

Explore, Reflect, Apply

Synthesis Essay

By Kaleena Carter

I have always considered myself a life-long learner. Whether it be learning a new language, or learning how to better my character, I have always been fascinated about increasing my knowledge in various fields. Thus enrolling in a program such as the [Master of Arts in Educational Technology Program at Michigan State University](#), seemed to fit with my usual Modus de Operandi. What I did not expect was the number of takeaways that I can not only apply in the field of Education but also use in my everyday life. This essay discusses how the MAET program allowed me to explore, through various course selections, reflect on my understanding through a myriad of assignments, and then apply the knowledge I have obtained in my current school setting. 'Explore, Reflect, Apply' just so happens to be my current school's motto, so I thought it would be fitting to express my synthesis of learning using the three themes.

Teaching internationally at a reasonably small yet diverse school has allowed me the opportunity to expand my role as not only a teacher but also as a college counselor and as a mentor for new math teachers coming to our school as the lead math teacher. I have also learned how to share my expertise in technology as a part of the education technology committee, which strives to support teachers in integrating technology and understand digital citizenship with their students. Within these three roles, I was able to apply my learnings from various courses throughout the Masters Program, which I will share in this reflective essay.

Creativity:

I am well aware that I have privileges to be in a position in which I can freely develop curriculum with the support of administrators and colleagues who are also striving to challenge themselves in their respective fields. At my current school, this energy helps encourage one another to continue to be creative with our curriculum and pedagogy regularly. Therefore I had no issues with being ready to apply what I had learned in a course such as [CEP 818 Creativity in Teaching & Learning](#). Mathematics, as stated before, is a topic in which many think that they are not allowed to be creative. This idea stems from the notion that mathematics must always follow a given set of postulates, theorems, and general logic to produce a solution. However, through this course and my general practice, I have been able to identify aspects of my math classes that directly call for creative thinking and tinkering to solve problems. More specifically, I was able to apply many cognitively creative tools from this course that allowed my students to explore their understanding of difficult concepts in a creative manner. It has allowed me to break down my knowledge I have obtained, and continually modify my teaching of challenging ideas throughout all levels of mathematics. Some changes that I have enforced are described below.

- Giving my students allowance: This requires for me to allow my students to play without any worry of the outcome. It would require me to introduce aspects of play in the curriculum that will enable them to potentially discover the relationship to the mathematical concept on their own accord. For example, after this course, I decided to introduce culminating projects in my Algebra II course at the beginning of the unit rather than the end. Students would start playing

and building Ferris Wheels with circuits without any knowledge of how they are related to sinusoids. They focus on the play at the beginning and then slowly see the connections. I have noticed that this allows for more opportunities for sparking creativity.

- Take time for Modeling and Abstraction: This course introduced these two concepts: modeling and abstraction as a way to spark creativity. These two concepts are ideas in mathematics that are already well known to students. However, after CEP 818, I have redefined the notion of abstraction and modeling and approach these concepts differently. For example, I asked my Calculus students to Abstract an implicit differentiation graph by creating a story or poem that represents that graphical image. Or in my Algebra II class, I asked students to model the idea of a function using a representation that is not math-related.
- Practice Embodied Thinking: This is one of the concepts from CEP 818 that I wish to do much more in my current classes. It will encourage students to get out of their seats and be more active in the classroom. What I have learned is that having students use their full body and movement to explore a theme in mathematics allows for creativity and higher retention of an abstract concept. I attempted this activity with my AP Calculus students while studying the very abstract concepts of velocity and acceleration and their respective signs. Students asked, “why do particles speed up if the signs of their acceleration and velocity are the same? (either both negative or both positive). To demonstrate this, I use embodied thinking, and had them represent velocity as themselves walking back and forth left to right (negative to positive). I then introduce another student to be acceleration, a force (push or pull) and require them to either push or pull the student who is acting as velocity. I then ask, what happens when you pull the person to the right when they are walking towards the left? What happens when you push to the left when the person is walking towards the left? Now my students have an embodied experience with an abstract concept that they can now remember.

Problem Solving:

In any school setting, there are always underlying problems that need to be addressed. [CEP 817 Learning Technology Through Design](#), allowed me to address a 'Problem of Practice' that involved my other role at my school as the college counselor and also required a reflection on how I approach design in my teaching. I learned through exploration, that design must start with empathy. Ironically this is one of the ten character traits that we encourage our students to embody at my current school. Through this course, I realized that I could not merely rely on the reasoning of the 'why' as it pertains to design thinking for problem-solving concerning the different aspects of my role at my school (College Counselor and Mathematics Teacher). This course and the [Stanford d. Design School modes](#) forced me to revert to a 'who' approach or 'for whom,' focusing on empathic design. Using the [Stanford D. School Bootcamp Bootleg methods](#) such as the How/Why Ladder, I was also able to determine the underlying variables that help frame my problem of practice more explicitly, and establish a better direction for the solution. My problem of practice was thus defined as "*The Lack of importance (or awareness) put on non-academic criteria such as character, community, passion, etc*

that make for a strong college application for college-bound students at international schools in Korea." Once my problem of practice was clearly stated, I then was able to develop a prototype solution. I was able to find a solution by interviewing administration, college admission counselors, students, and building a character profile of a potential end-user. The result is the first iteration of a program that will allow students to explore a passion project in high school that could ultimately transfer to areas of study or a vocation after their high school career.

This course not only reminded me of the importance of empathy when it comes to problem-solving but also allowed me to reflect on the design process and how it can improve my approach to lesson design. In the case of curriculum design, I now approach my teaching units/programs/projects using these design modes, which will allow me to have opportunities to continually refine my teaching through prototypes and iteration after the testing them. The 'End Users' who will test our designs, in this case, are our students. Through feedback in the form of grade analysis, direct observation and student surveys from year to year, I can deter what was successful and what was not, and then refine my curriculum for testing the following year. This process also allows the opportunity to use failure as a learning mode, thus allowing failure without judgment. Now I approach teaching with testing as a mode of design, which will ultimately allow me to re-identify problems with my lessons or curriculum that I may have misidentified in the beginning stages.

Leadership:

Before enrolling in this degree program, I did not necessarily view myself as a leader in technology. With the help of [CEP 815 Technology and Leadership](#) and through self-reflection, I was able to determine my strengths and weaknesses as a leader, and the characteristics of what makes a good leader. [The Seven Transformations of Leadership by David Rooke and William R. Torbert](#) helped culminate my understanding of the idea that your inner action logic determines how effective you are as a leader. Thus one of the biggest takeaways from the course is how I, as a leader, view problems and develop my approach to integrating technology into the problem-solving process. The implications for further practice in my leadership roles include (but are not limited to) continuously taking a step back and practicing missional thinking when addressing problems that could potentially be solved with the help of technology. By focusing on the bigger picture, leaders can avoid the trap of instrumental thinking, which focuses on the tool or technology itself, which can be limiting by honing in on one available strategy for a solution.

Furthermore, this course introduced me to the [ISTE Standards for Education Leaders in Technology](#). Not only was I introduced to the standards, but I was also required to take them apart and address each of their elements contextualizing them in my current school setting as a leader in technology. This activity introduced not only a new resource but also a process of how to apply the standards to further my understanding of technology standards. It allowed me to explore problems in a school setting while considering the limitations and affordances of potential solutions that I develop. Ultimately I was able to create a [vision statement](#) as a leader in technology to share with others.

Conclusion:

The experiences in all the courses that I have taken at MSU have shaped me into a better educator. I have a sound understanding of how technology, creativity, learning, and leadership can help shape a better learning environment for students and innovative teaching strategies for colleagues. Through understanding the multifaceted ways to spark creativity, I am now able to encourage that practice in my classroom regularly. Furthermore, from my experience in this program, I was able to create a toolkit for other teachers that encompasses my learning succinctly, as a basis for a professional development opportunity that encourages creative thinking in their respective classrooms. I am now even more confident when convincing students that creativity is innate in all of us. The MAET program also developed my problem-solving skills. With the help of the Stanford D. School model for problem-solving, I am now able to address problems of practice with an empathetic lens and find solutions through testing prototypes, that ultimately allows me to practice failure as a learning mode. Lastly, this program allowed me to become a reflective leader. Not only have I learned how to lead, but I have been able to determine what strengths I already obtain as a leader, and how I can improve on my weaknesses to develop into a leader that I would gladly follow. The MAET program was challenging in that it pulled me in every direction, had me observe various perspectives, and even questioned my pedagogy. I am grateful that I was able to explore, reflect, and apply all the knowledge that I have obtained and will continue to do so in the future.