with leading PL benefit from program materials and supports in different ways and may need more differentiated kinds of support. Future research is needed to investigate the relationship between program supports, facilitator experience, and program implementation more systematically.

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