

DEEPER TEACHING FOR DEEPER LEARNING IN TEACHER PREPARATION



Jenny DeMonte, Ph.D. and Claire Donehower
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Vision: *If our students need to experience deeper learning to be ready to succeed in the 21st century, then our teachers must be prepared to offer the kind of deeper teaching that can support that learning.*

Leah Alcala always begins her eighth-grade mathematics classes with a warm-up problem. This is fairly common in mathematics classes. But what makes Ms. Alcala's class different is what she does with the students' answers to the warm-up problem.¹

Rather than simply review how to solve the problem, Ms. Alcala gathers notecards on which students have written their solutions. She then sorts the cards into two piles: those with the correct solution and those with a mistake. She chooses one card from the mistake pile to show to the class. She calls it "My Favorite No."

Ms. Alcala writes on the board the solution on the "My Favorite No" card. She and the students look for what is correct in the solution. Then they identify the error and talk about alternatives that would have led to a correct answer. This simple warm-up becomes an exercise in deeper learning.

Ms. Alcala's teaching signals to students that mathematics is about more than getting a correct answer. She uses the warm-up as a way to share ideas about solving problems and about different ways to solve problems. The students deepen their knowledge of mathematics by sharing their critical thinking and ideas.

Ms. Alcala makes this kind of deeper teaching for deeper learning look easy. But this type of teaching can be challenging to many teachers, particularly beginning teachers. Ms. Alcala faces several unknowns in the warm-up lesson. She does not know what the students will offer as solutions so she cannot plan what she will say. The students might not be able to analyze the mathematics involved in her Favorite No, or be able to describe what happened that led to the incorrect answer. She has to manage those unknowns and keep the lesson focused on problem solving.

Because few teachers experienced deeper learning and teaching when they were students in school, learning how to do this kind of teaching is a new skill for many of them. To meet this challenge, teacher educators may have to upend their typical structures and coursework to find better, innovative ways to help teacher candidates learn to teach deeply.

What Does Deeper Teaching Look Like?

The National Research Council synthesized a lot of research on how humans learn and then used the resulting guiding principles to examine effective teaching.² Author Magdalene Lampert identified three principles of deeper teaching.

Teachers must:

- Understand the knowledge and experiences that students bring to the classroom
- Help students to integrate what they have learned with new ideas and transfer their knowledge to new situations
- Support students' capacity to become aware of and engaged in their own learning and ability to decide whether their answers make sense³

To do this, teachers have to consider how they think about knowledge. Is knowledge a fixed set of ideas that teachers must transmit to students? Or is knowledge built by teachers and students together? David K. Cohen compares possible assumptions about knowledge and the kind of activities in which teachers might engage in factual versus deeper learning (Table 1).⁴ Through deeper teaching, teachers work directly with students to activate their thinking and help them to construct knowledge.

Table 1. Perspectives on knowledge and how they influence teaching, by type of teaching

Type of Teaching	Teacher's Views of Knowledge	Teacher Explores Student Knowledge Indirectly	Teacher Explores Student Knowledge Directly
Factual teaching	Teacher views knowledge as fixed and searches for congruence between student knowledge and fixed knowledge.	The teacher uses multiple-choice tests, homework, handouts in class, and similar devices to probe student knowledge. The teacher requires little interactive skill and little knowledge of exploratory techniques.	The teacher uses simple questions or formal recitations to probe students' knowledge. Teachers need some interactive skill and knowledge and some capacity to frame questions and quickly assess answers.
Deeper teaching	Teacher views knowledge as the outcome of inquiry and searches for indications of minds at work.	The teacher uses essays, journal writing, and the like to explore what students know and how well they can explain it. The teacher needs considerable specialized knowledge of the subject to ask good questions and to respond thoughtfully to answers from students.	The teacher uses discussions, debates, extended colloquies, and other direct discourses to probe what students know. Teachers require considerable knowledge of the material, interactive skills, and ways to combine the two.

The example of Leah Alcalá's classroom reveals an instructional practice that is part of deeper teaching. In her classroom, an incorrect solution may be more valuable than the correct one because it provides an opportunity for meaningful discussion. Students share what they know with the teacher and other students to surface their ideas about mathematics. Ms. Alcalá stresses the importance of understanding incorrect solutions as a way to help her students understand the mathematics that lead to the correct solution.

Her lesson also highlights another key feature of deeper teaching. Ms. Alcalá does not just ask for answers to questions, creating a back-and-forth that is a familiar part of many classrooms. Instead, she prods her students to explain their reasoning and ideas aloud and teaches them how to respond to other students.

How Are Teacher Preparation Programs Helping Teacher Candidates to Teach Deeply?

Teaching is complex and challenging to everyone, most certainly to new teachers. Moving from being a new teacher candidate to a competent classroom teacher is not easy. TeachingWorks, at the University of Michigan School of Education, has identified 19 high-leverage, fundamental skills that all new teachers need before they enter the classroom. These skills are based on research and clinical experience.⁵ Some of the skills, such as eliciting and interpreting student thinking, are the tenets of deeper teaching.

The skills may seem simple, like facilitating a group discussion. But they lead directly to the kind of collaborative, knowledge building that is critical to deeper teaching. Some preparation programs find it challenging to design and oversee a high-quality student teaching experience, which is the part of clinical training when teacher candidates take over a classroom while being supervised by a classroom teacher. But veteran teachers who might serve as mentors often do not have any experience with deeper teaching or have not been trained to deliver it. Thus, teacher preparation programs see real value in training the mentors and supervising teachers who work directly with student teachers. Preparation programs are offering training and support on deeper teaching to experienced teachers before a teacher candidate is placed in their classrooms. Often, mentor training programs, which are typically offered in the summer before the teacher has a candidate assigned, are created and delivered by the preparation program faculty who will also be supervising the teacher candidates.

Many preparation programs are also improving other features of student teaching. For example, the National Center for Teacher Residencies partners with school districts to pair a teacher candidate with a mentor teacher for an entire school year. This yearlong training puts teacher candidates in classrooms at least four days a week.⁶ The strong partnership between the preparation program and the school district allows for training that is tightly focused on what candidates are learning and what feedback they receive. This focus more closely resembles medical training, whereby novice doctors learn in hospitals alongside practicing physicians. In this way, teachers learn how to teach.

Many teachers in the United States are prepared at schools of education in colleges and universities. Some of these preparation programs have also changed the way they organize clinical training. In the past, teacher candidates typically spent three or four semesters in education classes—taking courses at the university and then observing

in a school for a few hours a week. This would be followed by one semester of student teaching, working in a K–12 classroom alongside the mentor teacher. But recently, a number of traditional providers have moved their preparation programs into K–12 schools. Candidates take college coursework at the school. This allows them to move easily between preparation coursework and working in classrooms with students. Other preparation programs have changed the structure of how teacher candidates observe classrooms. Rather than observe one classroom for an entire semester, teacher candidates rotate through several classrooms. This allows them to observe instructional practices used by different teachers.

Spotlights of Teacher Preparation Programs

Teacher preparation programs are designing and implementing innovative ways to ensure that new teachers have the skills they need for deeper teaching.



VOICES FROM THE FIELD

Faculty and teacher candidates dive into deeper teaching

The School of Education at Metropolitan State University of Denver focuses on deeper teaching. The faculty strives to embed constructive thinking and problem solving into coursework and assignments for their teacher candidates. To accomplish this goal, faculty members have created a culture of continuous improvement. “The expertise of faculty plays into their willingness to take risks and take a different approach rather than just disseminating information,” said Dr. Roland Schendel, assistant professor.

- Faculty model the same deeper teaching techniques in their own interactions with teacher candidates.
- Faculty observe each other’s teaching, just as they observe teacher candidates, to grow and improve from feedback.
- Past graduates open their classrooms to teacher candidates to offer a setting for learning to teach deeply, while still being supported by the teacher-of-record.

The goal is to ensure that all teacher candidates learn to teach project-based lessons, grounded in standards, that ask students to solve problems and ask questions. The highly collaborative environment encourages faculty members to problem solve with each other when a teacher candidate is struggling.

The university also works on strengthening relationships with community partners who share their real-world problems and needs. “Our faculty work with principals, teachers, and parents rather than superintendents, to get a sense of what is happening in the classroom,” said Dr. Elizabeth Hinde, dean of the School of Education.



VOICES FROM THE FIELD

Collaborating in Tennessee to create a high-quality clinical program

Project Inspire in Hamilton County, Tennessee, designed its STEM teacher preparation program to reflect the model used to train physicians. The intensive, yearlong residency program places teacher candidates in high-needs classrooms, where they learn to teach alongside expert teachers. Residents enter the program with a bachelor's degree in a STEM field, and work four days per week in classrooms with their mentors. This rich field experience is enhanced by four semesters of rigorous coursework. Residents reflect and connect with each other and faculty during seminars on Fridays.

The mentors realized that many candidates enter the program with traditional ideas of what teaching should look like: lectures and tests. “We have to create opportunities for teachers to learn in a different manner,” said Jill Reese, teacher residency site coordinator. That meant:

- Mentors teach an inquiry-based mathematics lesson to teacher candidates, often on their first day, to show them how to engage in deeper teaching.
- Teacher candidates often work through a student textbook to get a better understanding of what students might be thinking, and what errors students might make.
- Mentors lead the coursework that teacher candidates encounter, and they watch the candidates teach in the classroom.

Throughout the 15-month program, Project Inspire helps its teacher candidates connect theory and practice. From the first day, all of the training is designed to help new teachers engage in deeper teaching, address student misconceptions, and lead meaningful discussions with students.



VOICES FROM THE FIELD

A residency program at a museum

The American Museum of Natural History (AMNH) in New York City runs a program that prepares secondary earth science teachers to problem solve in complex environments, like K–12 classrooms. The teacher candidates already hold a bachelor's degree in earth science. They start the program with a museum residency in the summer. Here, teacher candidates deliver inquiry-based instruction—alongside skilled curators—for small groups of students. During the fall and spring, they take part in coursework and school residencies in high-needs high schools in New York City or Yonkers. The program ends the following summer with a field-based research practicum.

The entire program prepares teacher candidates to offer deeper teaching; that is—

- Becoming skilled at planning and implementing project-based, hands-on activities that will support their work in the school year
- Practicing and delivering inquiry-based instruction that prompts students to ask questions and solve problems
- Connecting earth science to students' daily lives to build their learning on what they already know

Even with this structure in place, AMNH found that it needed to devote resources to prepare mentors. The mentors needed to know how to talk about deeper learning and how to model it. “To teach the teachers to do deeper teaching, we first need to teach them to do deeper learning. We have to model that in their teaching programs,” (J. DeMonte, personal communication, June 10, 2016) said Maritza MacDonald, senior director of Education and Policy.

Supporting Teacher Preparation to Teach Deeper Teaching

To expect deeper learning, higher level thinking, and complex problem solving from students, teachers at all levels must have the deeper teaching skills to facilitate deeper learning. To support new teachers, teacher preparation programs should provide models of deeper teaching for teacher candidates during their coursework and field experiences.

Teacher preparation programs, as demonstrated in the previous examples, are already exploring new and innovative ways to meet this goal. Many programs are providing field experiences in non-traditional environments. They are investing in mentor and faculty training focused on deeper teaching and learning. They are also providing increased continuity between coursework and field experiences.

States, school districts, and teacher preparation programs must build structures for teacher candidates that will help focus teacher training on deeper teaching. These organizations will likely have to do their work in different ways. It could mean having university faculty who observe each other's teaching. Or it might mean helping mentor teachers learn the skills necessary to help teacher candidates learn how to teach deeply. Ultimately, the more teacher candidates directly participate in and observe deeper learning and deeper teaching, the more likely they are to implement these skills in their classrooms.

Endnotes

- ¹ Teaching Channel. (n.d.). My Favorite No: Learning from mistakes, grades 6–8/math/warm-up [Video]. Retrieved from <https://www.teachingchannel.org/videos/class-warm-up-routine>
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- ⁴ Cohen, D. K. (2011). *Teaching and its predicaments*. Cambridge, MA: Harvard University Press.
- ⁵ Teaching Works, University of Michigan. (n.d.). High-leverage practices. Retrieved from <http://www.teachingworks.org/work-of-teaching/high-leverage-practices>
- ⁶ Urban Teacher Residency United. (2015). *Clinically oriented teacher preparation*. Chicago, IL: National Center for Teacher Residencies. Retrieved from <http://nctresidencies.org/research-publications/reports/>

Vision

Strengthen the public and higher education system so that every Texas student is prepared for educational and workforce success.

Mission

Increase postsecondary readiness, access, and success for all students by building partnerships, leading innovation, and scaling practices and policies.



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c/o Communities Foundation of Texas

5500 Caruth Haven Lane

Dallas, TX 75225-8146

Email: EdTX@CFTexas.org

Phone: 214-750-4222

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