

# Meeting common core standards for math

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Megan Staples, associate professor of mathematics education, center, speaks with two teachers from Manchester High School, Cathy Mazzotta, left, and Adrienne Satin, during a workshop at the Neag School of Education. Credit: Shawn Kornegay/UConn photo

For three days this week, math teachers from three Connecticut school districts have worked with UConn faculty members and graduate students to develop skills and resources to enable them to meet new teaching and assessment standards and improve their students' learning in math. The workshop, part of a federally funded project known as

Bridging Practices Among Connecticut Mathematics Educators, is led by four UConn faculty members: Megan Staples, Dorothea Anagnostopoulos, and Tutita Casa of the Neag School of Education and Fabiana Cardetti of the Department of Mathematics. Staples and Anagnostopoulos outlined the goals and rationale of the initiative for UConn Today.

**Q: What are some of the new demands for math in the Common Core and accompanying assessments – in Connecticut, the Smarter Balanced Assessment Consortium test?**

A: Both the Common Core and the Smarter Balanced Assessment are placing more emphasis on students' abilities to construct, communicate, and critique mathematical arguments, as well as setting the bar a little higher for the depth of conceptual understanding students need. An emphasis on argumentation and communicating reasoning supports both goals. It moves beyond students using mathematical procedures, algorithms, or formulas. While students need to develop skills and fluency with procedures, they also need to understand the [mathematical reasoning](#) behind when you would use these procedures and why. A focus on argumentation and reasoning also means greater emphasis on expressing ideas verbally and in written form.

**Q: What is the significance of these new demands?**

A: These new demands represent a fundamental shift for teachers and students and for teacher educators. Although for decades the mathematics and mathematics education communities have called for deep understanding, reasoning, and good problem-solving skills, the Common Core puts these ideas more in the fore by articulating a set of standards of mathematical practice. In addition, the new assessment

system targets these important outcomes – moving beyond just multiple choice testing of smaller bits of knowledge. This emphasis – both in standards and assessment – on understanding, reasoning, and communication is very different from conventional mathematics teaching and learning in U.S. K-12 schools.

Although many teachers already emphasize some Common Core mathematical practices, teaching students to reason abstractly, share their reasoning, and formulate mathematical arguments will require teachers to deepen both their own mathematical knowledge for teaching and their ability to employ instructional practices that support students' communication about their mathematical reasoning and understanding. When teachers engage students' ideas so fully, it opens up a lot of uncertainty for the teacher, as she must manage multiple perspectives, misconceptions, and be able to hear the good mathematics in what students are saying, even if it is not so clearly articulated yet. Teacher educators will also need to deepen their knowledge and instructional skill to make sure that beginning teachers enter schools prepared to help their students meet the Common Core Standards.

## **Q: How does the UConn project address these challenges?**

A: The Bridging Practices Among Connecticut Mathematics Educators project, or Bridging Mathematics Project, creates a professional learning community that includes multi-grade teams of mathematics teachers from the Hartford, Mansfield, and Manchester School Districts and UConn teacher education and mathematics faculty, and master's level pre-service teachers. The teachers and faculty will work together to create curricular and instructional resources and tools that will support students in constructing, communicating, and critiquing arguments in mathematics.

The faculty and teachers have begun work on these tools in the 2014 Summer Workshop. During the workshop, teachers have explored various approaches to engaging students in mathematical argumentation, such as using a routine called the Talk Frame, as they have deepened their understanding of proportional and algebraic reasoning. Teaching routines that help shift classrooms from I-tell-and-you-do toward incorporating more student thinking, reasoning, and sorting through of challenging concepts have an important role to play.

Teachers also have developed their skills in working together with their colleagues to create tools they can use in and across their classrooms to support their students' learning. This work is important because currently teachers do not have enough resources to implement Common Core well. Textbooks are still working to align to new standards, and teachers need materials with consistent attention to reasoning and sense making at all grade levels. One outcome of the project will be a shared repository of tools – tasks, rubrics, instructional tools – that have been developed and vetted by this group. This work will continue into the 2014-2015 school year, culminating in a final 2015 Summer Workshop.

## **Q: What are the benefits of these techniques for how children learn math?**

A: Over the decades, we've learned a lot about how students learn. Students learn by being able to build on their prior knowledge and figure out how new ideas fit in with and extend the old. Teaching in ways that center on student reasoning supports learning across the board. In addition, when students are asked to reason more, they generally are asked to talk more, share their thinking, and consider others' perspectives. In doing so, they develop skills in expressing their ideas, communicating, and recognizing that there are multiple approaches to problem solving and ways of reasoning. They also learn that they can

learn – that they can figure out ideas and collaborate with others to gain new knowledge. Two important goals of education are ensuring that students can learn independently and can contribute positively to our democratic society. Both are supported by pedagogies that focus on [reasoning](#) and sense making.

## **Q: Do you expect these techniques to mollify some of the controversy surrounding the introduction of the Common Core?**

A: Primarily no. A lot of the controversy around Common Core is largely political. The controversies do not always focus on questions of what is best for children, but rather who should decide. So in that sense no. Another piece of the controversy likely comes from general anxiety about change, which is extremely reasonable given that this is a very large change and it does not seem that adequate time and resources are being devoted to supporting teachers to make this shift. In addition, [teachers](#) are under intense pressures with all the changes happening around teacher evaluation.

And this leads to the small sense in which the answer is yes. The more educators understand the goals, have opportunities to develop appropriate pedagogies, have time and resources to make the shift, including time to collaborate with colleagues, the better off, generally, their schools, their colleagues, their parents, and ultimately their [students](#) will be in approaching Common Core.

Provided by University of Connecticut

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