

Section 1: Why Mentoring Is Important

WHEN we think about mentoring, we usually picture experienced teachers guiding and sharing wisdom with beginning teachers. Experienced teachers are well aware of the demands placed on those in the mathematics teaching profession. In addition to creating lesson plans, motivating students, and grading endless papers, teachers must also manage paperwork and meet deadlines; call parents; and maintain communication with counselors, deans, and case managers. At some point in each teacher's career, he or she masters the juggling act required to deal with all the details inherent in the job. Why, then, might an experienced teacher need mentoring?

The heart of mentoring is the support and encouragement offered by one professional to another. Mentors listen and help us solve our own problems and face the challenges of teaching. Mentors urge us to question our practices and empower us to set and achieve goals that help us become better mathematics teachers. Almost any teacher can benefit from mentoring, yet the form that mentoring takes will likely be different for experienced teachers than it is for beginners.

With the current focus on standards-based curricula and instruction, combined with increased accountability as measured by standardized assessments, teachers are being asked to do more now than ever before. Too often, however, schools and districts neglect to provide veteran teachers with the resources and support necessary to maximize the effectiveness of these standards-based initiatives. Teachers are a school's greatest resource, and given the importance of mathematics education for our students and its prominence in the nation's scrutiny, mathematics teachers are especially valuable. It seems, then, not just prudent but essential to consider the importance of mentoring for experienced teachers as one component in the high-quality mathematics education of our students.

“Those having torches will pass them on to others.”

—Plato

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Mentoring Mathematics Teachers in the Twenty-first Century

With changing demographics in the United States, the need for effective mentoring of teachers, particularly mathematics teachers, has become increasingly important. Recent demographic data indicate that approximately 48.3 million children are enrolled in public schools in the United States in prekindergarten through twelfth grade. Of these students, 43 percent are members of a racial or ethnic minority group, 19 percent speak a language other than English at home, and 14 percent receive special education services (Rooney et al. 2006). Further, the U.S. Census Bureau (2006) reveals that about 18 percent of children under eighteen years old are living in poverty.

In the current era of high-stakes testing and accountability, a mentor must possess the knowledge, skills, and disposition necessary to provide effective mathematics instruction to all students, along with assistance to colleagues. Given the diverse, changing student demographics in the United States, the mentor and mentee's relationship must be grounded in the notion that "[a]ll students, regardless of their personal characteristics, backgrounds, or physical challenges, must have opportunities to study—and support to learn—mathematics" (NCTM 2000, p. 12). Further, an effective mentor is one who is knowledgeable about research in mathematics teaching and learning and best practices in the field.

The standards set forth by the Interstate New Teacher Assessment and Support Consortium (INTASC) provide a solid framework for mentors as they support, through deliberate scholarly planning and decision making, the development of mathematics teachers. Table 1.1 highlights how the INTASC standards are articulated with respect to mathematics teaching and learning.

For developing mathematics teachers, the mentor is a powerful and essential supporter and sponsor. The mentor functions as a bridge between teacher preparation, whether traditional or alternative, and effective membership in the mathematics teaching community. Whether mentoring a first-year teacher or someone with fifteen years of experience, the goal is the same: to provide "more and better mathematics for all students."

— Shonda Lemons-Smith

REFERENCES

- National Council of Teachers of Mathematics (NCTM). Principles and Standards for School Mathematics. Reston, Va.: NCTM, 2000.
- Rooney, Patrick, William Hussar, Michael Planty, Susan Choy, Gillian Hamden-Thompson, Stephan Provasnik, and Mary Ann Fox. The Condition of Education 2006. National Center for Education Statistics Publication 2006071. Washington, D.C.: National Center for Education Statistics, 2006.
- U. S. Census Bureau. Current Population Survey. 2006 Annual Social and Economic Supplement. Washington, D.C.: U.S. Census Bureau, 2006.

Mentoring Teachers in Standards- Based Mathematics Education: A Visual Framework

Most of us who have mentored teachers in mathematics education are aware of an inherent and perplexing challenge: "Teachers, equipped with vivid images to guide their actions, are inclined to teach just as they were taught" (Ball, as cited in Wolodko, Willson, and Johnson [2003, p. 243]). In mentoring preservice and in-service teachers toward Standards-based practices, I have found that much of the work involves helping new teachers develop personal images, metaphors, and references that may be different from those to which they are accustomed.

Although I share my visual framework for Standards-based mathematics learning and pedagogy as a reference (see fig. 1.1), I urge teachers with whom I work to develop their own representations. The images they create seem to capture their personal views of mathematics education while revealing some of their concerns, as well.

Typically, a useful framework includes only enough detail to remind the teacher of major organizing ideas, concepts, and relationships; too much detail may detract from the purpose of the framework. The relationships among the various parts of the framework can be made explicit through placement, arrows, colors, font size and style, and so on. The real value of such an illustration, however, is not what is communicated to others but the ideas, concepts, and relationships the image evokes for the person who constructed it. The framework can be altered or completely reorganized as a result of additional learning or new insights.

Table 1.1
 INTASC (Interstate New Teacher Assessment and Support Consortium) Standards Applied to Mathematics Teaching and Learning

Elements of Practice in INTASC Standards	Application to K–12 Mathematics Teaching and Learning
Standard 1: Knowledge of subject matter	Mathematics teachers should possess strong content knowledge in number and operations, algebra, geometry, measurement, and data analysis and probability.
Standard 2: Knowledge of human development and learning	<ul style="list-style-type: none"> Mathematics teachers should understand developmental factors that affect learning and ensure that mathematics instruction takes into account multiple intelligences.
Standard 3: Adaptation of instruction to individual needs	<p>Mathematics instruction should—</p> <ul style="list-style-type: none"> be differentiated to meet the needs of students at various cognitive levels, including those who are struggling and those identified as gifted or talented; reflect principles of culturally relevant pedagogy or culturally responsive teaching; and take into account students for whom English is a second language and students who have special needs.
Standard 4: Multiple instructional strategies	<ul style="list-style-type: none"> Mathematics instruction should effectively use manipulatives, technology, and other tools for learning, along with a variety of modalities, such as student-centered learning, cooperative learning, and small-group and whole-group activities.
Standard 5: Classroom motivation and management	<ul style="list-style-type: none"> Teachers should foster a mathematics classroom culture in which all student voices are equally valued and encouraged to participate in the learning process.
Standard 6: Communication skills	<ul style="list-style-type: none"> Mathematics instruction should consist of high-level problem posing and questioning, as well as teacher-student and student-student mathematical discourse.
Standard 7: Instructional planning	<p>Mathematics instruction should—</p> <ul style="list-style-type: none"> reflect high expectations and consist of high-level mathematical tasks; build on students’ informal mathematical experiences, prior knowledge, strengths, and interests; and be aligned with local, state, and national mathematics standards.
Standard 8: Assessment of student learning	Mathematics instruction should afford students flexibility and multiple opportunities to demonstrate their mathematical understanding.
Standard 9: Professional commitment and responsibility	Mathematics teachers should strive to be reflective practitioners who critically evaluate their roles in promoting students’ mathematics achievement.
Standard 10: Partnerships	Mathematics teachers should participate in professional learning communities, such as school-based, local, state, or national mathematics organizations.

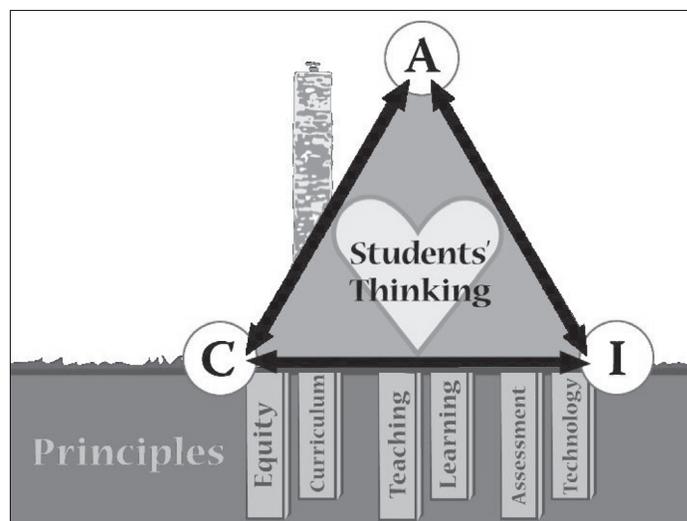


Fig. 1.1. Visual framework: My house of mathematics

For my visual framework, which continues to evolve, I have borrowed heavily from both my preparation and experiences as a teacher in various contexts, including the elementary school classroom situations in which I have served as a supervisor, professional development workshops, and university teacher education courses. The Standards documents of the National Council of Teachers of Mathematics (NCTM 1989, 1991, 1995, 2000), the writing and research of colleagues in the profession, and my experiences in supporting preservice and in-service teacher development have heavily influenced my model. The following paragraphs describe my framework, which I think of as a “house of mathematics.”

The Foundation

Standards-based mathematics classrooms may look different from one another on the surface, but the knowledgeable visitor will see evidence of decision making guided by principles common to such classrooms. As NCTM notes, “The Principles for school mathematics reflect basic perspectives on which educators should base decisions that affect school mathematics. These Principles establish a foundation for school mathematics programs by considering the broad issues of equity, curriculum, teaching, learning, assessment, and technology” (NCTM 2000, p. 2).

The Structure

My house of mathematics is not showy, but it is strong. Notice that it resembles a triangle, considered to be the strongest of all basic shapes, with “corners” labeled with the letters C, I, and A. These letters stand for three major areas of teacher concern: curriculum and mathematics content, instructional pedagogy for teaching mathematics, and assessment. Arrows indicate the interaction of decisions made in each of these fields. I use the triangular model to illustrate the high level of interdependence among content, pedagogy, and assessment in making instructional decisions. I also use it to remind myself that although at times I may focus on mentoring teachers in one area, their success in promoting students’ learning in their classrooms is dependent on a deep and connected knowledge base in all three areas.

The “Heart” of the Home

Over the years, I have become increasingly convinced of the need to place children’s thinking at the center of our practice as teachers of mathematics. Any decision making regarding curriculum, instruction, and assessment should be based on knowledge of the mathematical thinking of our students and made with the goal of further promoting that thinking.

— Eula Ewing Monroe

REFERENCES

- National Council of Teachers of Mathematics (NCTM).
Curriculum and Evaluation Standards for School
Mathematics. Reston, Va.: NCTM, 1989.
- . Professional Standards for Teaching Mathematics.
Reston, Va.: NCTM, 1991.
- . Assessment Standards for School Mathematics. Reston,
Va.: NCTM, 1995.
- . Principles and Standards for School Mathematics.
Reston, Va.: NCTM, 2000.
- Wolodko, Brenda L., Katherine Willson, and Richard E.
Johnson. “Metaphors as a Vehicle for Exploring
Preservice Teachers’ Perceptions of Mathematics.”
Teaching Children Mathematics 10, no. 4 (December
2003): 224–29.

Learning from Mentors as a Beginning and Experienced Teacher

My experience with mentors both as a new teacher and somewhat later in my career shows that the mentoring relationship can be beneficial for teachers at any stage in the profession.

The Beginning

When I was a first-year teacher, Mr. Alexander was assigned as my mentor. Without his support and professional advice, I do not think I would have been as successful as I have been as a mathematics teacher. My college coursework had prepared me in some ways, but I still lacked a great deal of knowledge about being an effective mathematics teacher in a real classroom. Mr. Alexander taught me more in two and a half years as my mentor than I had learned in four years of undergraduate teacher preparation. He showed me the true meaning of hands-on mathematics teaching and learning—using mathematics manipulatives and centers—and how to build a strong mathematics learning community. After having such a powerful mentoring experience with Mr. Alexander, I had no doubt that I could be a successful teacher in any school.

Returning Home

My next destination was an urban, high-poverty elementary school in Georgia. I was certain the adjust-

ment from one classroom to another would be simple, but I soon discovered that I was mistaken. During new teacher orientation, I felt a little insulted when I realized I would have to participate in a district-mandated mentoring program for one year. I thought to myself, “But I’m not a new teacher! I have two and a half years of experience, and I think I know what I’m doing!” The week before school started, however, I learned that my teaching position had been changed from my “comfort zone” of second grade to prekindergarten. When school began, I felt overwhelmed and unsure of my abilities as a teacher at this level. My “rescuer” came in the form of Mrs. Johnson, who noticed my look of uncertainty as soon as she entered my classroom. She first told me not to worry about appearances and instead to focus on possibilities, words of advice that have stayed with me throughout my teaching career. All the resentment I felt about being assigned a mentor quickly vanished. Mrs. Johnson explained the scope and sequence of the prekindergarten mathematics curriculum and provided assistance related to instructional planning and decision making. She and I met regularly, and at each meeting, we established goals and a time frame for meeting those goals. I found this format helpful for planning, and with Mrs. Johnson’s guidance, I thrived as a prekindergarten teacher!

— Shonda Lemons-Smith and Lisa Matthews

