Four elementary teachers' journeys into the understanding and application of mathematical proficiency
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Abstract

The National Research Council (NRC) has recommended that the integrated and balanced advancement of the five strands of mathematical proficiency should guide the teaching and learning of school mathematics. The graphic depiction developed by the NRC to represent the interrelated nature of the five strands was the conceptual framework for this research study, and all data collected were examined from this perspective. The five strands (conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition) offer a structure for looking at the understanding, skills, abilities, and principles that comprise mathematical proficiency.

Because research suggests that professional development can improve mathematical proficiency, elementary teachers from a Midwestern school district who had participated in extensive mathematics professional development were selected for this study. Each teacher was interviewed three times, observed teaching mathematics nine times, and each one kept a journal during the four weeks we worked together, which allowed for in-depth data collection and triangulation of results.

The stories that emerged from the data collected provide a picture of how these teachers cultivated mathematical proficiency in themselves and their students. Each teacher was able to use the concept of the five strands of mathematical proficiency to plan, implement, and reflect on the teaching and learning of mathematics. Each teacher found that journaling helped to document what she was learning about herself and mathematical proficiency; it was an important component in improving practice.

Even though each teacher's journey to mathematical proficiency was very personal, there was a common thread that could be used by other teachers to improve their teaching of mathematics. That common thread included the planning of mathematics lessons, implementation of the lessons, and written journal entries about the process, with three interview/discussion sessions at the beginning, middle, and conclusion of the nine-lesson cycle. This study suggests that principals and curriculum developers should encourage the use of this model for professional development. Teachers were able to understand and apply the components of mathematical proficiency in order to improve instruction and student learning.