

Change, is never easy, and it is often a little scary. Regardless of how we feel about it, change is a part of life. For us teachers in particular our lives are constantly changing: students come and go, the classes we teach change, the level that we teach change, and we get laid-off, displaced, and recalled. Teachers need to be flexible to handle all this change in stride. We learn to adapt, to fit the situation, and find a way to make the best of whatever situation we are put in.

Technology is always changing and improving on itself, and becoming more important in our everyday lives. When I first started teaching, phone calls were the best and easiest way to contact parents. Now, parents and students are just as likely to contact me via e-mail as the phone. I remember being handed my first official grade book, but now I enter everything online and post to a website where students and parents can check their grades. I remember when the only way for students to get additional help was to staying after school, but now I have begun to create an online resource where students can find additional notes, lessons, and tools to practice the math skills we are learning about.

When looking at Masters programs, I knew that I wanted to learn more about technology and the powerful role it can play in the classroom. The Masters of Arts in Technology Education program at Michigan State University was clearly the best choice for me. When I began the program my experience with and knowledge about technology was just as limited as my teaching experience. I was a traveling teacher, and I would bring a laptop and jump drive to each class that I taught. While this allowed me to incorporate some level of technology into my lessons, it was extremely tedious for me. My first master's class forever changed the way that I thought about the role of technology in education and opened my eyes to possible ways that technology could work for me.

The first course I took as part of the MAET program was CEP 810 (Teaching for Understanding with Technology) which focused on different types of technology and different ways teachers can use them. Through this class I was introduced to several different technologies that have since become an integral part of my life. [Google Drive](#) and simplified my life as a traveling teacher. Google Drive allows me to save my work to “the cloud” and access it from any computer. With this, I was able to leave my laptop and jump drive at home, and access my saved lessons and files over the internet. This also allowed me to share files with other teachers. Thanks to Google Drive, I am able to share ideas and information quicker, easier, and more efficiently than before. Despite changing buildings I became able to share ideas with teachers in other building as efficiently as if I was there.

While Google Drive simplified my life as a teacher, [RSS feeds](#) opened doors for me to keep up do date with current research and technologies. RSS feeds allow you to select blogs, websites, and news feeds, and the RSS reader will then automatically retrieve the headlines and highlights. This has been

incredibly useful for me in several ways. First, this has allowed me to keep up-to-date on the latest news from around the world. This is extremely important in a global society, where what happens in one part of the world is likely to have ramifications everywhere. Second, my RSS feeds have allowed me to keep up with new ideas in education and find different ways to present information. I am currently following several technology education and math education blogs. From these blogs, I have not only been able to get lesson plan ideas, but I have also gotten different ways of seeing and presenting problems. Third and lastly, my RSS feeder allows me to see what today's scientists and mathematicians are coming up with. Armed with my RSS reader, I am able to answer that age-old question every student asks, "who uses math, and why is it important?"

While CEP 810 started opening my eyes to different technologies available to me, CEP 806 (Learning Science with Technology) how limited my students' ability to learn use technology is. CEP 806 focused on using scientific principles and inquiry to learn about different ways we could use technology in the classroom to further students understanding of a concept. The [first inquiry project](#) that I completed looked at students ability to navigate an internet search. I was shocked by my students limited knowledge of online search strategies. Many of my students had never completed a Google search before, and had no idea how to go about one. Even the basic terminology, such as "link", was foreign to them. In the class I learned about how important it is that students be able to take their education into their own hands. In today's internet-connected world students can learn about an endless variety of subjects if they only know how to look for the information and navigate the results.

My second inquiry project focused on comparing virtual labs to hands-on labs in the classroom. For this, I presented my students with two similar activities using manipulatives to model adding and subtracting integers. They were completed with an assigned partner. I had expected that students would prefer the online activity simply because it gave them the opportunity to use the computer. I was very surprised with the outcome of the project. My students reported that 81% of them felt that they learned better using the hands-on activity, but according to their scores more students were able to accurately explain what was happening after the simulated activity. These results are even more surprising because the computer simulation (which students did better on), was the first of the two activities the students completed. According to A. Carmichael, J. Chini, N. Sanjay Rebello and

S. Puntambekar's article on "Comparing Students Learning in Mechanics Simulations and Hands-on Activities" there are mixed results in student performance with simulations and hands-on activities. These mixed results support my goal to use both simulations and hands-on activities in my math class to further the understanding of my students.

While learning from the internet and online simulations may seem like just a novelty, online education is a growing field and is already a part of many of our students' lives. Having spent a semester teaching a hybrid program, I got a taste of what online teaching can be like. Even with this prior experience, creating my own online course module in CEP 820 (Teaching K-12 Students Online) taught me a lot about different ways that students can be taught online and the different considerations that need to be made. When I started creating my [online course module](#), I thought I knew just what I wanted. I wanted a module that allowed students different ways to access content and illustrate their understanding of a topic. Using a variety of Web 2.0 technologies, such as Blogs, Google Docs, and online apps students are able to explore topics in ways that would be challenging in a typical classroom. Lessons are presented with not just typical notes, but also videos, practice problems, and plenty of opportunities for collaboration and peer responses. The purpose of the module is for the students to solve a real-life problem that they will re-create either at home or in the classroom. Each lesson asks students to complete a piece of their final project. In the end, students will be using what they learned and take the individual pieces and combine them into a final project that illustrates the students' understanding.

The challenge with creating an online course is not just the technology needed to incorporate into the classroom, but also the learning management system that is used to support students' learning. The hybrid course I taught gave students very little chance for collaboration and group discussion. The ability to collaborate and work together with others is an important part of a student's education. By discussing with others, students often deepen their understanding of a topic, while learning how to work with and collaborate with others. Even though collaboration was missing in the learning management system in the course I taught, there are many ways to incorporate collaboration through outside sources. Using a discussion board would be the easiest way to incorporate discussions, reflections, and collaboration into a lesson, a blog could be used to a similar purpose. Blogs allow students to reflect on what they are learning and allow others to respond, either agreeing with or arguing against the student. Google discussions could also function as an outside discussion board. Here, students would need a Google ID to log in. Social networking sites could also be used to give students a chance to discuss class topics. Students would be able to discuss and post questions relating to class. By using social networking sites, students would also have a network of people who they can continue to interact with and use as a resource later.

Learning with technology does not have to be online though. CEP 822 (Approaches to Educational Research) introduced me to a multitude of technologies available for use in the classroom, and the powerful conceptual change that these technologies can be used to support. CEP 822 introduced me to the idea of teaching for conceptual change. When teaching for conceptual change, we must first assess students background knowledge, and use that as a framework to build upon. This sometimes means forcing students to re-evaluate misconceptions that they hold. As part of this course, we used video editing to show a physics principle that is counter intuitive. We taped a person standing still dropping a ball, walking and dropping a ball, and running and dropping a ball. When watching the video, especially in slow motion, we were able to see that in all instances the ball drops straight down and lands in line with the person. This is a concept that many students struggle with in physics, yet by using video editing and using a simple smart phone camera, we were able to bring about conceptual change.

While conceptual change is on the forefront of the educational research that we looked at, we also delved deep into TPACK. TPACK is the idea that technology, pedagogy, and content knowledge all go hand-in-hand and need to be considered together when planning lessons. Up to this point, when planning lessons, I would try to incorporate technology where I could, just for the sake of incorporating technology. Now, when I begin to plan a lesson, I think about what my goals are and how technology can enhance the pedagogy and make the content easier for students to understand. I now think about whether the technology will enhance the lesson, or whether I am just using technology to mirror a pencil and paper lesson. When incorporating technology we need to be purposeful in our planning and incorporation. Now, when creating lessons I think about what I want my students to learn, what conceptual change I would like to see in them, and how technology can help to get them there.

Throughout the MAET program my understanding of technology and education has changed and grown. In particular, my knowledge of technologies available to me has grown greatly. This knowledge has changed the way I teach, it has changed the way I connect to parents and students, and it has changed the way I think about technology. The skills that I have learned throughout the MAET program have allowed me to keep in better contact with my students parents by using e-mail and to create a class webpage to let parents see what is going on in the classroom. I have begun putting together an online reference website where students can go to find videos of lessons that we completed in class, links to places they can go for additional help, and questions they can use to get additional practice. I am now able to incorporate technology into my students learning experiences that allows them to deepen their understanding of a topic through online simulations. I am able to take advantage of technologies such as video cameras to show students how the concepts they are learning affect them everyday and bring real-life problems and examples into the classroom. Now, when I look at technology, I see a powerful classroom tool.