Curriculum Design Through Authentic Learning Projects In An International Baccalaureate Middle School Technology Design Classroom

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CURRICULUM DESIGN THROUGH AUTHENTIC LEARNING PROJECTS IN AN INTERNATIONAL BACCALAUREATE MIDDLE SCHOOL TECHNOLOGY DESIGN CLASSROOM

by

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A capstone submitted in partial fulfillment of the requirements for the degree of Master of Arts in Teaching

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Dedication

To all of my friends and family that have kept me going through this process. Thank you for keeping me on task and encouraging me to finish the project.
“The role of a creative leader is not to have all the ideas; it's to create a culture where everyone can have ideas and feel that they're valued.” - Sir Ken Robinson
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When I think about teaching in a middle school setting, I think about each and everyone of my students who are in school from 7:50 in the morning to 3:15 in the afternoon. I think about all of the time that they have to sit in desks and listen to an adult. They usually are not told why they are learning something or what significance it will have on them later in life or even if they will ever use it again. Seeing these kids in my mind all day, sitting in a chair and listening makes my heart hurt. I don’t even have to sit all day. As a teacher I get breaks, I can stand when I want, sit when I want and move about the room when I want. Why can’t it be the same way for the students? I want learning to be fun, relevant and personalized. Students need to be in charge of their learning and then need to have a stake in what they are learning about. Creating curriculum that is student driven, project based and that follows the International Baccalaureate philosophy is something that I hope will create a newfound excitement in students. How can creating a curriculum that fosters student creativity through authentic learning projects enhance instruction in the digital age?

Chapter 1 is a journey through my life and my different experience that have led me to where I am today. I have often wondered about the different ways to distribute instruction and what the impact would be on students. I am going to show how I looked at school through my early years and through my adult life. I am also going to show why I am interested in project based, student led learning in the digital age. As well as how it
has shaped the way that I teach now. Chapter one is also going to explain why this topic should interest students, parents and colleagues.

**Education through my life**

As a child I always got in trouble for talking and being out of place when I was in school. I was always busy doing something that I didn’t want to do and it was usually something that never interested me. I remember sitting in my desk not paying attention because I didn’t care about what I was learning. We didn’t have any variety in what we were learning, and we didn’t get a choice for what we actually wanted to learn about. Since I wasn’t actively engaged and didn’t really care about what I was learning, I was seen as a “troublemaker” I found it hard to concentrate and didn’t get all I could have out of school. It always seemed boring and nothing that we studied seemed very interesting. When I think back through all my middle school years I can’t really remember a time when I got to drive my instruction.

My first time experiencing a variety in curriculum was in high school. I loved the fact that you could pick and choose the types of classes to take. I remember the excitement I felt when I was given the opportunity to decide on subjects I was interested in and what I would be learning. They were classes that I was required to take, but I was given a choice in what they would be, who taught them, and when I would take them. To this day, I can remember a lot that. They were great experiences and I learned a lot of life skills through these classes. I loved singing, Spanish and social studies. Two of my favorite classes were concert choir and famous people. These were both classes that I found interesting and really enjoyed learning about. The freedom of choice was
something that I really loved, and never wanted to give up.

During my undergraduate career, I once again had the freedom of choice. My degree was in Fashion Design and I was grateful to be able to pick and choose the path that I would take. When I got to that school, I didn’t know all of the different careers that I could choose from, and my professors helped me decide but ultimately, I had the final say. There were many classes that I got to dip my hand in and got me interested in different aspects of fashion design. When it was time to complete my final internship, I worked at Walt Disney World. The internship really opened up my eyes because I originally wanted to be a costume designer but in the end, I knew that I did not want to work there. I was struggling with the fact that I didn’t feel that spark to go to work every day. My fear was that I was going to have to move to New York or LA to try and make it in the industry and at that time I had no desire to do that. As I was finishing up my internship with Disney, I was still missing something. I had a void but I wasn’t sure how to fill it. I decided to move to St. Paul to be closer to my family. My brother suggested volunteering at a local elementary school because I had contemplated being a teacher when I graduated high school. I began to volunteer at an elementary school close to where I lived. As I reflect back, this decision changed my life in many ways. It shaped my future path in many ways. When I first walked into that classroom I was surprised to see children looking like they were having a good time, but yet they were all doing different things. It amazed me that they were always seemed interested in what they were doing. After my time volunteering was over, I made the decision to enroll back in school and become a teacher. It just so happened that Hamline had a great program for people
like me. All of the pieces were falling into place. Through my classes at Hamline, there had been some interesting topics but one always sparked my interest. I loved hearing about different methods of teaching. There are so many ways to deliver content but making sure that each student is getting what they need has always been something that I have strived for.

**Parents, students and teachers, there is a different way**

Some students and parents have always wanted to know if there is a different way to teaching in general. I really want parents to feel comfortable enough to be able to come into my classroom and share what their thoughts and concerns are about their child’s learning. This journey all started one year when a colleague and I were talking about, how there must be a better way to teach students. At times throughout the day we would look out into our class and see students who were lost, bored or not paying attention. I have always prided myself on not allowing students to stay in their seats for very long but that didn’t always help. We were looking for an answer that allowed us to help those that were lost in the curriculum, the students who needed to be pushed in their thinking and the students who were just not paying attention. Our principal was very trusting and allowed us to co-teach 44 students and create a student driven classroom. We had a parent meeting at the beginning of the year and WOW did we have a lot of concerned and excited parents. We explained that students were going to be more responsible for their learning and they would not all be learning the exact same thing at the exact same time. We were very scared to start this journey and we knew that the parents were a little hesitant as well. We had a lot of parents who were worried that their
student could do whatever they wanted without getting into trouble. They also worried about their student not getting all of the curriculum before the state tests. They had a lot of questions that we didn’t really know that answer to because this was the first year that we were trying to do this. That first year of teaching in a student driven classroom was one of the best years that I had. Within a student driven classroom, students are taking control of most of the topics being taught. In the student driven classroom, teachers become the facilitators. As a teacher, we bring the topics to the table but the students really dictate where we go from there. Students were allowed to explore different things at different times and were given the responsibility to take charge of their learning. There were times when I felt not needed because students were helping each other, they were teaching each other and I had learned how to ask better questions of my students that made them think. It was amazing to see. By the end of the year parents were overjoyed with what had happened in our class. Their child was more responsible and felt like they had gained a lot more than just the academics. My students who were originally labeled as problem children had a turnaround year. They wanted to be in our classroom and they didn’t want to leave when the bell rang. Seeing and hearing from the students about how our classroom worked, got me excited for the next year. I took the students feedback and really understood how things can be different and what things would need to change. I knew from that moment on that I would never go back to the “traditional” way of teaching.

**What to expect next.**

Throughout the rest of the paper I am going to try and figure out if providing a
student driven, authentic learning project based curriculum can benefit any and all students. I am going to look at how different teachers differentiate instruction, create design units through project/problem based learning that are relevant and authentic to students in the digital age. I want to figure out if there is a way to make sure that kids are getting what the need out of school, and to make learning more exciting for them.

In chapter 2, I will look at the middle school brain and how it works. I will also be looking at differentiation, multiple intelligences and the power of choice when it comes to learning. Lastly, I will be looking into different ways that authentic learning, project and problem based units have fostered a love for learning. I want people to understand that there are other options for teaching no matter what grade you teach. I hope that this paper will help others like me that are looking for something different and are tired of just going with the motions. With all of the different theories out there, I am hoping to explain why I think this is a great option for any classroom. Chapter 3 going to show how I am creating the scope and sequence for my 6-8th grade students as well as developing curriculum specific to my 8th grade students. I plan on creating multiple units of learning that have student choice while still being relevant and project based. Chapter 4 will be a reflection on developing the curriculum as well as the trials and tribulations of the real life application. It will have examples and reflections embedded into the chapter.
Chapter 2

Literature Review

This chapter will focus on a brief look into how a middle schooler's brain is developing and processing, an in-depth review of authentic learning, project based learning units and Learner active classrooms, and it will also focus on constructivism and choice theory within the classroom. Within the chapter, I will look at how a young adolescent brain is developing in middle school and what that means to the people who teach them. I will also look at the actual development of the brain and how it affects the decision making of the student. Next, I will look into understanding the basics of constructivism and choice theory. I will look at how these two different philosophies affect students and change the way a classroom looks like. Lastly, I will look at Project Based Learning, Authentic Learning Units and what Learner Active classrooms look like. I will explore the different ways each of these can change the outcome of the learning and how it can benefit the teacher as well as the students.

The question guiding my research throughout the chapter is:

· How can creating a curriculum that fosters student creativity through authentic learning projects enhance instruction in the digital age?

By the end of this chapter you will have a better understanding of all of the concepts that will drive my creation of the curriculum.
Middle School Brain, What is going on up there?

The brain is an interesting organ that does amazing things. There are 5 different stages that the brain goes through. Stage 1 is from zero to ten months, stage 2 is from birth to six years, stage 3 is from seven years to twenty two, stage four is from twenty three to sixty five and the last stage, stage five is people who are older than sixty five (Guberti, 2016). During each stage, the brain has different jobs to do and the older we get, the more functions it has to perform.

To start off, the brain has 13 regions. The regions are; Frontal lobe, Motor cortex, Sensory Cortex, Parietal lobe, Angular gyrus, Wernicke’s area, Occipital lobe, Cerebellum, Spinal cord, Temporal lobe, Auditory receptive area, Olfactory bulb & track and Broca’s area (McNeil, 2009).

There are certain parts of the brain that need to be defined:

Neurons: These are essential elements of the brain. They are the basic using of the nervous system. They have two unique features; to convey nerve signals as electrochemical pulses and receptors. Almost all neurons are generated before birth. Humans are born with around one hundred billion brain cells.

Brain Plasticity: This is the capacity to be modified by experience. The use of lose it adage. Because of plasticity, our brains can change depending on our experiences.

Grey and White matter: Grey matter is referring to the quantity of nerve cell bodies. White matter has more nerve processes, usually axons. It is called white matter because the axons have a coating of myelin which enables the trickles of electricity to travel through it (McNeil, 2009).
What does all of this have to do with middle schoolers? The young adolescent brain is developing during stage three. Children usually range from seven to twenty two in this stage. The word adolescence is Latin in origin, derived from the verb adolescence, which means “to grow into adulthood.” Adolescence is a time of moving from the immaturity of childhood into the maturity of adulthood. There is no single event or boundary line that denotes the end of childhood or the beginning of adolescence. Rather, experts think of the passage from childhood into and through adolescence as composed for a set of transitions that unfold gradually and the touch upon many aspects of the individual’s behavior, development, and relationships. These transitions are biological, cognitive, social and emotional.

Even though there are 13 regions of the brain, scientists sort them into three different regions (Marshall & Neuman, 2011). These three regions can also be referred to as the reflex brain, the feeling brain and the thinking brain (McDonald, 2010). The first region of the brain is the smallest of the three. It is located just above the spinal cord. This area of the brain controls basic body functions as well as our flight or fight action. Our instincts come from this area of the brain. The second brain, the feeling brain, is larger than the first region of the brain and is located just above the first region. A human’s emotions are controlled by this part of the brain (McDonald, 2010). This is also the region where humans learn from their past experiences and where they make their emotional decisions. The third region of the brain is the largest and is referred to as the thinking brain. It surrounds the other regions and is the area that stores
knowledge and memories (McDonald, 2010). Humans use this part of the brain to plan ahead as well as determine different consequences within a situation.

**Adolescence Brain**

The brain of an adolescent goes through a profound neurological reorganization. A young adolescent brain has an increase in grey matter when it is reorganizing itself. When the brain is reorganizing itself, it connects correct pathways and fades away connections that are no longer used. This is a way that the brain starts “pruning” itself (Vawet, 2010). The result of this pruning is efficient sensory/motor patterns and then grey matter decreases. During this phase, the brain sections go through a reorganization process. The prefrontal cortex plays a direct role in selecting behaviors. It also contributes in the development of a human's short term memory. Since a young adolescent brain is still developing, the prefrontal cortex is going through reorganizing and that is where the voice of reason comes from. When a middle schooler is confronted by a teacher or put in an emotional situation, the amygdala is used to respond to the situation. When one uses the Amygdala to respond to situations, the decision is based off of emotion. It is the fight or flight response. When middle school students are confronted, the Amygdala is triggered and their reaction of self-preservation kicks in. They start to deny responsibility, argue or place blame. It destroys at least twenty percent of all connections previously build. With the pruning, sometimes students can’t access the part of the brain that they need or want. While the brain develops, it develops from back to front. The primal brain develops first, then the emotional brain, the amygdala and then last the neo-cortex, executive brain (Vawter,
2010). The emotional brain develops differently in adolescence. The emotional brain doesn’t necessarily advance with more intelligence. No matter how smart one is, the emotional part of the brain doesn’t speed up. In a female brain the neo-cortex develops between the ages of 11 and 15 while in a male brain, the neo-cortex develops from the late teens to early twenties. Even though students in middle school are going through a physical change, and may look more mature, their brain isn’t actually fully mature until they are in their twenties. We can often assume that since they are growing on the outside, they are also maturing as much on the inside but that is not the case. Therefore, expecting middle school males to be at the same maturity level as middle school females is not logical.

**Classroom implications**

Middle school students are in the process of major brain developments. They are moving from concrete thinking to more abstract thinking (Lorain, 2002). They have new emotions to navigate and it will take them a long time to understand them. Another part of the brain that is still developing during this time is the part of the brain that works on motivation. According to Emma McDonald (2010), *A quick look into the Middle School Brain*, teens may see activities and behaviors that either lead to a high level of excitement or require very little effort on their part. Since this part of the brain is still undergoing changes, this may be the reason that is can be so hard to motivate middle school students. Since students at this age have a brain that is still developing, students make most of their decisions based on their emotions. To these students, love matters to them. When the student feels comfortable and loved, they create new
relationships and tend not to make rash emotional decisions (McNeil, 2009). To middle school students, a strong emotion can overshadow other thoughts and often affect their behaviors (McDonald, 2010). As a teacher of a middle school students, this information can really help communicate and create relationships with these students. Think about it, if they are making emotional decisions, we need to be sensitive about what we say and how we say it to them. When thoughts are centered around emotions and bodily needs, the brain “downshifts”, and they can’t think about anything else during that time (McDonald, 2010). The emotion or need takes up all of their thinking and thought process and there is not more room in there brain for learning until they have resolved that need.

**Constructivism**

Constructivism is a comprehensive framework integrating different theories relating to how various cognitive, affective and social factors influence learning in contrast to the more traditional information processing view. There are many different definitions of constructivism but there is a common thread between them. Constructivism requires the learner to actively engage in the meaning or learning. Constructivist believe that the knowledge is not passively received but built up by the cognizing subject (Jones, 2002). The perspectives of constructivists on the emphasis of making meaning and the active participation on the learner are reasons why educators are so drawn to this theory. Teachers usually has an understanding of the prior knowledge that students walk into the classroom with and realize that they are not
blank slates. They bring in prior knowledge, experiences and emotions that constructivists use as a starting point to build upon.

Constructivism in education emerged after the behaviorist movement as a welcome and refreshing view of learning that centers on the active learner within the teaching-learning process. This emphasis on the individual student during instruction has drawn attention to the prior beliefs, knowledge, and skills that students bring with them. Prior knowledge has been shown to significantly influence the ways individuals make meaning out of instruction. The key idea that sets constructivism apart from other theories of cognition was launched about 60 years ago by Jean Piaget (Forsnot, 2013). In Piaget’s constructivist theory, he states that one cannot draw conclusions about the real world from the adaptedness of humans or base their decisions on others’ perception. Piaget thought that what we see, hear and feel is the result of our own perceptual activities. Knowledge comes from actions and reflections on the action. Constructivism is all about learning and not about the teaching. There is not a book about teaching style or a set of instructional techniques that is about the constructivist approach.

There are a couple of things to keep in mind when rethinking our educational practices. Learning is not the result of development. Learning is the development (Forsnot, 2013). It requires the student to invent and organize. Teachers need to allow our students to form their own questions, create hypotheses and be able to test and defend them. Constructivists understand that errors need to not be minimized or avoided but explored and discussed. Reflection is also a part of the learning. Students
need to be able to reflect on what they are learning and understanding. Learners also need to be able to communicate with others to further their thinking. The more students communicate with each other, the more they are engaged in activity and reflection. When they communicate, students have the opportunity to explain their thinking, defend their thinking and justify their thinking to others. The constructivist focus on the social context and larger community of learners has resulted in a major shift away from individually-based instruction to instruction that incorporates and embeds teaching within the larger community of peers, younger students, as well as those who are older. Constructivism’s greatest contribution to education may be through the shift in emphasis from knowledge as a product to knowing as a process (Jones & Brader-Araje, 2002).

The role of the teacher in a constructivist classroom is to act as a guide providing students with opportunities to test out their understandings. Educators should understand the prior knowledge students bring to class. They know that each and every student has had experiences that have shaped what they believe. Discovery needs to be provided by using the correct resources. Knowledge is active and learning is a process of discovery. Teachers provide assistance with the new knowledge that students are learning and help direct the prior knowledge that students have. Learning should be flexible and allow inquiry. Teachers should create situations where the students feel safe questioning and reflecting on their process. Educators should present authentic tasks that require learning through real world situations and encourage collaboration among
the students. Teachers need to provide scaffolding when needed and it presents itself. Students need the opportunity to learn from one another.

**Social Constructivism**

Social constructivism understands the importance of culture and context in understand about what occurs out in the real world. It is based on certain assumptions about reality and learning. Social constructivists believe that reality is formed through human actions. It is something that is not discovered and it does not exist before social interactions. Members of a society work together to create the properties of the world. Knowledge is also created by humans. Like reality, knowledge is socially and culturally created. Humans create meaning through their interactions with one another. Learning is a social process. It is something that happens when humans communicate and interact with one another. Social constructivists rely on collaborative groups in the classroom and each student takes turns leading the conversation in the group. Within these groups, students will have opportunities to learn from each other as well feel like an expert within the group. The content should have a meaningful context and the students should be active participants. Social constructivist perspectives on learning maintain that cognitive development is a social process and reject the idea that it is an individual process. Learning relies on significant relationships in two facets: learning with fellow students and learning with a skillful partner, such as a teacher or instructor.

Students who are in a constructivist classroom will need to actively participate in their learning. It is their job to keep the discussions going and keep the knowledge building. Students will also start where they know. Meaning that students will rely on
their background knowledge to get them started. It will be their starting point and from there they will build. Students will need a safe place to discuss their findings and to question the learnings. They will be able participate in conversations that take place and be able to argue their point or reasoning with classmates. The students also need to actively reflect on their learning. In the constructivist classroom, the teacher and student think of knowledge as a dynamic, ever changing view of the world that we live in and they have the ability to successfully stretch and explore that view.

**Choice Theory**

Choice theory behavior is that we always choose to do what is most satisfying to us at the time (Glasser, 1986) He explained how and why humans behave the way that they do. Choice theory states that our behavior is to meet one or more basic human needs. All of our behavior is purposeful. This doesn’t mean that the behavior is effective or responsible, but it means that the child is doing it for a purpose. There are five basic human needs that drive our behavior; survival, to be loved and belong, to gain power, to be free and fun. As we all know, each class, year and student will have a different lay out of each of these basic human needs. Some students may have a higher need to belong while other may have a stronger need to have fun. It always differs and that is why we can’t always do the same thing year after year and expect the same experience. Choice theory is all about payoff. It is about what we need as a human being to be satisfied. Students who work hard in school and get good grades find some satisfaction and get their needs met that way. Students who do not succeed don’t fill that need and eventually stop trying. While students are in elementary school, tend to
not have as many issues because they are getting love from their parents and love from
their teacher. They get more attention and they are getting mostly positive feedback.
When student reach middle school, it is usually their first encounter with multiple
teachers that they will need to please. The work gets harder and if they have no real
bond with the teachers, they don’t feel needed. The teachers tend to be less personal
because they have more students to attend to. Teachers in middle school also become
less available. They have a lot more students and students don’t have as much time
with each teacher so it is harder to form that bond with them. Middle school students
usually turn to their friends to fill that void. If their friends are working hard in school,
then in turn that student will also work hard because they want to keep that set of
friends. If their friends are finding school hard, and they are not trying then in turn the
student will follow suit.

With choice theory, all of our behavior is always our best attempt at the time to
satisfy powerful forces called our basic needs. With this theory, it is explained that all
behavior is purposeful. Which means, that there is some underlying factor that is
driving our behavior. Choice theory is one of hope. It teaches humans that all of us can
do and that we all need to do to fulfill our basic human needs.

Sometimes the needs profile of a class can have big implications for the best
instructional and management strategies for that particular group of students. A class
that has a high love and belonging need wants opportunities to work together, to share,
to form and maintain relationships. One with a high-power need may enjoy being
listened to, being challenged, and gaining recognition for their successes. A group of
students with high freedom needs, like the one above, craves choices, movement, and novelty. A class with a high fun need enjoys learning games, role-playing, and humor. One with a high survival need likes attention to safety, predictable procedures, and a sense of order. You can determine a class's needs profile the way I did, just by observation and making an educated guess, or you can teach the students about their needs and have them share with you an informal assessment of their own needs profile. Sometimes you may have a class that leans strongly toward one particular need, and you can adjust your managing and teaching accordingly (Glasser, 1986). Most often classes will be a mixture of students with many different profiles. Teachers need to use a balance of strategies to help meet the needs of all the students. By using the strategies that Glasser writes about, you will be addressing a multitude of learning styles, multiple intelligences, engaging both sides of the brain and different teaching strategies that will engage all students.

**Project-Based Learning**

Project based learning is an approach to learning that focuses on many different strategies that are critical in the twenty first century. There are many different acronyms that are associated with this approach. They all are inquiry based, project driven and student centered. Students will drive their own learning through inquiry, collaboration, research, and projects.

Project based learning has been around the education world since the early 1980’s. Project based learning (PBL) began out of an idea, “learning by doing” from John Dewey. Dewey stated that students should be encouraged to become the center in
the learning process. PBL can be an effective approach to learning that allows students to ask questions, develop theories, use multiple tools and skills and share an opinion.

PBI is: 1) having a process and product; 2) giving students (partial) ownership of the project; 3) extending over a period of time (several days, weeks, or months); 4) integrating skills; 5) developing students’ understanding of a topic through the integration of language and content; 6) collaborating with other students and working on their own; 7) holding students responsible for their own learning through the gathering, processing, and reporting of information from target language resources; 8) assigning new roles and responsibilities to students and teacher; 9) providing a tangible final product; and 10) reflecting on both the process and the product (Stoller, 2006).

Project Based learning is definitely not the way that most people were taught back when they were in school (Boss, 2013). It is a new way of thinking about how teachers should deliver the content as well as what the teacher should deliver. Most teachers are lifelong learners and they are always wanted to gain more information and this approach also has that effect on students. They are begging for more information, they are inquiring about things that one didn’t ask them to and they are finding new ways to share and present their findings. There are three things that are essential for project based learning (Boss & Krauss, 2007):

1. A culture that empowers adults as well as students.
2. Teaching that engages.
3. Technology integrated throughout the learning process.
When thinking about the Project based learning approach, teachers need to consider many different things.

What are the learning goals? When we think about our students, we need to understand and really think about what the students will know and do. We can’t just say well it’s the next chapter in the book or it’s the next lesson on our district's scope and sequence. We have to be thoughtful about our goals (Wells & Kingston, 2015). The next thing to think about is, how will you engage with your students. Project based learning is something that students should always be engaged in. It is something that will spark their interest and they will take it to the next level all on their own. While thinking about how you are going to manage your classroom. With the students working on different parts of projects, working on different projects and working on different subjects, how are we as teaching going to manage it.

Another question to ask yourself is, Does the traditional classroom layout work of for PBL? With the research on what Project based learning is, students need to be able to work in collaborative groups, they need space to create or make and they also need space to learn by themselves (Wurding, Haar, Hugg, & Bez, 2007). When looking at project based learning, teachers really need to understand that it is not going to be something that will require less work, it requires different work.

Project based learning is all about the process of completing the project. In Project based learning- It’s the how. A project is an act of creation over time. It evolves the students working on something over a period of designated time, something that requires more that one day or one step. Students must take the project and break it
down into steps and understand that each step is as important as the next step. Through project based learning, students are guided through research. The teacher is there as a facilitator and to help ask those questions that sometimes students do not think about (Spires, Hervey, 2012). When project based learning is done teachers hope that students will become more responsible about their learning, they are independent and they are discipline with their studies. Within the daily life of project based learning, students are writing goals that they have for the class time, they are collaborating with other group members, they are setting up interviews or writing emails to experts on whatever they are learning about. Students are taking charge of their learning and they are understanding that it is up to them to make it all happen.

Project based learning provides students with opportunities to be creative as well as innovative. It is crucial that students have certain skills when they enter the real world and being a thinker who can start with an idea and turn it into action is one of them. Two of the International Society for Technology in Education, ISTE, standards are Innovative Designer and Creative Communicator. Through project based learning students have to become both of these to complete any project. Creativity is a common trait that we see often. They are the painters, musicians, filmmakers, dancers and artists that we see. Creativity is any outlet for personal expression and a reflection of culture (Boss, 2013). People usually forget that creativity extends beyond this. Creativity can be anything. It can be a child in a garage thinking of new video games he can create, a student who is dreaming about a new piece of clothing that they want to design, or a chef thinking about a new menu item. People who can apply a creative outlook tend to
do better in life. If one is a creative thinking they usually have emotional expression, a rich imagination, are flexible, funny and have original ideas (Boss, 2013). With the right classroom setting, students can discover, develop and express their creativity. When students are engaged in their work, it is them applying the highest-order thinking skills. Innovation a little different from creativity. It is more about putting a great idea into action. With one idea can come many different innovations. As a teacher, we have to ensure that students learn to use a process for generating ideas, making improvements and communicating their thinking to others (Boss, 2013). When students apply creativity and innovation to project based learning, they are able to come up with solutions for complex problems and tasks. They critically think about what the problem is and find a way to solve it.

One big component of project based learning is technology. Through project based learning, students are learning 21st century skills and how to make it in the world. Technology plays a big role in the approach because students need to be able to access information faster and easier than before. They might have questions that they want to know and a teacher may not be knowledge about that topic. They will have people that they will have to talk with but sometimes they just need to know. Technology plays a big role in any classroom but teachers need to remember that it is a tool to use and should be not solely relied upon.

Inquiry, research, collaboration, presentation and reflection are five major points in creating a truly authentic learning environment. One thing that project based learning really focuses on is creating real world authentic connections. Real world
connections is something that drive the engagement of students and really makes it interesting to the students. While students are learning about real world situations through project based learning, they are working on their research skills. They are looking at current information and information that is relevant to their world. They are working on life skills that will help them as they work their way through college and beyond.

One concept that is loosely based off of project based learning is called Learner Active Technology Infused Classroom, LATIC. This is a paradigm shift to create a student driven classroom. Dr. Nancy Sulla has written a book that describes this paradigm shift. Teachers can be taught different strategies to improve their instruction but without the belief in the system, there will not be a change. In the learner active technology infused classroom, there is a belief within the classroom that if the academic rigor is increased, students are actively engaged in their learning and the students are required to take on a bigger responsibility role, they will achieve and success. With the learner active technology infused classroom, students are engaged in real-world problems that provide a felt need (Sulla, 2011) just like project based learning. With the Learner Active Technology Infused Classroom, there are three goals for implementing this practice; Engaging learners, students responsible for their learning and academic rigor.

Engaging learners is something that is very important in the classroom. Even though students can be kept busy with hands on activities, group work or even projects, it does not mean that they are actively engaged in their learning. Students can get their
work done but did they really learn while doing the activity? Teachers need to give students mind on activities (Sulla, 2011). A truly engaged learner is someone who is grappling with the content in significant ways most of the time. They are understanding the concept as well as using their thinking skills to understand deeper implications of the content.

Student responsibility is something that teachers need to build upon because students are used to being told what to do and when they need to complete it by so they don’t understand how to manage their time. The responsibility is taken out of their school lives and they lose a life skill by teachers spoon feeding them. If students are taught how to take responsibility for their assignments, due dates and projects, they will learn how to manage their time and the consequences of not being responsible when it comes to work. Once the students have that felt need of responsibility, they will take action. They will know what is expected of them and they will know when it is due. Students need to be responsible for setting their goals. They need to take ownership of what they are going to learn, how they are going to learn as well as how they are going to share that knowledge. With students taking charge of the learning, students will be in the driver's seat while the teachers are facilitating the discussions.

Academic rigor is something that will naturally follow if students are engaged in their learning as well as taking responsibility for learning. For information to move into long-term memory, it must have sense and meaning (Sulla, 2011). Throughout the years, teachers had a mentality of lecture, drilling skills and memorization. This tactic may work for a short period of time, but students do not remember these things
long-term. Students need time to grapple with the content. They need to be able to connect it through a meaningful problem that they can relate to. From this, they will build a deeper understanding of the content and that will stay with them for the long term. There are easy ways to increase academic rigor through well-crafted assignments, questions, collaboration and projects.

With the Learn Active Technology Infused Classroom, teachers need to remember that this is an all-in or nothing philosophy. Teachers can’t teach math this way and then teacher English the traditional way. The Learner Active Technology Infused classroom encompasses many structures and strategies and seeks to provide the best possible learning environment for all students.

**Conclusion**

In the literature review, the question that I was using to guide my learning was, How can creating a curriculum that fosters student creativity through authentic learning projects enhance instruction in the digital age? The middle school brain, choice theory/constructivism and Project Based learning were the main focus of this chapter.

The young adolescent brain is something that is still very much developing. It is referred to in three different sections and each section has a major job. Middle schoolers make decisions based on their basic needs. If a middle schooler is hungry, they will focus of their hunger. If a middle schooler got a bad grade before a class, they will only be focusing on that. Their brain makes emotional decisions instead of rational ones. They lead with their emotions. Students are still developing their prefrontal cortex and this is where rational decisions are made when this part of the brain is fully
developed. Middle school female students brains develop earlier than middle school males. Middle school is usually where students have a big physical growth but it doesn’t matter how much the develop physically, their brain is still maturing. Research has also shown that the more academic or “intelligent” a person, their brain is still developing at the same rate as their peers.

Constructivism and choice theory are two theories that are based on satisfying a student’s basic human needs. Constructivism is driven on the fact that we learn from social situations. Constructivists believe that there is learning all around us and within our environments. With both of these theories, the learning is focused on the student and how to make a better environment for the student. It is about empowering them and changing them into lifelong learners. Within choice theory, it is giving students the decision power and letting them decide how they want to go about it or how they want to learn about something.

Project based learning is a fairly new approach to learning. It is all based on facilitating a classroom and letting the students guide their learning. As a teacher, one needs to provide the project and make it authentic to the world and the student. The teacher also is there to help the students and guide them in the right direction but not give them exactly what they need. Students need to be engaged in learning, take responsibility in the classroom and teachers needs to increase the academic rigor within the classroom. Teachers needs to find a way to create a superior environment for all students in the class.
Chapter 3

Project outline

Introduction

The purpose of this capstone project is focused on the question: How can creating a curriculum that fosters student creativity through authentic learning projects enhance instruction in the digital age? Chapter 1 was and introduction into my personal education experience and how I became so passionate about this study. Chapter 2 looked at different topics that will help shape the curriculum that I will create. The topics that I focused on were learning about the middle school brain, constructivism and choice theory as well as Project based learning. Chapter 3 will be a look at my school, the classroom setting as well as an outline of what I am hoping to create with my curriculum. In this chapter, I will also look at how this curriculum will tie into our International Baccalaureate expectations.

Private IB World School

The school that I teach at is a private international baccalaureate school located in southern California. We are a school who serves early preschool (2 year olds) through 8th grade. At my school, there are approximately 230 middle school students. Our student population is about 90% white, 6 % Asian and 4% other minorities. Our students are located throughout the county. We are the only school in the county that offers an International Baccalaureate education for all of the K-8 students. The school started out as a religious school but with no church affiliation. This school defines itself through integrity, academics and spirituality. We strive to provide students that
are globally connected to the world, intellectually diverse, interconnected by technology and always learning and changing. Our school prides itself on being a family and having a strong family commitment. We strive to create students who are caring and companionate as well as risk-takers and thinkers. We have a strong arts program that also enhances our program.

**International Baccalaureate**

The school that I teach at is an International Baccalaureate world school. What does this mean? International Baccalaureate is a non-profit educational foundation founded in 1968 (International Baccalaureate, 2017). It has four different programs depending on what grade the child is in. The four programs that they offer are PYP (Primary years programme), MYP (middle years programme), Diploma Program and Career-related Programme. The PYP program is for students who are between 3-12 and it prepares the students to become active, caring lifelong learners. They focus on developing the whole child. The MYP program is for students who are 11-16. During this stage of the program, students work on making practical connections between what they are learning in the classroom and what is going on out in the real world. The Diploma Programme is for students who are between 16 and 19. Here students are working on developing a depth of knowledge that goes beyond what they studied in the MYP program. The newest program is the Career-related Programme. Students range from 16-19 years of age and the focus here is on a specific career with emphasis on apprenticeships or employment.
Middle Years Programme

At the school I am currently at, I teach in the Middle Years Programme. Students are required to take 8 core classes. These classes are Design, Language Acquisition, Math, Science, Individuals and Societies, Language and Literature, Arts and Physical Education. Each subject is considered a core subject and requires a minimum of 50 teaching hours a year. Students are engaged in real world projects as well as interdisciplinary units between 2 or more core subjects. Besides the actual content that students are learning in each of their core classes, there are other things that they focus on in every class they have. International Baccalaureate classes design units with a conceptual understanding as well as different approaches to learning. One big thing that International baccalaureate school focus on is service as action. Each one of these are integral parts of the international baccalaureate program. The subject that I am teaching is Design. Design can mean many things to each participant but in this class we focus a lot on technology design. Students will have this class 2 times every 6-day cycle. Each class period is 50 minutes and there is usually only 10-15 minutes of homework each week. In the design classroom, we follow the international baccalaureate design cycle that has four different major strands with 4 minor strands in each major strand for a total of 16 strands.

Method

A partial familiar method that I have been looking at to create my unit of study is called authentic learning tasks. Authentic learning tasks are created with the real world in mind as well as building in student choice and student voice. These units are
compared to the more well known, Project Based learning units but these will have student choice incorporated into each unit. This is not a philosophy that is meant to stand alone; it is meant to be a solution to many of the challenges facing schools today. (Sulla, 2013) These units really focus on problems that are relatable to the students. Something that they have heard of from the news or something that seems relevant to their lives. We are not solely talking about things that happened in the past or things that the teacher thinks are important. We are bringing purpose and meaning into each of the units that are provided. Creating authentic learning units allows a teacher to become a facilitator to help guide the students but really lets the students take charge of their learning and really dig deep within the content.

**Curriculum Overview**

Over the last year of my teaching, I was faced with many new challenges. I am in charge of creating the curriculum for my international baccalaureate design classes for 6th, 7th and 8th graders. For this capstone, I am going to focus on the 8th grade students. The curriculum is going to progress throughout the year. The theme that I am going to use will be One Voice. We will be focusing on this statement all year and will revisit it frequently. Since service is such a big part of the international baccalaureate program, the 8th grade students will start out with a service project. With in this first unit, students will be working on an interdisciplinary unit tied to science. The students will be working with a company called enable, the hand challenge. Students will design, 3-d print and assemble a prosthetic hand for children who are in need. These hands will be shipped out to different countries through the E-nable the future company.
In science they will be learning about simple machines and how our hands function as a simple machine. When they get to science they will have completed the first part of the project which is designing and printing the hand parts. During the unit, students will be creating a website to document their understanding of and journey in making the prosthetic hand. When the students have assembled their hand, they will edit their videos, pictures and create their website submissions to share their learning. After this unit, students will then have a choice of multiple courses they can take. Each final project that the students will create, will also reflect in a theme of their choosing. The courses that the students will be able to choose from are: animation, digital design, programming and film production. Once the students have selected their course, they will have to stay in that course since I am planning on having them create a final project that will take time to create.

In the animation course, students will be working on skills that will allow them to create a short-animated film. Students will be working with different design programs that will allow them to create characters, backgrounds and lip-sync animations. There will be 4 projects leading up to the final animation. Students will have a brief knowledge on animation from a project that they completed in the year prior so for their first project, they will create a character to star in their final project. The next topic will deal with character movement. They will be studying lip-sync animation and walking/running movement. For their last topic of study, they will learn about background and foreground animation. For their culminating project, students...
can work in groups to combine all of their projects into a short animated movie to be shown at the end of the year showcase.

In the digital design course, students will be working primarily with Photoshop. They will create and make different projects that will be used around school or in their life. First students will become familiar with Photoshop and all of the different tools that are involved with this program. Next students will create a photo that merges two photos together for a teaching aid in the lower school titled, Can you trust everything on the internet? Next students will create a poster for the theater program that advertises their spring musical. They will work with their client, theater teacher, create this. Students will then show off their work and have one that will be used as the official poster of the musical. The final project for the digital design students will be creating an advertisement for a summer school class of their choosing. They will research and interview teachers who are teaching that class to understand what the program is and what student will do in that classroom. My hope is that these posters will hang around school to get students to excited about our summer school programs.

The last course that will be offered is film production. Here students will learn the art of digital storytelling and will create a short films about something that they are passionate about. Students will first learn about adobe premiere and how to use it. They will create short films about a topic to deepen their understanding of the program. Then students will learn about different components of creating films and what goes into it. Once students become familiar with the art of filmmaking, they will then create a documentary about something that they are passionate about for their final project.
Summary

Working in an International Baccalaureate school in Southern California has presented me with the opportunity to create what is being taught in my classroom. Teaching technology design to 6th through 8th grade in a private school has allowed me to take what was previously taught and make it better. Students will be given the opportunity to have a say in what they would like to learn about and how they would like to learn about it. In the 8th grade year, students will be working on different projects that will involve learning different skills based on their interest. They will be using authentic learning tasks to help drive the instruction. Through these project, students will be able to have choice within each project and each project will be authentic to the student. With this curriculum that I will be creating, the teacher will become the facilitator and the students will create learning opportunities for themselves.

In Chapter 4, I will consist of me sharing my journey of creating the 8th grade curriculum. It will focus on the highs and lows of the project process as well as an overview of the actual project. There will be detailed outlines of each course and will follow the international baccalaureate strands and development guidelines.
Chapter 4

Overview and Reflection

How can creating a curriculum that fosters student creativity through authentic learning projects enhance instruction in the digital age? This question is what drove my research for this paper. As I was learning and growing, it also gave me a spark to create and want more for my classroom. Throughout this process, I have had a lot of highs and lows, but I know that it is all going to be worth it in the end. My students will benefit from my hard work. Creating a curriculum that gives the students the freedom of choice and knowing that they will have a voice in what they are learning about is going to really help with their attitude as well as understanding and enjoyment of school.

Chapter 4 will be a reflection on my journey through this process and what is still to come with this project. Throughout this paper, I have talked about my journey into the education world, done research to gain a better understanding of different topics related to my curriculum and laid out a brief description of what I am planning on creating for my curriculum. In this chapter, I will be reflecting on the process as a whole. I will discuss what I have learned through this whole process, revisit my literature review, look at the outlines of my project, talk about the limitations, implications and recommendations for future projects. Also in chapter 4, I will be sharing my personal views on the project as well as what the future holds for it.
What I have learned

This project has really opened up my eyes to all that goes into writing curriculum. The first thing that I learned was when I was writing chapter 1. I have never really sat down and thought about my past and how it has really shaped my current situation. I enjoyed looking back and revisiting some of the positive and negative things that had a role in my future. As I wrote chapter 1, I saw all of the connections between my school life in middle and high school and how I developed my current teaching practice. It was an eye opening experience for me to see those connections. Another thing that I learned throughout this process was when I was researching for my literature review. I found it very difficult to comb through all of the different resources. I became overwhelmed with the amount of books, articles and videos that would pop up in my search. I think that half of my life spent on the literature review was picking through all of them to find just the right one. In the end, there was not one perfect one. I had to stop myself throughout this process because I would get frustrated thinking that there would be one more article that would give me the best information but in the end, they all had valid and important information.

I think that the one thing that surprised me was learning about how the middle schoolers brain works and where they are developmentally. This is my second year of teaching middle schoolers and having that understanding has really helped me in my classroom. Having a better understanding of the developmental stages that the brain goes through during that time really played into the types of activities and choices that I added to the curriculum.
The last big thing that I learned through this process was really having creative freedom to create curriculum. I have never had the freedom of creating a curriculum. Since this is my first time in private school, I really had the opportunity to create units based on what I think the students would like to learn about and are interested in. With that being said, I found this new freedom to be very challenging. As a public school teacher, I always wished for the freedom to teach what I wanted to teach but now that I can I am finding it very overwhelming. When given the opportunity to teach whatever I want, I am finding that my mind is running in about a million directions. I had the ability to create anything and I felt like this was a roadblock for me. It was too big of a luxury and I need help narrowing it down. I decided to brainstorm different ideas that as a kid I would have wanted to learn about, ask other teachers about things that they wanted to see their students be able to do as well as talk to my administrators about what they wanted out of this class.

Once I had a better understanding of the direction I was headed. So for this project, I decided to keep some of the old concepts but turn them into units that I felt comfortable teaching and add some new things for the students to learn about. I think that doing this has allowed me to use parts that I enjoyed about the old curriculum but gives the feeling of freedom to change and tweak what I want. I was surprised that this was one of the most difficult things for me during this process. I think in my case too much freedom seemed to weigh me down. I will say that I am glad that I experienced this because I think that it gave me perspective on how students might feel if they were given the choice of doing anything with boundaries. To some it might be jubilation for
others it would be very stressful and not enjoyable. I know that I need to give choice within reason.

**Literature Review**

In chapter 2, I sifted through mounds of books, articles, videos and websites to help me better understand different components associated with my research question. The topics that I believed would best help me through this process was adolescent brain development, Constructivism, choice theory and Project based learning. As I researched each one of these topics I was fascinated by learning about the brain. This surprised me because I ever really enjoyed reading about medical things when I was younger. I think that as I get older and work with different ages of students, it has sparked an interest in learning about it.

As I look back at all of the things that I read, I think that learning about how a middle school thinks and comprehends was one of the most beneficial things that I did. Taking classes in college about brain development led me to believe that I had a basic understanding of student development but the more that I read about this topic I realized that I only had a very basic understanding. It was very interesting to learn about the different parts of the brain and their effects on our actions. As a teacher new to middle school, I read all that I could about information given in the classroom as well as emotional needs that these student would have. Adolescent brains are rapidly developing and being a teacher on that age range, I need to be sensitive to that. Peter Lorain (2017) states, “Adolescents are moving from concrete to abstract thinking and to the beginnings of metacognition.” During this period of growth,
students are learning to think critically, plan and control their impulses. Since this is a learning stage for students, they have not mastered all of these skills so as teachers we need to be aware of that. We need to give them the tools to be successful and we need to work with them so they can feel successful. After having a better understanding of how the middle school brain develops and the social and emotional components that go with that, I was able to adjust my expectations and choices that I gave students. Learning all about the brain has really enabled me to create lessons and activities that students should enjoy as well as understand.

Another thing that I found very helpful in creating my curriculum is digging deeper into Project Based Learning. I really enjoyed reading a book called, “Reinventing Project Based Learning Your Field Guide to Real-World Projects in the Digital Age” by Susan Boss and Jane Krauss. This book was helpful in the fact that it really focused on digital learning. I loved that they made a point to remind us that we didn’t need to throw away all that we already knew about project based learning, we just need to amp up our goals. With project based learning, we create open ended questions that force students to collaborate with others. It also naturally create student choice so they are interested in what they are learning about as well as have ownership over what they are producing. This deeper understanding really helped me to think about my units and the different activities that I am creating and made me reflect on what was my goal for the learning unit. I think that as I was creating the units, I always made sure that I had an end goal in mind and that it was something that I
think the students would be interested in. Project based learning for me is something that is going to give the students excitement. Excitement for the project, excitement for the learning and excitement for the potential to make a change in this world. When the students feel like they are having a say or impact on something, they are always willing to work a little harder or longer because they know that it has meaning.

**Project Overview**

The first project that I created for my 8th grade student is called the Hand Challenge.

**A HELPING HAND**

Think about your daily routine. When you woke up this morning did you turn off your alarm clock? When you stepped into the bathroom did you brush your teeth? Did you turn on a light when you got out of bed? You probably didn’t even realize how valuable your hands are. Imagine what it would be like if you did not have one of your hands. How would your daily life differ?

Ms. Greenfield have enrolled you in the hand challenge to help a child in need. In the next couple of weeks, your group will create, print and assemble a prosthetic hand to
send to e-Nable. They will distribute the hands to children in need. Throughout the process, you will be keeping a personal website to track your progress.

Here is a link about the Hand Challenge.

Once my students complete this project, they will then move onto picking a technology track that they are interested in learning more about. The different tracks that they are choosing from are; 3-d Animation, Film production, Programming and Graphic Design. Within each of these tracks students will learn by completing activities, projects and lessons that help create a better understanding.

For 3-d Animation students will be working with the program Maya. They will learn what an animator does, how they create different animations as well as create many short animations of their own. Students will first learn about the animation platform Maya. They will be creating a very short animation that they created called Space Race. Once they have a brief understanding on the maya platform as well as some of the most useful tools in maya, we will move on to character animation. Students will design and create a 3-d character using the maya software as well as learning how to make their character walk, run and talk. Once students understand how to do all of this, they will get the chance to put it all together. Students will create a short animation about anything that they want. They will use the skills that they have learned through the year to create this animation.

For the programming students, they will first start the year off with learning the programing language javascript. Once the students have an understanding of this language, they can choose to also learn another language. Depending on what they
would like to do with this language, I will help guide them to the right one. Suggestions for languages will include python, C#, C++, or Ruby. Once students have become familiar with this language as well, they will have the opportunity to create something with code. Students will have the creative freedom to program anything that they want as long as the code is written in their language of study.

For the film production students, they will be working with the platform Adobe Premier Pro. Students will first become familiar with Premier pro by creating a short 1 minute video that shows the point of view of an object that they use everyday. Students will then become familiar with how to edit their clips, add sound, titles and transitions as well as finalize their work. Once they are comfortable with the program, they will then have opportunities to create multiple short films to show of their learning. They will create a music video, infomercial, documentary and fiction film.

The last option for the students is going to be graphic design. Within this track students will use adobe photoshop to help edit and manipulate their designs. To understand how to create images in photoshop, students will work on creating a “Frankenstein” monster of themselves. They will learn all about how layers work, transforming pictures and quick selecting images. Once they have a good understanding of how photoshop works, they will take on the role of a graphic designer and create images for clients throughout our school. They will be working on a design for our spring production, they will help create advertisements for the school and they will be tasked with creating a visual that represents their time here at St. Mary’s.
Within each and everyone of these units, students will have a voice in how to lessons are taught and what is taught. Students will also have choice in what they are going to produce through each unit. All students will present their work at our end of the year EXPO to families, friends and our community. MYP Technology Design Website

Limitations and Recommendations

Some limitations that I foresee are time and expectations. I think that one of the limitations that I will run into is running out of time. I always want to pack many things into my lessons, and I want the kids to get excited about what they are doing but I always seem to run out of time. I only see the students twice every six days and I want to make the most of my time but every class the bell rings and students are rushing to get things finished. I think that I will need to make sure that I am keeping the tasks simple as well as broken down into digestible bites so I don’t lose their interest, attention or focus. With each of these projects, I am going to have a structure that students will easily be able to follow along as well as checking off tasks.

Another thing that I see as a limitation is the fact that students really don’t have a lot of freedom during the school day and they may not know what to do with all of that freedom. I think that I will have to keep very clear expectations on what is going to be done during class and making sure that I am available for all students during that time. I do foresee that I maybe pulled in many directions because students will be learning at different speeds and learning different things but I have to be prepared for that. I know that once the students understand my expectations and they understand what they are required to do, I hope that they will really learn to love this set up and will grow. I hope
that my students will really put in effort and not just do exactly what they direction's say. I want them to strive for better and not the minimum that is required.

**Final Thoughts**

This has been a long process for me. It has been quite the journey and has also been an eye opening one. I think that for the last couple of years I have wanted to see a change in what I was teaching and now I have finally created a path to create my dream. Now that I have completed all of this research and really developed a curriculum for my middle school technology design students, I am excited to see how it will work. I also am hoping that if this style of teaching and learning goes well in my class that I can share it with colleagues and see if we can make middle school more exciting for all that attend. I want student to look forward to coming to school and wanting to be in class. Students should be excited, and thinking about what is happening in class as well as bringing what is happening in the class home. Students should develop a love for learning and understand that learning never stops. In an ideal world, it will go smoothly:) but in reality, I know that there are going to be some hiccups but I am hoping that the students will enjoy the freedom of choice and voice that the curriculum will give them.
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