
nc²ml
Research-Practice Brief
#66

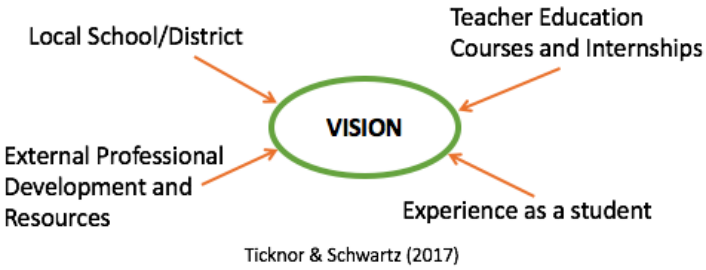
# Developing Vision for High-Quality Math Instruction

## NC Collaborative for Mathematics Learning

If you were asked to visit a mathematics classroom, what would you look for to decide if the instruction was high quality? What kinds of math problems would students be working on? What would teachers be doing? What would students be doing? The images that come to mind when a mathematics educator thinks about these questions represents his or her *instructional vision*. Our instructional vision shapes the way we see and interpret mathematics teaching and learning in classrooms. Researchers have found that teachers' instructional vision relates to instructional quality (Munter & Correnti, 2017), and sharing a common vision with others can lead to improvements in academic achievement, (Chance & Segura, 2009) and support successful implementation of new programs or policies in schools and districts (Gamoran et al., 2003).

### WHAT IS VISION AND HOW IS IT SHAPED?

Vision is not simply a collection of static beliefs, a mission statement, or broad teaching philosophy. Rather, it is a living set of concrete notions about what the classroom should be like that shift with experience, knowledge, and context. Moreover, it is a view of what it means to teach and learn mathematics that becomes more layered and sophisticated over time. A mathematics educators' vision is in part shaped by participating in different social contexts and thus informed by different and sometimes conflicting messages from both inside and outside schools (Ticknor & Schwarz, 2017).




Ticknor & Schwartz (2017)

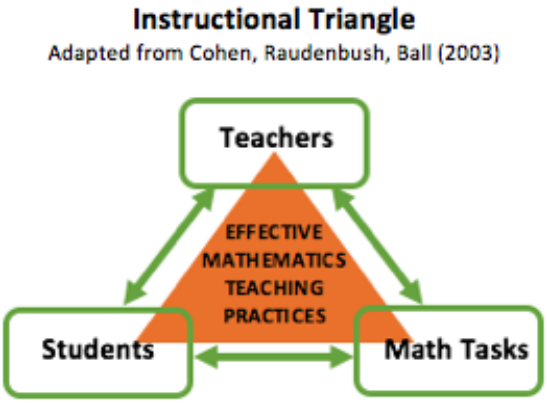
**QUESTIONS TO CONSIDER WITH COLLEAGUES**

How has your vision for mathematics teaching been shaped by:

- *your prior experiences as a mathematics student?*
- *your teacher preparation experiences?*
- *your local schools' and/or districts' vision of mathematics teaching?*
- *your access to professional development and instructional resources?*

### HIGH QUALITY MATHEMATICS INSTRUCTION (HQMI)

Instruction can be thought of as a collection of interactions among students and teachers around content that occur in schools and can be envisioned across three dimensions: the content & tasks students and teachers engage with; the work that teachers do to support learning in the classroom; and the ways in which students engage with one another, the teacher, and the content (Cohen et al., 2003). For mathematics instruction, the mathematics education community has made great strides in identifying and describing research-based instructional practices that, when enacted with attention to these dimensions, can support students' mathematical learning (e.g. NCTM, 2014). High quality mathematics instruction (HQMI) provides all students with access to mathematics through collaborative engagement in challenging mathematics tasks, participation in discussions about students' mathematical thinking, and formalization of these discussions toward conceptually grounded mathematical understanding. For this form of instruction to support student learning, teachers must be proactive and intentional in their interactions with students by problematizing ideas (Munter, 2014), providing students with opportunities to develop mathematical authority (Lampert, 1990), and scaffolding discussions toward formalized mathematics learning goals (Smith & Stein, 2011).




EFFECTIVE MATHEMATICS TEACHING PRACTICES

- Establish mathematics goals to focus learning.
- Implement tasks that promote reasoning and problem solving.
- Use and connect mathematical representations.
- Elicit and use evidence of student thinking.
- Build procedural fluency from conceptual understanding.
- Pose purposeful questions.
- Support productive struggle in learning mathematics.
- Facilitate meaningful mathematical discourse.

(NCTM, 2014)

## VISION OF HIGH QUALITY MATHEMATICS INSTRUCTION (VHQMI)

Research has shown that students' engagement in HQMI relates to positive learning outcomes (Boaler & Staples, 2008; Franke et al., 2009; Stigler & Hiebert, 2004; Tarr et al., 2008) and researchers are exploring the ways mathematics educators' vision of high quality mathematics instruction (VHQMI) relate to mathematics teaching in schools. As part of a longitudinal study of four large districts working to improve mathematics instruction, researchers explored mathematics educators VHQMI along three dimensions: the role of the teacher, the role of mathematics tasks, and the nature of classroom discourse. Results from this study indicated that as teachers' visions for mathematics instruction developed over the course of the study, their instruction was of higher "quality" (e.g. Munter & Correnti, 2017). In another study focused on prospective teachers, researchers found that as novice teachers' vision developed over the course of their program, it was often perturbed after engaging in field experiences in schools where more direct forms of instruction were common (Walkowiak et al., 2015). From a systemic perspective, results from a number of studies have revealed that teacher collaboration, professional development, and strong connections between teachers and other education leaders are rarely effective unless they are tied to a shared vision of high-quality instruction (e.g. Peterson et al., 1996). Taken together, these results from research highlight the importance of working together to co-define what we in North Carolina consider to be high quality mathematics instruction.

## NC MATHEMATIC EDUCATORS VISION OF HIGH QUALITY MATHEMATICS INSTRUCTION

In NC, our mathematics education community continues to progress in both developing a common way to talk about high quality mathematics instruction and working together to promote HQMI in classrooms. As part of this endeavor and in partnership with DPI, the NC2ML conducted a statewide survey to capture NC mathematics education stakeholders' visions of high quality mathematics instruction and received over 1,900 responses from teachers, school-based personnel and administrators, and district-based mathematics curriculum personnel from across NC. During the 2017-2018 school year, the NC2ML will examine and share these findings to inform future work. We continue to invite teachers, PLCs/PLTs, school leaders, and districts to join colleagues across the state in building a shared vision of high quality mathematics instruction.

QUESTIONS TO CONSIDER WITH COLLEAGUES

- *What are possible implications of differing visions of mathematics teaching in NC?*
- *Which of the eight Effective Mathematics Teaching Practices do you feel most confident in doing?*
- *What is one practice that you would like to work on? What are actionable steps you can take?*

## Selected References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### SUGGESTED CITATION

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