

From Start to Finish

By Kaitlyn Chen

Though my undergraduate program adequately prepared me to be a teacher, I always knew I would pursue a master's degree to further my knowledge of the teaching craft. When I started looking into different master's programs, the Master of Arts in Educational Technology (MAET) at MSU caught my eye because technology integration was something I wanted to improve in my own practice. Upon entering the program, I had two very specific goals: I wanted to learn when to integrate technology into my classroom lessons, and I wanted to gain a plethora of technology resources to use. While I have met my two goals through participating in this program, the MAET has taught me so much more than that. As I finish my master's degree, I find myself better equipped to include creativity, productive questioning, and intentional planning in my math classroom daily.

Creativity

Prior to pursuing my master's degree, I thought creativity had less of a place in math classrooms than it did in other subjects. Sure, creativity belonged in a math classroom; I encouraged my students to be creative by finding different ways to solve math problems, but that was the extent to what I believed about creativity in math.

CEP 811: Adapting Innovative Technologies to Education taught me so much more about creativity. A common theme that was brought up in this course was that the world is changing, and education needs to change correspondingly. Schools were designed to produce citizens that can follow directions and assemble (in a factory setting), not citizens who need to think for themselves. In a world that is shifting to many occupations requiring critical thinking, problem-solving, and innovation skills, it is imperative that students get experience with these skills in the classroom.

Because of this need, CEP 811 largely focused on maker education and how it fits into the classroom. I admit, I was a skeptic at first. Maker education seems to support the science, technology, and engineering parts of STEM well, but has less direct ties to math. At times, I wondered how creating a makerspace in my classroom could possibly help me teach my sixth grade math content standards. At other times, I was thrilled by the benefits of maker education and I saw direct ties between those benefits and what I want my classroom to be: engaging, integrative, and collaborative. While I was struggling with these ideas, the course challenged me to create something with my MakeyMakey, which is a circuit board that connects to various objects. At that point, it dawned on me: the whole process I had just gone through is similar to what my sixth grade math students go through in my class everyday – play around with problems, try to make sense of them, and come up with a solution that works. One of the Standards for Mathematical Practice in the Common Core State Standards is to make sense of problems and persevere in solving them, and it is a standard with which my students need a lot of support. As a result of this learning experience, I created a maker lesson for my own students that gives them a very specific goal and a clear purpose, but leaves the product up to them: my students need to creatively problem-solve to be successful. This is a lesson that I now use at the

beginning of the school year. It introduces the creative problem solving that I expect of my students all year long in an engaging way.

This course also taught me about experience design. I learned that experiences are triggered by our senses, so the classroom design I create has an effect on my students' experiences. This course taught me that natural light, furniture, colors, and the visual environment all impact academic and behavior performance in the classroom. For an assignment, I created my ideal classroom using the application SketchUp.

Because money is a factor in classroom design, I was not able to implement everything pictured in my ideal classroom into my actual classroom, but I was able to make some changes right away. I collected lamps for my classroom so that I no longer have to use the fluorescent ceiling lights, I have a beanbag corner and a high-top table for alternate student seating and a kidney table for small group instruction, I have fake plants, and I also play calming music during independent work time. I have felt a huge change since implementing these elements, and my principal commented on multiple occasions on the noticeable difference in the calmness of my classroom.

Questioning

In CEP 812: Applying Educational Technology to Issues of Practice, I learned the art of questioning. If you picture a toddler in your head right now, they are probably asking tons of questions. Fast-forward to elementary school, and the questions are significantly fewer. In this course, I learned that questioning levels drop rapidly after preschool (Berger, 2014, p. 73). I was astounded that one year of school has that much of an effect on a child's desire to ask questions. Deborah Meier, a former principal in New York, pointed out that many children "were trained not to ask questions in school" (Berger, 2014, p. 73). Reflecting on my own experience as a student and as a teacher, this claim is largely true, and it is a problem when trying to prepare students to be critical thinkers and problem solvers.

In an age where inquiry-based learning is becoming ever more popular, I need my students to inquire, to put it simply. I see the results of my students being taught not to ask questions in their schooling experience, and combined with the peer pressure of middle school, questions are rare at the beginning of the year in my classroom. Now that I know the reasons behind this rarity of questioning, I work all year to undo it. Not only do I work to create a comfortable learning environment to eliminate some of the peer pressure, I also know I need to work to encourage inquiry. There are several techniques that I have incorporated into my instruction since taking CEP 812. I praise questions to show my students that I value curiosity. I point out when a question leads to a productive discussion. I model questioning techniques for my students, and we practice together what a good question might sound like many times throughout the year.

Another big takeaway I had from CEP 812 is how to address wicked problems in education. I worked collaboratively with two of my peers in the course to solve the wicked problem: Allowing failure to be as powerful a learning mode as success. This problem is wicked because there are several perspectives to consider, and there is not just one solution. Realizing that we would have to change a practice in the classroom as well as recondition students and parents not to fear failure, we decided standards-based grading could be part of the solution to

this wicked problem. While we recognized that this would not magically solve the entire problem, standards-based grading would help because it emphasizes learning rather than performance, allows students to redo assignments to improve their understanding, and stresses feedback about student learning.

This issue allowing failure to be as powerful a learning mode as success is of particular importance to me because mistakes are common in the math classroom. I need my students to be okay with this fact and to be able to learn from their mistakes. Upon realizing the benefits of standards-based grading, I decided to incorporate it into my own classroom. My students now talk about grades in terms of levels of understanding, and they realize that they can change their level of understanding. They know that they can fix their mistakes and then retry any math test. I give them feedback about each content standard assessed so that they know their level of understanding on each topic instead of a whole unit. While my students still fear failure, these changes that have happened as a result of standards-based grading are a step in the right direction. It will take time to recondition students and their parents, and I am committed to sticking with standards-based grading.

Intentionality

I was excited for CEP 813: Electronic Assessment for Teaching and Learning because I wanted to learn how to use technology to assess my students. This course fulfilled that hope, but I learned so much more about assessment than just how to use technology to improve it. Using common themes that I learned from the course, I created a checklist that I can use to determine if an assessment is high quality. According to my checklist, assessments should be designed to identify a student's level of understanding, capture important learning goals, give me feedback about my teaching, allow me to give my students good feedback about their learning, and give my students a chance to self-regulate. I used this checklist to evaluate my own assessments that I created for course assignments. I also critically reviewed the typical math quiz used in school. Commonly, quizzes are used as summative assessments to determine a grade for the gradebook. However, mid-unit math quizzes provide an opportunity to give students feedback that they can use to improve their understanding before the unit is complete, and therefore could be better used as formative assessment than summative assessment. This feedback must be descriptive, must be about specific learning goals, and must help the students understand what they need to do in order to succeed at that learning goal.

I aligned the assessments I use in my classroom with my assessment design checklist. Prior to every quiz and test, I structure time for my students to self-assess their understanding of the different topics that will be on the assessment. On the actual assessment, I have a cover page identifying the learning goals and space to fill in the student's level of understanding for each goal. When grading quizzes and tests, I write feedback inside the assessment. The feedback is about the learning goals and points the student toward his or her next step towards succeeding at those goals. I use this process to give myself feedback about what learning goals I may need to teach again in the classroom and how I might approach them differently in the next school year. Furthermore, I have changed the way I put quizzes in my gradebook. The grade goes into the gradebook to communicate how a student is progressing so far, but if a student improves their understanding of any learning goal by the unit test, I exempt the original quiz grade to honor the student's learning.

CEP 813 also taught me to always think through the affordances and constraints that come with different technologies. It is easy to focus on only the affordances that some technologies provide, but there are so many technologies available to teachers that it is important to consider which technology fits best with the assessment or instructional purposes. For example, I love the affordances of Google Classroom, like being able to distribute and collect work easily and collaborate with classmates, but it is not a good fit for my classroom because collected work is in the form of typing, which makes it hard for students to show mathematical work. Instead, my instructors introduced me to Educreations, an interactive whiteboard and screencast tool that allows for easy distribution and collection of work as well as collaboration, like Google Classroom, but allows students to write on an iPad instead of typing, while simultaneously recording audio. This technology is a better fit for my classroom.

As my time in the MAET program concludes, I am walking away with a great understanding of how and when to integrate technology in the classroom, as well as a long list of technology resources that I can use. However, I am walking away with much more than that. I learned the importance of creativity in the math classroom, the need for questioning in my own practice and for my students to question, and the need for intentionality in designing assessments and instruction. This program has also taught me the importance of collaborative reflection. In every class, collaborative reflection was a regular part of the learning process. I reflected with my peers on our understanding of ideas and the quality of the products we created. As a consequence, I have found myself collaborating with my colleagues more than ever before about my own teaching practice and how we can begin to solve problems within our school together. The MAET program has truly made me a better educator.

Reference:

Berger, W. (2014). *A More Beautiful Question: The power of inquiry to spark breakthrough ideas*. Retrieved from <https://ebook.yourcloudlibrary.com/library/kdl/EPubRead/euzktg9>