



Michigan Association of Mathematics Teacher Educators

On the Michigan Standards for the Mathematical Preparation of Elementary Teachers

October 2019

What is the current reality?

For decades we have prepared people to become elementary teachers because they love children and want to help them learn to read. The fact that these individuals also need to teach mathematics, to provide a fundamental foundation for all future learning of mathematics, has never been taken seriously by our nation. That many of these people had negative experiences with mathematics themselves only negatively reinforces the system.

Ideally, to ensure that classroom teachers are well-prepared to teach the content of the school mathematics curriculum, high-quality teacher preparation programs must focus on all domains within the curriculum. For example, The Mathematical Education of Teachers II recommendations state that while not all of the domains need to be addressed to the same extent, “an elementary teacher should study in depth, and from a teacher’s perspective, the vast majority of K–5 mathematics” (Conference Board of the Mathematical Sciences, 2012, p. 23).

Across the nation, elementary teacher preparation programs are constrained by institutional commitments to four-year degrees, thus limiting the amount of time spent on the mathematical preparation of teachers.

We understand that the writers of the new state standards for elementary teachers chose to address this quandary by focusing on a smaller number of topics in greater depth versus a comprehensive set of topics in a more superficial way. Now, as mathematics teacher educators in the state of Michigan, we should continue to innovate and design ways to ensure high-level preparation of elementary teachers with both breadth and depth in mathematics content and pedagogy, as well as a capacity to meet the needs of all learners.

What is the vision?

Integration of Topics in Courses for Pre-Service Teachers

As written, the standards for the preparation of elementary teachers specifically require programs to focus on the high-leverage topics; namely attribution, counting, whole number and operations, fractions, decimals, and operations with rational numbers. Thus, we suggest that instructors of pre-service teachers and designers of courses and programs for pre-service

teachers should consider wrapping these domains around other topics that are not named in the teacher preparation standards. Geometry, measurement, and statistics could be contexts in which to deepen understanding of the high-leverage topics.

Focus on Additional Topics in Professional Development

We need to be cognizant of the focus on high-leverage topics when supporting the continued professional learning of mathematics and learning of their teachers. Content and pedagogical knowledge should be extended focusing on all domains, particularly geometry, measurement, and statistics.

Ongoing Evaluation of New Standards

As teacher preparation programs must be continuously evaluated, the standards must as well. The new standards are innovative in taking a stance on depth versus breadth. This innovation provides an excellent opportunity for mathematics teacher educators to study the effects of this new approach to standards and understand the outcomes for teachers and for elementary students.

Teacher Preparation Programs

Colleges and universities must realize that for elementary teachers to be prepared to teach both language arts and mathematics equally well their programs must be considerably expanded. Furthermore, the authority to determine the curriculum and instruction for teachers of mathematics must be vested in professional mathematics teacher educators.

Resources

Finally, while some of the suggestions above can be accomplished by individual instructors working in their individual course contexts, we suggest that making progress as a state system of preK-12 and higher education requires collective action and resources. Resources – including time, money, and commitment - are needed to support collaborative work and system change and we advocate for leaders of school districts, colleges and universities, and the Michigan Department of Education to identify and share resources to support this work.

References:

Conference Board of the Mathematical Sciences. (2012). *The Mathematical Education of Teachers II*. Providence, RI, and Washington, DC: American Mathematical Society and Mathematical Association of America.

Michigan Standards for the Preparation of Teachers of Lower Elementary (PK-3) and Upper Elementary (3-6) Education (2018).