

My Math Teaching Philosophy

Samantha A Peterson

Seattle Pacific University

As a secondary mathematics teacher my primary goal is to develop student's mathematical skills and problem solving capabilities in order to prepare them to meet real world math challenges with confidence. I envision a classroom that engages students in active learning and problem solving and excites interest for them about the subject. I desire to create positive learning communities within the classroom that support high standards for all students in both behaviors and academic achievement.

To describe my math philosophy I've chosen to consider how my teaching can address the broad goals outline by the National Council of Teachers in Mathematics (NCTM) in the document *Principles and Standards in School Mathematics*, which supports a vision of improving mathematics education and learning across the country. There are six principles for school mathematics that I will speak to and share how my teaching philosophy connects with each principle.

Equity

“Excellence in mathematics education requires equity—high expectations and strong support for all students” (NCTM).

I believe that all students should have equitable access to learning. In order to create equitable learning opportunities within my classroom I will need to “modify my teaching in ways that will facilitate the academic achievement of students from diverse racial, cultural, gender, and social-class groups. This includes using a variety of teaching styles and approaches that are consistent with the wide range of learning styles” (Banks & Banks, 2010). Using a variety of teaching styles requires careful planning and consideration on my part. First off, I will need to learn each of my student's unique needs so that I can appropriately plan teaching approaches that fit with student need. For instance, ELL students benefit greatly from sustained vocabulary work because it helps these students to participate and engage more deeply in academic thinking and communicating. Thus, I can plan teaching activities that address mathematical vocabulary and provide students with opportunities to practice using this vocabulary both orally

and in writing. At present I use a variety of teaching strategies to support multiple learning styles. However, I do acknowledge that I can become better at addressing individual student need. I have recognized that with 150 different students it is easy to teach to the masses and forget specific student's distinct needs. This is an area that I would like to grow in.

Another area of equity that I care deeply about is helping students from economically disadvantaged backgrounds. Economically disadvantaged students experience even less motivation and confidence due to early failure in school, feeling like a slow learner, and the difficulty in seeing the relevance of schoolwork to their future goals (Meece & Daniels, 2008). My goal is to reinvigorate feelings of success and internal motivation within these students. A chief factor in promoting student confidence and improving intrinsic motivation is to give students regular feedback that is both informative and positive to endorse feelings of competency and efficacy (Meece & Daniels, 2008). Students from economically disadvantaged backgrounds need the confirmation that they are smart and valuable members of the class and society at large. Too often these students receive negative feedback from teachers because they are not meeting the learning targets. It's important that I recognize the need to give low achieving students positive attention and genuine praise. I feel that I am good at supporting students with praise and personal attention. It brings me joy to lift someone's spirits and acknowledge something positive that a student has done.

Lastly, I will realize the equity principle in my teaching by establishing and maintaining high expectations for all students. All students need teachers who believe in their abilities and are willing to help the student realize his/her potential. Students will respond to the expectations that teachers have of them (Meece & Daniels, 2008). Thus, to help all students reach their potential I must show them that they are capable of achieving greatness and entice them to go after their goals. In the future, I wish to become more explicit about having students outline their goals and reflect back on their progress towards meeting them as the school year evolves.

Curriculum

“A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well-articulated across the grades” (NCTM).

Being a great mathematics teacher requires three essential bodies of knowledge, namely, (1) knowledge about math, (2) knowledge about how students learn math, and (3) knowledge about how to teach math (Abbott, Baker, Smith, & Trzyna, 2010). I will strive to learn and grow in each of these three bodies of knowledge. It is necessary that I have a deep and vast understanding about mathematics in order to make meaningful connections between mathematical topics. I want to help my students recognize how math topics build on each other and connect in significant ways. To do so, I must possess deep knowledge about the curriculum, outline big picture learning targets for my students, and always strive to connect these big picture learning targets to the immediate learning focus. I do believe that I have a strong understanding about mathematics. I would like to develop my ability to connect individual topics to the larger picture. Students often view individual units as disconnected puzzle pieces in their mathematical journey. I want to become better at helping them piece this puzzle together so that they may appreciate the complete picture.

Teaching

“Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well” (NCTM).

As I mentioned in the Curriculum principle, it is vital that I establish the big picture learning goals for students so that they understand the objective(s) that they are working towards. Once the main learning targets are established I can then work to structure teaching and learning activities that support students in their learning of mathematics and engage them in deep levels of thinking and problem solving. My intention is to use effective teaching methods that promote active problem solving amongst students and that support the development of both concepts and skills.

I want to be a mathematics teacher who teaches students algorithms in a manner that enables them to grasp the skill, in addition to the conceptual component that the skill embodies. “Conceptual advances are invariably built on the bedrock of technique” (Wu, 1999). I believe that memorization and mastery of basic skills is important, but only by way of teaching students the underlying ideas, or theories that back these skills. I often hear students express feelings of confusion and frustration associated with math. These feelings are usually connected to their lack of understanding about the concepts, and boredom with just memorizing formulas and solving numerous problems. I want to help students develop number sense and the ability to reason by effectively teaching them mathematical principles. I believe that if students increase their conceptual understanding, they will in turn develop better mastery over the skills, and thereby utilize higher order thinking. My hope is that this will alleviate some of the negative feelings connected to the study of mathematics.

With regards to higher order thinking, I desire to support students in thinking critically, reasoning, and justifying by employing teaching strategies that challenge students to produce and explain original thought. These strategies include posing focused and guided questions, making predications based on prior knowledge, and making sense of word problems. “In an atmosphere of constant questioning, students are forced to clarify their thought processes, analyze their errors, and refine their own questions” (Costa & Kallick, 2009). My intention with each of these strategies is to provide students with opportunities to practice thinking, communicating, and reflecting on the reasonableness of their conclusions. Since the start of my teaching I have consciously practiced questioning in a manner that stimulates discussion. I have noticed improvement in my ability as the year progresses and in student response. I would say that becoming an expert questioner and facilitator of discussion is one of my greatest goals as a I continue to refine my teaching practice.

Learning

“Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge” (NCTM).

My primary interest in becoming a mathematics teacher is that I want to help student learn mathematics and find relevance in the topic to their own lives. To help students learn I first need to create an environment that is safe, engaging, and supportive. It has been shown that “students who do not feel efficacious about their ability to succeed often are unwilling to tackle problem situations” (Costa & Kallick, 2009). Therefore, I must strive to create learning opportunities that allow all students to feel successful, yet also challenge students so that I maintain their interest. “Students who lack motivation have been so accustomed to thinking that they can’t be successful, that they have to be given small opportunities so they “may be reawakened” to the fact that they can be successful” (Mendler, 2000). This is a very important factor to consider when designing learning activities because I do not want to squash student confidence. I can help students to feel successful by giving them realizable goals. For instance, I could ask students to write down everything that they remember, or wish to learn about a particular topic. In this way, all students feel comfortable, and able to participate.

Another factor to consider when helping students to learn mathematics is how to build connections between prior math topics and new learning. Making connections between topics facilitates understanding and comprehension and leads to long-term retention. There are numerous techniques that I can employ to aid me with this endeavor. Some of these techniques include using advanced organizers to connect the “big picture” goal with the mathematical procedures, incorporating group work to allow students to share and discuss math ideas, asking questions that probe students to revisit prior information, and providing complex mathematical problems that demand the use of multiple concepts and skills. These are just a few examples of teaching ideas to develop my students’ “toolbox” of mathematical knowledge. I then want to teach my students how to apply their entire “toolbox” of knowledge to a variety of situations and

show them that their skills transfer to multiple scenarios. If students recognize and understand processes used to arrive at an answer, they can then “refine, alter, or repeat” that process for later use (Costa & Kallick, 2009). Being able to adapt knowledge in this manner is a sign of true understanding, which is what I desire to teach my math students.

Assessment

“Assessment should support the learning of important mathematics and furnish useful information to both teachers and students” (NCTM).

I believe that assessments should be used in a manner that communicates the learning progress of students to both the teacher and students. Every assessment should have a purpose, and that purpose should be communicated to the students. I want every student to have a “clear sense of what they are learning, of where they are in the path toward mastery, and of what they have to do to become successful” (Boaler, 2008). In order to assist students in recognizing each of these components I must establish explicit mathematical goals that describe the important mathematical ideas and skills that students are working towards. It is my duty to clearly convey these goals to the students so that they are aware of what is required to reach these goals. I wish to employ Boaler’s idea about making “I” statements for students. “I statements are clear for students to understand and they communicate to them what they should be understanding from a piece of work” (Boaler, 2008). I like “I” statements because they are also easy for me to reflect back on and ask myself, “Is my teaching supporting students in their learning targets?” At present, I don’t think I am doing a strong enough job at communicating the learning targets to students. I would like to grow in this regard and help students to truly consider, and reflect on their individual growth and learning process.

Clearly communicating the learning objectives to students is one aspect of assessment. The other vital component is the assessment itself and how the assessment communicates the students’ learning progress. My goal is to develop assessments that allow all learners to convey what they know. This means that I need to be careful in the creation of problems and ensure

that each problem can be easily understood by all learners. Therefore, I will take care to not set in contexts that may be confusing to some students and I will not use long and complex sentences when unwarranted.

The final piece to assessment is the feedback that I provide to my students. My goal is to give students positive and corrective comments whenever possible. It has been shown that “students who were not given scores but instead given positive corrective feedback were more successful in their future work” (Boaler, 2008). Although there is a place for scores, I will strive to find more opportunities to give students comments or verbal feedback instead of numerical grades in order to maintain feelings of success within students.

Technology

“Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning” (NCTM).

Due to the growing demand for technologically competent workers it is my duty as a teacher to prepare students to meet this demand. I plan on doing so by infusing opportunities for students to use technology in the classroom. Technological tools can be used as resources to help students better understand mathematical concepts, and used as resources to help students perform mathematical procedures more quickly.

Utilizing technology in the classroom is an area in my teaching practice that I recognize I need to develop. Although I appreciate the benefits of technology I am not aware of all the potential resources available to me. As part of my professional development goal I wish to learn about technology resources that I can use in my mathematics classroom and learn how to employ these resources to best help my students.

Reference List:

- Abbott, M., Baker, D., Smith, K., & Trzyna, T. (2010). *Winning the math wars no teacher left behind*. Seattle, WA: University of Washington Press.
- Banks, J. A. & Banks, C.A.M. (2010). *Multicultural Education: Issues and Perspectives (7th ed.)*. Hoboken, NJ: John Wiley & Sons.
- Boaler, J. (2008). *What's math got to do with it? how parents and teachers can help children learn to love their least favorite subject*. New York, NY: Penguin Books.
- Costa, A. L., & Kallick, B. (2009). *Habits of mind across the curriculum practical and creative strategies for teachers*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Meece L., J., & Daniels H., D. (2008). *Child and adolescent development for educators*. New York, NY: The McGraw-Hill Companies, Inc.
- Mendler, A. (2000). *Motivating students who don't care*.
- National Council of Teachers in Mathematics (NCTM). (2012). *Principles for school mathematics*. Retrieved from <http://www.nctm.org/standards/content.aspx?id=26802>
- Wu, H. (1999). *Basic skills versus conceptual understanding: a bogus dichotomy in mathematics education*. *American Educator*, 1-7.