

By: Ashley Marlow Published: April 11, 2025

Michael F. Giangreco, distinguished professor, cartoon artist, and fellow Vermonter, published a cartoon in 2002_highlighting the challenges of reactive instructional design. In it, a wheelchair user asks someone shoveling steps to clear the ramp first, but the person responds that they'll do it later after clearing the stairs. The wheelchair user points out that clearing the ramp first would allow everyone to enter. This scenario parallels how some teachers approach lessons, telling students they'll be helped later after they get through the lesson with the rest of the class, sending a message about who belongs and deserves to participate in mathematics.





As a classroom teacher, math specialist, math coach, and facilitator of learning, I've seen firsthand the impact math has on students' lives. At All Learners Network (ALN), we understand that math is a gatekeeper for future opportunities. Our mission is to provide resources and support for teachers to create inclusive learning environments and deepen their content knowledge.

Many teachers feel unprepared to meet the diverse needs of today's students, as their pre-service programs didn't equip them for the current educational landscape. There are four key ideas that I think really impact what high-quality math instruction looks like.

In this blog post, I'll focus on four key ideas that are essential for high-quality math instruction:

- Supporting students' math identities
- Maintaining high expectations for all students
- Rooting math instruction in relevant and engaging contexts
- Providing ramps for learning through proactive instructional design

Supporting Students' Math Identities

Math identity encompasses students' beliefs about themselves as mathematicians and their attitudes toward learning math. We need to actively challenge the harmful cultural norm that some people are "math people" and others are not.

When we think about identity, we need to think about the beliefs our students hold about themselves as mathematicians. As early as preschool, we see students developing unhelpful beliefs about themselves as math learners. And I would argue that a lot of that has to do with the fact that we are in systems that prioritize representational teaching in one way. "This is how you add two-digit numbers. Now go sit at your desks and do several more of the same thing."

This "do it like me" approach sends the message that the teacher's way is the best way to solve a problem. And so, of course, when our students are not able to access that oneway, one-size-fits-all approach, we are sending the message that we don't think that they have the skills to solve a problem.

As educators, it is our ethical responsibility to view our students' experiences, their identities, and their math mindset with a strength-based approach. We get to ask ourselves questions for our students like "What do I know about you as a learner?" and "How do I design for you?" The best part of teaching is getting to use your craft to design instruction for the students in front of you.

High Expectations for All

Holding high expectations for all students is crucial. Every student deserves rich, robust,



and engaging high-quality math instruction. It's our job as educators to believe in our students and to help them believe in themselves. We need to create a learning environment where all students feel supported and capable of achieving success. We can hold high expectations for all of our students, even though they're starting at different places. Through our instruction, we provide the ramps for them to get there. And that ramp looks different for each kid.

Relevant and Engaging Context

Math instruction needs to be rooted in relevant and engaging contexts. We want our kids to show up and see math in the world. We want them to see that the math they're doing in school matches the experiences that they are having in their lives. When students can see the connections between the math they're learning in school and their own lives, they're more likely to be motivated and engaged. We can make math more meaningful by using real-world examples, incorporating students' interests and experiences, and highlighting the ways math is used in different careers and communities.

Proactive Instructional Design

So what do we mean by proactive instructional design? Proactive instructional design involves anticipating the needs of diverse learners and designing instruction accordingly. It's about creating a learning environment that's accessible to all students from the start, rather than reacting to challenges as they arise.

A couple of years ago, I started working with Katie Novak, a Universal Design for Learning expert. She and I got to talking because she's providing professional learning opportunities in an effort to support teachers in the Universal Design for Learning framework. The idea of the UDL framework is centered around the belief that we need to design for the variability of our learners. When we enter a classroom, we need to think about our students and design accordingly rather than react throughout the lesson when it's not going as planned. The two key tenets of the UDL belief system are that we want to help our students to become expert learners, to know who they are, to know what they're interested in, and to know that they have what it takes to get there, but they need to know what they need. We need to know what they need in order to create a learning environment that provides them the opportunity. And that requires us to change the design of the environment.

We will never change the kids who show up in our classroom every day. That is an unrealistic expectation for teachers. It's an unrealistic expectation of students. It's an unrealistic expectation on our systems. Instead, we need to be asking, what is going on



in this environment, in my instruction, in my system that is removing access to this kid, to this learner, and what do I need to do about it? That is what proactive instructional design is all about - finding the ramps that need to be cleared and figuring out how to do it.



Reactive design is like shoveling the steps after the snow has fallen. It sends the message to students that they're an afterthought. Students receive this message when they hear things like, "We ran out of time," "We don't have the resources," or "I didn't think of you." They feel it when they don't see themselves represented in the curriculum or when they aren't provided scaffolds that allow them to get started and show how much they can do.

This is how I taught for a really long time. I'd start teaching, and I'd realize, "darn it, so and so doesn't get it" or "Oh gosh, I need to give them a different worksheet" or "Oh, yikes. So and so is rolling across the floor. I need to address that." All of my teaching was reactive. I was seeing things happening in my classroom and putting out all of these fires along the way because instead of thinking about what my kids would need from the beginning, I just tried to get through the lesson. I think this is how a lot of us feel, not for lack of interest or desire to do something different because "you don't know what you don't know". We weren't prepared in our pre-service teaching programs to know how to do anything other than be a reactive teacher.

And so what we're asking you to do is to be proactive. Proactive design is all about considering the needs of all learners before we even begin planning a lesson. It means recognizing the barriers that exist and designing instruction to address them. It means constantly asking, *"How do I design my instruction so all kids can access math class?"* It means clearing the ramp so everyone can get in from the beginning.

What Now? Scan the QR code and scroll to the bottom of the post for links to next steps

- 1. Explore our All Learners Lesson Structure, a teaching framework so everyone can learn math with conceptual understanding.
- 2. Review the Universal Design for Learning Guidelines 3.0 and check out Universal Design for Learning in Mathematics Instruction in K-5.
- 3. Bring All Learners Network (ALN) into your school or district for embedded professional development.



