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Steam And Social Studies: Creating An Integrated Classroom

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STEAM AND SOCIAL STUDIES: CREATING AN INTEGRATED CLASSROOM

By

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ABSTRACT

Penner, A.: STEAM and Social Studies: Creating an Integrated Classroom

The purpose of this capstone is to address the question *what strategies does the research recommend for supporting social studies educators in integrating* Science, Technology, Engineering, Arts, and Math (*STEAM) practices into their core content?* STEAM education has been adopted by many American school districts to help prepare students to be successful in 21st century careers. With a focus on problem-based learning and critical thinking, STEAM education can teach students real world skills. The goals of social studies education include preparing young people to be empathetic, active members of society. When teachers are educated in the best methods of integrating STEAM and social studies, students benefit. My review of the research literature lead me to conclude that there is a lack of research and support for social studies teachers in this endeavor. Through this capstone, my goal is to create professional development sessions that are directed at middle school social studies educators with the objective of engaging them in the planning, creation, implementation, and evaluation of STEAM integrated lessons. The professional development series includes a two-hour session designed to inform middle school teachers on the research behind integration, teach skills and strategies for creating integrated lesson plans, and provide time for collaboration, reflection and feedback. Following the two-hour session there will be four, twenty-minute follow-up sessions for collaboration and reflection throughout the year. My interest in this project comes from my personal experiences both as a student and as a middle school social studies teacher. The long term goal is that through teacher education of

purposeful integration, social studies teachers can find meaningful ways to integrate STEAM content and skills into social studies curriculum.

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CHAPTER ONE

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Overview Capstone Inquiry

The purpose of this project is to create professional development for middle school social studies educators to be trained in research-based strategies to integrate science, technology, engineering, arts, and mathematics (STEAM) education elements into their current curriculum at the middle school level. The research question is: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?*

In my experience teaching social studies at a STEAM magnet middle school, I have found that many of us who do not teach core STEAM classes have been left to explore, research, implement, and analyze the use of STEAM practices in our classroom. My review of the research literature lead me to conclude that there is observed a lack of research and support for humanities teachers in this endeavor. Through this capstone, my goal is to create professional development sessions that are directed at middle school social studies educators with the objective of engaging them in the planning, creation, implementation, and evaluation of STEAM integrated lessons.

Chapter One will explore my personal experience with the central question as well as an explanation of my personal/professional belief in the importance of both the humanities and STEAM fields. The chapter begins by explaining my current position and my experience with both history and the creative design process. Next is a discussion of the value of the project created in this capstone and how I and other social studies teachers would be able to use my research in our teaching. The final section will outline the chapters to come in this capstone.

Importance of Capstone Question to the Writer/Researcher

From a young age my two great passions were creating and history. As a child growing up in Wisconsin in the 1990s I would work on the small loom my parents had given me for a birthday while singing along to the School House Rock History Rocks tape. The tape was purchased for me by my local librarian because I had checked out their copy every week for almost a year. To support my passion for history, it was common for me to beg my sister to tell me what she had learned in history class that day. Being three years older than me, what she was learning about the Revolutionary War or the American Constitution was far more interesting than what was being taught in my own classes. I would look at her school books and draw illustrations of one room school rooms and Ojibwe wigwams. My parents observed my interests and wanted to encourage them.

My mother bought me a book of colonial crafts that taught the reader how to recreate dolls and decorations in the same style and using the same materials as young women would have done in the thirteen colonies. Once I learned that the house in the country about a half mile from my own had at one time been a school house, I was fascinated with taking that walk while imagining myself as a nineteenth century student, even once making the trek in the dead of winter just to see what it was like. Learning history and finding a way to make a physical connection to the people of the past was a passion of mine.

As an older student my interests progressed with my education. My love of history always kept me one step ahead of my classes in content as I would find and devour any book, show, or website relating to what we were learning in school. My love of creating led me to the fiber arts including weaving, embroidery, sewing, knitting, and crocheting.

Once as a highschooler while looking for a new mitten knitting pattern to make I stumbled upon a pattern that had been written by Eleanor Roosevelt. It was remarkable; not only was there a new side of the well known first lady, but I was creating something she had created, in her words, and make an exact replica of something that would have been created by a woman and sent to a soldier fighting in World War Two. The connection between my two passions was deeply embedded in myself as a learner and remains to this day. Still in 2019 I am using the Eleanor Roosevelt mitten pattern (as well as a hat and scarf pattern she created) and it always leads me to new questions and a deeper level of understanding to people of the past.

From my early love of learning history came a love of school and education which quickly led me towards a career as a teacher. Never doubting my desire to become a social studies teacher, my undergraduate courses were tremendously entertaining leading me to a whole wealth of topics to research and ideas of things to create. It was normal for me to seek connections between my learning and the evidence of the past all around me.

For example, during college on a trip to visit a classmate in Savannah, Georgia we went to a Civil War fort that had been turned into a museum by the Works Progress Administration. It was located near some tide pools. That semester I had also taken a course on Slavery, Civil War and Reconstruction, a course on the Great Depression and the New Deal, and an introductory level botany course. It was amazing how all three topics were interconnected in the very place that I visited. One thought connected to another and no one course was isolated or shown to be more significant than the other. I learned a deeper and more significant understanding when the topics were intertwined than when they were separate. That experience reinforced the value and importance for not only finding personal connections with people of the past as well as the

importance of finding connections between content and seeking out a more holistic education experience.

My passion for learning, history, and creating has led me to this point in my academic and professional career. Through this capstone, my goal is create a professional development that supports myself and other teachers in creating opportunities for similar connections to be made for current social studies students.

Teaching Social Studies and Increasing Student Engagement

After completing my degree in 2012 and received my teaching license, I accepted a job as a middle school social studies teacher in a Minnesota district. One of the first things I learned teaching Minnesota Studies, World Geography, and U.S. History was somewhat disheartening; many of my students found these classes to be boring.

Students were entering my classroom with a preconceived notion that social studies classes involved reading, or listening to what the teacher read, and writing down answers. Understanding how my students could feel this way, I was determined that my passion alone would shake these student expectations and my middle school students would learn the same excitement and joy for the humanities as me. Needless to say, my first year teaching made clear that this goal would not be so simple. Despite my passions, many students still found History to be dull. It was heartbreaking.

In my second year of teaching, my strategy was to reverse engineer a solution to this problem. This process started by asking my students what classes they prefer and what they liked about them. I heard many different answers; Science was the favorite topic of some because of the freedom to explore within the scientific methods and create different projects with it. Others loved

English Language Arts because of its wide variety of novel genres to choose from. Some students did love social studies, but they liked the freedom and creation involved in Tech Ed. Others loved math and would rather do equations than read about Industrialization and the effects on society. While the answers varied, something was consistent; students preferred choice.

This is by no means a complete revelation, but my goal was to use my students' feedback to think about ways to increase the opportunity for student choice and creation within the Minnesota Social Studies standards. My entire focus was on revamping an upcoming project with the idea of creation, student choice, and the elements of STEAM. My reverse engineering resulted in a research based student project on the Civil War. Students were given an introduction, an outline for thorough research, and then were challenged to come up with their own creations to teach their topic. While some students struggled with the research, every student created something they were proud of. The journey of one student in particular motivated me towards this capstone topic.

This eighth grade student had not previously been particularly engaged in the content and appeared to be going through the motions to receive a grade. He choose to research Juneteenth Day, a celebration remembering the day enslaved people in Texas learned of the Emancipation Proclamation. Being African-American himself, he felt a deep connection to the topic and had never heard of it before. He struggled somewhat through the research, as it was rigorous, getting stuck and asking for help along the way.

However he persisted and was motivated by the creation he had in mind; a 3D recreation of the symbol of Juneteenth Day, hands breaking free of their chains which he had proudly described to me and some of his peers. He persevered through the research, created his 3D model (even

spending time after school completing it) and set in in the front display case. His pride was obvious and because of the research and hard work he had done, he was also able to explain what Juneteenth Day is and why it matters. Given the value my students found in choice, the next challenge for me is identifying ways to integrate STEAM in all my history classes.

Finding STEM in History

My success with one of my first experiences encouraging and intentionally integrating STEAM elements in my Social Studies class has encouraged me to seek out new and more subtle methods for bringing it into my teaching. While I will continue to use this project and will continue to revamp others, I am also interested in integrating more elements of science, technology, engineering, art, and math in my day-to-day classes. While the culmination of hard work in the form of a physical creation will remain being a goal, I am also interesting in researching methods and practices to bring elements of STEAM into smaller scale activities as well. Through the integration of STEAM education practices with social studies content, my ultimate goal will be to increase student engagement, encourage genuine exploration and interests, and allow students opportunities to embrace a growth mindset. This integration will be fundamental to addressing the capstone question and speaks to importance of my capstone for other stakeholders

Potential Importance of the Capstone Question

This capstone has the potential to benefit a variety of stakeholders. For example, social studies teachers could benefit from it by providing them with research on the topic of STEAM integration and practical classroom methods for day-to-day use. It could also benefit administrators in STEAM schools who are seeking ways to encourage all teachers to continually explore how to bring STEAM into their classrooms, regardless of its inclusion in the acronym.

This capstone has the potential to benefit middle school students who struggle to make connections with the past or who have found themselves dreading a history class because they feel a lack of significance. Finally, a benefit to me in my local context is how this project will support me in my own teaching practices and grow my leadership abilities because of supporting t my coworkers in their professional development.

Summary

With this capstone I hope to answer the question: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?* Chapter One is a description of how my childhood and experiences as a social studies teacher in a STEAM magnet school impact my desire to find more effective ways to integrate STEAM in my curriculum. Chapter Two of this capstone will be an analysis of the current literature on the topic seeking to explore STEAM, social studies, and effective integration methods. Chapter Three will be include the creation of a professional development session directed at social studies teachers at the middle school level. Finally, Chapter Four will be a final thought and conclusion on the research, project, and journey.

CHAPTER TWO

Literature Review

Introduction

In Chapter One I described how my childhood and my experiences as a social studies teacher have impacted my desire to find more authentic, research based strategies for integrating STEAM and social studies. In Chapter Two, I provide a guide to the literature which explains exactly what STEAM education is, the importance of social studies and the benefits of an integrated classroom, and the best methods for both integrating curriculum and providing educators with the strategies and support needed to make these changes. In this chapter I address the question: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?*

STEM Education

J. Bequette and M. Bequette (2012) describe STEM education as the integration of Science, Technology, Engineering, and Math. With an increasingly globalized American society, STEM education has been the tool used to prepare American students to achieve academic success. The author notes that since the second half of the 20th century, the National Science Foundation (NSF) has encouraged the incorporation of engineering and math with a comprehensive science curriculum. By identifying the importance of technology in this balance, J. Bequette and M. Bequette (2012) describe that the content areas of science, technology, engineering and math morphed to create the STEM acronym.

Six authors (J. Bequette & M. Bequette, 2012; Liao, 2016; Gess, 2017, Blazer 2017, English, 2017) describe different reasons why STEM education is important for the United States.

Bequette and Bequette (2012) indicate that the purpose of STEM education is to prepare students for the high tech workforce of the future. Liao (2016) rationale for the importance of STEM education is based on its role in economic growth. She states that the "rhetoric of STEM education starts with the belief that future economic growth and innovation in the United States relies on STEM fields" (p. 44). Gess (2017) argues that improving STEM education has the potential to improve the standard of living for people all over the world. She connects the relevancy of STEM education to the betterment of the globalized world arguing that improving science, technology, engineering and math helps the global world improve lives.

Gess (2017) also argues that a majority of careers in America require critical thinking skills, mathematical knowledge, and oral comprehension and expression. These are skills that are characteristics of STEM education and careers in the STEM fields. The United States has recognized that to improve the standard of living for its citizens, students should be prepared to work in a globalized world characterized by technology and need for scientific literacy. Gess (2017) states that STEM education encourages a creative thinking mindset that is necessary for solving problems in a modernized world Blazer (2017) adds that STEM education increases academic rigor.

Both Gess (2017) and Blazer (2017) describe how, "STEM-focused teaching is described as a way to increase academic rigor in schools and introduce students to skills and knowledge that are believed to be of growing importance to tomorrow's workforce" (p. xix). Finally, English (2017) acknowledges STEM education is viewed worldwide as a critical component of education. She says "considered essential to promoting innovation, productivity and overall economic growth, STEM education is seen as critical across many nations, fuelled in part by perceived or actual

shortages in the current and future STEM workforce" (p. S6). These six authors all emphasis the significance of STEM education in the American school system for the academic rigor, career potential, and as the benefit of the global lives impacted.

While the current literature embraces the modern value of STEM education, it suggests that it has not yet been successfully integrated in many classrooms for a variety of reasons including the lack of true integration and a disregard of creativity and critical thinking in the application of STEM education.

Gess (2017) suggests this is caused by a lack of consistency in what effective STEM education look like. Gess (2017) also has suggested that a practice of isolating each separate content rather than integrating them has been detrimental to STEM. Gess (2017) explains that when these curriculums are integrated in classrooms rather than siloed, STEM classes better prepare students to succeed in real life or career applications of STEM.

Madden's (2013) critique of STEM education is that in many practices students are taught basic scientific techniques without attention to creativity and problem-solving skills. While an understanding of science and the scientific method is necessary for many STEM careers, it is not the only skill necessary. Many of these careers require the ability to problem-solve, communicate, and think creatively to find modern solutions. Madden (2013) suggests that modern employers "are interested in identifying ways to foster creativity in the context of science to encourage the kind of visionary innovations that will be needed to solve complex problems" (p. 542). The full potential of STEM education does not lie in technical skills alone, but must also include problem solving and creativity.

In attempting fill in the gaps of STEM education, another content area has been incorporated to teach critical thinking skills as well. Liao (2016) indicates that this critique of STEM education led to a change in how STEM curriculum is framed. Liao (2016) describes how the arts are seen as a way to cultivate creativity, which lead to the arts gradually being integrated with STEM. This integration has created hybrid field called Science, Technology, Engineering, Arts, Math or STEAM. The creation of STEAM has lead to the development of curriculum that not only challenged students to use skills developed in STEM but to make interdisciplinary connections and to develop creative and innovative solutions .

While many of the original critiques of STEM stated previously also apply to STEAM, the review of the research literature for this capstone supports the view that most experts see STEAM as an improvement upon the original STEM model with the goal of preparing students with an education with real-world applications. J. Bequette and M. Bequette (2012) argue that "interdisciplinary work in the arts and sciences can lead to curricular components that combine aesthetic and analytical models of thinking to the betterment of both science and art" (p. 43). By combining science and art, students are gaining experience in the type of creative problem solving skills that are necessary in many of these fields. Liao (2016) claims "one of the strongest arguments for STEAM derives from the view that creativity is the most important ability in the 21st century" and that "accordingly, the arts offer an important way to cultivate creativity" (p. 44). The use of STEAM over STEM in many American schools has led to a focus on critical-thinking in a variety of classrooms and how it can support the design process and problem based learning.

The Design Process and Problem Based Learning (PBL)

Gess (2017) recommends an approach to STEAM education that seeks to enrich classroom education with deeper understanding of real world problems as the focus on the design process. Designing STEAM education to use the design process, according to Gess (2017), is critical in facilitating critical thinking that embraces and grows from failure. Another advantage of using the design process when designing STEAM is how both engineering and art use it to make a meaningful connection to encourage the growth and development of students and adults that are globally literate citizens (Gess, 2017).

In addition to Gess (2017), J. Bequette and M. Bequette (2012) also advocate for the use of the design process in development STEAM program and elaborates on its components. J. Bequette and M. Bequette (2012) states that the design process, though often associated with engineering itself, is a method of identifying a problem, developing solutions, creating a prototype, testing and evaluating, and redesign. The traditional eight step model of the design process used in engineering can also effectively be implemented in an arts or STEAM setting.

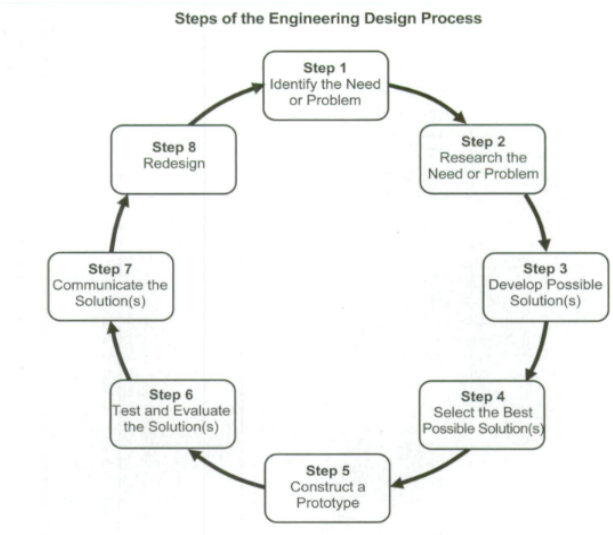

Figure 1. "Steps of the engineering design process" (MA Department of Education, 2006, p. 84).

J. Bequette and M. Bequette (2012), while addressing the fundamental differences of the design processes in arts and engineering, most significantly the importances of aesthetics in the former rather than the later, ultimately make connections to strengthen the similarities between the two. They describe that arts and engineering both require complex, design-oriented thinking and that students of both require the ability to view design as inquiry, embrace failure, maintain focus on a big picture solution, and think and communicate as a team. As an extension of the design process, J. Bequette and M. Bequette (2012) is problem-based learning (PBL) which the authors also views as a fundamental approach to STEAM education. Goodnaugh and Cashion (2006) define PBL as

> a curriculum and instructional approach in which students work in small collaborative groups; leaming is driven by open-ended, authentic problems; teachers act as facilitators of learning; and students develop content knowledge while engaging in a comprehensive set of cognitive processes. (p. 282)

They examine a meta-analysis (Vernon & Blake, 1993) which found that while students in PBL classrooms reported more positive attitudes and opinions to their courses, there were no differences in performances on science tests compared to students in traditional classes. Though Goodnaugh and Cashion (2006) acknowledge the effectiveness of PBL is not conclusively positive, their study reveals that teachers who embrace PBL do so to help foster creative, problem solving skills.

J. Bequette and M. Bequette (2012) describe PBL as “a way to motivate and integrate authentic learning in a discipline” (p. 44). These authors recommend the addition of PBL to STEAM because it “ . . . develops student’s higher order thinking skills as they investigate

ill-defined problems drawn from real life situations" (p. 44). For J. Bequette and M. Bequette (2012), PBL becomes another method for students to get the opportunity to apply STEAM skills in cross-curricular, real life scenarios.

Like J. Bequette and M. Bequette (2012), Liao (2016) also views PBL as an integral part of STEAM education. Liao (2016) describes PBL as an approach which "encourages student to see connections among their knowledge, skills, and abilities and to draw on these connections in advancing their own education and eventually contributing to solutions to 21st-century problems" (p. 45). Liao (2016) also points to the specific role of the arts in PBL saying that "creative problem solving through artmaking should be at the center of this approach" (p. 46). PBL has been identified as a way to both enrich STEAM education and to allow students more experiences with real-life problems.

STEAM education has been determined by the literature to be a productive and necessary tool to prepare American students to participate in a globalized world. In addition to the knowledge gained in science, technology, engineering and math, STEAM education encourages critical thinking and problem solving skills through the design process and PPBL. In order to continue to foster this growth and develop these skills further, STEAM integration should go beyond the classes represented in the acronym and should be used in social studies classroom as well.

Interdisciplinary Education in Social Studies

In the American education system, the outcome of social studies is to prepare students to be well informed citizens. Also, while not explicitly focused on literacy goals, higher levels of literacy and critical thinking skills are valuable outcomes of social studies curriculum. The National

Council For the Social Studies vision for K-12 social studies education is to create “a world in which all students are educated and inspired for lifelong inquiry and informed civic action” (NCSS, 2018, par. 1). Despite the importance of these outcomes, the research in this chapter will suggest that social studies often takes a back seat to other contents, particularly Math and Reading. Through purposeful integration of social studies with STEAM, the learner outcomes for all subjects improve. Both Social Studies and STEAM courses are promoted with interdisciplinary curriculum. The benefits of an integrated approach to Social Studies and STEAM are significant to both individual learners and society as a whole.

Role of Social Studies in American Education

The ideal outcome for Social Studies education is often described as preparing young people to be active members of society. Social studies teaches students how to participate in their community. B. W. Pryor, et al. (2015) describe Social Studies as having the role of teaching students today how to be productive members of a democratic society. They write, “the social studies have had the educational mission of preparing the nation’s next generation to participate in a democratic society” (p. 123).

Hinde (2005) agrees that social studies prepares students to be active citizens saying, “Social Studies primary purpose is the education for citizenship” (p. 105). Expanding on Hinde’s (2005) description of the role of social studies is the The National Council of the Social Studies (NCSS) (as cited in B.W. Pryor et al. 2015). The NCSS (as cited in B.W. Pryor et al. 2015) states, “The primary purpose of social studies is to help young people make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an

interdependent world" (p. 124). In addition to developing a well-informed society, Social Studies education can also be tied to promoting literacy.

Hinde (2005) indicates the importance of students learning to read to the importance of the Social Studies purpose of teaching citizenship. She says:

> What is the ultimate goal for children learning to read? It is difficult to answer that question without broaching the subject of citizenship. To wit, it is important for student to become good readers because we want them to become productive members of society; we want the next generation to be able to sustain our country's place of international prominence; we want our students to appreciate the problems that past generations have overcome; we want them to be tolerant of other religions and cultures while being firmly grounded in their own. (2005, p. 105)

In the previous quote, Hinde (2005) makes a strong case that Literacy and Social Studies are inherently connected. Through reading and writing, students become informed citizens and prepare to contribute to their society. While social studies is not explicitly a literacy subject, improved literacy is a byproduct of the main goals of social studies

In addition to literacy and citizenship, social studies also teaches critical thinking and problem solvings skills foundational to the STEM and STEAM curriculum. For example, Harshman and Kılınç (2016) say, "Through the incorporation of technology and cross-cultural learning opportunities, social studies educators foster critical thinking and expose their students to multiple perspectives across time and space" (p. iii). In addition to critical thinking, social studies teaches a worldview that is needed in solving future global problems another focus of STEAM. B.W. Pryor et al. (2016) say that similar to the problem-solving skills necessary for STEM

education, Social Studies addresses the need for the workforces of the future to solve complex problems. The problem-solving skills referred to by B.W. Pryor et al. (2016) are also important in STEAM.

While the value of Social Studies in both promoting citizenship, literacy, and critical thinking skills is often stated, Social Studies fades in importance when compared to many other subjects. Hinde (2005) describes how in the elementary curriculum, social studies often falls to the wayside and is seen as subject to teach only if time allows. While elementary teachers value social studies education, because of the significance of standardized tests that do not include social studies they often choose to focus on those subjects that are heavily tested such as math and reading (Hinde, 2006). B.W. Pryor et al. (2016) also reach the same conclusion saying, "the social studies are often considered less central than English and mathematics [. . .] The increased marginalization of social studies has been well documented, especially at the elementary level" (p. 123). Both authors conclude that because social studies is not a paramount section of most standardized tests, many teachers choose to focus very limited time and resources on the subject.

One solution to the trivialization of social studies that not only addresses the pressure for teachers to focus on tested content but also teach the fundamentals of citizenship is to integrate social studies into math, science, and reading and vice versa. Hinde (2005) states,

> the problem for elementary teachers is how to continue to stress the areas of the curriculum for which they will be held most accountable (reading and math) without sacrificing social studies. One solution that continually is posed is to integrate social studies content with those areas that teachers are already teaching. (p. 106)

Through mindful curriculum integration of social studies with one or more content areas, teachers will be able to maintain focus on the heavily tested subject matter without neglecting untested content such as social studies. In addition to social studies, many classes benefit from an integrated approach.

Benefits of Integrated Classrooms

Integrated classrooms have been used as a progressive form of education since John Dewey and Francis Parker (as cited in Hinde, 2005) established the idea as part of effective pedagogy in the 1890's and 1900's. Hinde (2005) suggests "by now, early in the twenty-first century, combining subjects to meet objectives across the curriculum is firmly entrenched as an instructional method" (p. 108). Modern integrated approaches are intentional and foster better understanding of students. Parker (as cited in Pryor et al. 2016) defines integrated curriculum as an approach that draws the methods and perspectives of multiple to create more powerful learner outcomes.

Hinde (2005) explains that integrated curriculum is considered to be a more engaging way to increase students critical thinking abilities by creating content that is more applicable to the lived experiences of students. It is natural for students to make connections to things they learn or observe throughout their day. Sychterz (2015) says "Isolated teaching deters student engagement and divorces them from their natural inclination to synthesize connections and develop critical-thinking skills" (p. 6). Isolating content, in fact, makes learning more difficult. Sychterz (2015) argues instead that integrated classes increases engagement and development of critical-thinking skills by drawing on students natural abilities to make connections with their experiences.

Successful outcomes of students who have been taught in integrated classes have been documented by Kimberly Sychterz. Sychterz (2015) described a case study in which an 8th grade team focused an entire academic year on purposeful integration of subjects with a focus on physical and life science. In that year, student proficiency on the New England Common Assessment Program jumped from 9% the year before the integrated approach to 21% the year of the new interdisciplinary model (Sychterz, 2015, p. 9). In this case study an integrated approach resulted in significant increased standardized test scores for the school year it was adopted. Higher achievement as result of integration can also be seen as a potential outcome of STEAM curriculum.

STEM/STEAM education is inherently focused on integrated classroom and interdisciplinary education with the goal of preparing students to succeed in a globalized world (Bybee, 2010). STEAM is not only a connection between the subjects listed in the acronym, but the integration of challenges of society as a whole. Though many STEAM programs link science, technology, engineering, art, and math successfully, there are fewer connections made between STEAM specific courses and other subjects. Hoachlander (2015) states "Even where STEM offerings are taking root in a more coherent and integrated fashion, these courses . . . are rarely linked to the rest of core curriculum. Schools aren't connecting STEM to English, social studies, world languages" (p. 74). Current curriculum models lack a connection between STEM and non-STEM classes and lessons. Through further development of integrated classrooms, schools can continue to gain the benefits of interdisciplinary education on more inclusive and holistic level.

Benefits to Social Studies and STEAM in an Integrated Approach

Both Social Studies and STEAM specific subjects stand to benefit from an integration of their content. Social studies will benefit by increasing student engagement and allowing teachers

to dedicate time to social studies without sacrificing time spent on more heavily tested content. STEAM subjects benefit by incorporating a societal and cultural perspective on largely scientific and engineering based problems.

Social studies curriculum already involves the integration of various social studies disciplines, such as history, geography, economics, sociology, and civics. The National Council for the Social Studies defines social studies as "the integrated study of the social sciences and humanities to promote civic competence" (NCSS, 2018, par. 4). Though already integrated, the subject as a whole would also improve by integrating elements of STEAM as well. B. W. Pryor et al. (2016) argues that social studies curriculum would foster more developed critical thinking skills with the integration of STEM subjects. They argue that connecting the content of STEM with social studies will increase the abilities of students to think critically (B. W. Pryor et al. 2016).

Social studies curriculum can also benefit from an integration of the model of project-based learning (PBL) often associated with STEAM content. Duke, Halvorsen, and Strachan (2016) describe project-based learning as projects that utilize a variety of content skills and are based around real-world contexts and purposes to solve a problem. Duke, et al. (2016) say, "despite greater attention to project-based learning in STEM education, some of the most powerful evidence in support of PBL comes from social studies educational research" (p. 16). Though more often associated with STEAM curriculum, social studies concepts as well as critical thinking skills are effective tools developed in PBL. Duke et al. (2016) also provide evidence of higher performances on Advanced Placement tests for high schoolers exposed to PBL in social studies and higher academic growth rates for elementary students with similar opportunities.

STEAM education and its purpose of solving modern problems with an integrated and problem based learning (PBL) approach can benefit from including content from the social studies as well. For example, Sun (2017) describes the need for STEM curriculum to incorporate empathy and the needs of society into the solutions they create. She believes this can be accomplished by integrated social studies content into STEM classes. Sun (2017) states "seeking to understand another's perspective, or what many call engaging in empathy work, can help middle school students better understand how STEM related issues can affect people and society" (p. 6). Future solutions to problems of society will not only need the elements of STEAM, but the empathy and perspective taught in social studies as well.

Sun (2017) also describes the importance of bringing out a humanistic and culturally relevant side of STEM in order to engage students of different backgrounds in the STEM fields. She argues that by making STEM relevant to students' lives, students will be able to see themselves as members of the STEM community (Sun, 2017). By making connections between STEM and citizenship, a fundamental sector of social studies education, STEM becomes more important to students because they can see themselves and their communities in the material. Sun (2017) states that integrating social studies into STEM curriculum can shed stereotypes or preconceived notions students might have about who STEM is for. She writes:

> Taking a more interpersonal and empathy-based approach to STEM learning can also broaden our visions of what it means to be a "STEM person." Scientists and engineers are often perceived as lacking interpersonal skills, and these beliefs can alienate particular students from engaging in or identifying with STEM-related fields. By making STEM content relevant, students will be able to see themselves as potential contributing member of

> the STEM community. Such work aligns with research that emphasises the need for teachers to make instruction culturally relevant and accessible to all students. (p. 6)

The integration social studies with STEAM can help students begin to see applications of STEAM in the broader context of themselves and their communities and can then engage in the content personally as well.

Allina (2018) also describes the benefits to STEAM when social studies content is integrated. She says more integration in STEAM would benefit students and society by engaging a wider variety of students in the content, and thus preparing them to be productive citizens of the 21st century. Allina (2018) also emphasises that while the workforce of the future needs to have STEM competency and scientific literacy, they will also need problem-solving, critical thinking, and collaboration skills which are increased in STEAM when social studies concepts are integrated in the curriculum.

Though integrating curriculum between subject matters that appear to have little in common such as STEAM and social studies can be an intimidating task for teachers, the benefits to students surely outweigh the costs. Through intentionally integrated classrooms the intended outcomes of both social studies and STEM education are supported and student performance is increased. Critical-thinking skills are enriched and students are better prepared to contribute to society as creative problem-solvers and well informed citizens. While it may seem like a daunting task, with the proper support and knowledge teachers of all content areas can enrich their curriculum with STEAM integration.

Integration Methods and Effective Professional Development

While the value of STEAM and interdisciplinary classrooms has been established in the previous sections, finding effective methods for social studies teachers to make these changes must also be considered. When integrating social studies into STEAM curriculum, there are certain challenges to be addressed. There are effective ways to incorporate these classes and there are disingenuous ways.

Effective professional development (PD) and social studies specific integration methods are crucial for teachers and students to gain the benefits of a social studies class with purposeful STEAM integration. Hinde (2005) mentions, "although it is true that there are times when teaching the subjects separately is more appropriate than integrating them, it is also true that when teachers are knowledgeable about content areas and integrate them effectively, students' achievement increases" (p. 108). Although it is a challenging task, both teachers and students benefit from purposeful integration. The intended outcomes of a social studies class integrated with STEAM include higher student engagement, well developed critical thinking skills, and age appropriate knowledge of both social studies and STEAM content.

Strategies for STEAM integration with Social Studies

To consider when and how social studies teachers can incorporate elements of STEAM in their curriculum there are certain elements to consider. Activities and lessons should be educationally valuable, meaningfully integrate social studies and STEAM using an authentic application of skills and knowledge, and should be age and knowledge appropriate.

The integrated nature of STEAM and the hands on approach to Problem Based Learning (PBL) can be an important engaging aspect of interdisciplinary classrooms. While these concepts should be promoted, it cannot be supplementary to actual learning. Hinde (2005) reminds teachers

how lessons still need to meet curriculum objectives and integration should always be supporting social studies education. Successful integration finds a balance between standards and benchmarks and student curiosity and critical thinking skills.

When considering opportunities to integrate social studies and STEAM, one must avoid superficial connections and instead only use integration when there are deep and genuine connections that benefit both content areas. When lessons distort any content learnings, they do not have the intended outcomes. So again Hinde (2005) cautions teachers to remember that when integrating STEAM their " . . . students should emerge from the lessons with a clear and in depth understand of the social studies subject matter" (p. 108). It is not enough for students in an interdisciplinary classroom to gain the benefits of STEAM education, they must also gain the intended knowledge from the social studies content as well.

A lesson integrating STEAM and social studies must also use an authentic application of skills and knowledge. Duke et al. (2016) explain this by saying "avoid integration for integration's sake. Instead, determine ways to meaningfully and authentically involve content from these domains; it is not always easy, but it is worth the challenge" (p. 18). Ensuring that integrated lessons are authentic and not superficial will benefit both the students and teachers.

Finally, integrated lessons should be content knowledge and age appropriate. Hinde (2005) mentions "teachers need to be cognizant of what their students are capable of understanding and then challenge them with new material" (p. 108). In an integrated classroom, the teacher needs to be responsible for not only their students capacities and skills in their own content, but also in the content they are integrating. When creating lessons or project-based learning (PBL) activities, teachers need to be aware of the skills of their students in order to effectively tap into them.

Potential Problems Related to STEAM and Social Studies Integration

While the benefits of integration are worth the challenges, there are specific problems with integrating social studies in STEAM that teachers need to be aware of in order to avoid. Watering down content for the sake of integration and creating lessons and activities that lack educational value are two ways that an interdisciplinary classroom can fall short.

Teachers who are attempting the challenge of integrating STEAM in their social studies classrooms may find that by seeking a superficial connection in social studies content or even changing information to fit their needs, integrated lessons can be easier to achieve. While integrating STEAM and social studies in this way may be easier, it will not have the benefits of an interdisciplinary classroom and even risks students misinterpreting social studies content. Hinde (2005) gives an example of a teacher doing just that saying:

> Brophy and Alleman describe a lesson in which students are asked to sequence the steps in building a log cabin. The problem is that three of the five steps seem to have been arbitrarily imposed instead of being historically correct. Although the authors were successful in including a sequencing activity (a social studies and math skill) in the unit, the result was an activity that detracted from meaningful social studies. (p. 108)

While the teacher who created this lesson was seeking to integrate social studies and math content, they changed the social studies content to fit their needs and in doing so did not effectively or truthfully teach the social studies material.

Similarly to changing social studies content to better fit with a STEAM integrated curriculum, creating lessons that are not academically rigorous or educationally valuable is also a challenge to integration. Having students participate in busy work activities (or activities involving

memorization or simple, repetitive tasks) may seem to be a way to incorporate STEAM but in fact trivializes both contents. Hinde (2005) provides another example of this:

> Having students participate in activities that lack educational value in any content area and busy-work exercise [is a problem to integration]. Such activities emphasize doing rather than learning and examples include alphabetizing states and capitals, adding together the heights of mountains in various mountain ranges, carving president's faces onto pumpkins, round-robin reading of social studies textbooks, or repetitively writing social studies vocabulary words. The activities may keeps students busy and be tenuously related to social studies and other content areas, but they do not further the goals of either social studies education or the other disciples. (p. 108)

While these examples integrate social studies with other courses, they do so at the expense of academic rigor and are therefore counterproductive to the goals of integration. Another challenge to STEAM and social studies integration is the attitude of social studies teachers.

Importance of Teacher Buy-In to Creating an Interdisciplinary Classroom

The challenge of integrating STEAM in social studies may seem overly daunting to some teachers. The possible shortcomings may seem to overshadow the intended results and may lead to some teachers viewing the costs as outweighing the benefits. Increasing teacher buy-in and creating an effective model of professional development (PD) is one way to encourage teachers to take on the challenge that stands to have great benefits to them and their students. Hoachlander (2015) describes that when teachers embrace the thinking that integration is more representative of adult life, they can provide new weight to the answer of the age old student question "Why do we need to know this?"

B. W. Pryor, et al. (2015) find that a teacher's beliefs in the benefits of integrating curriculum have a strong impacts of their planning and implementation of interdisciplinary lessons and activities. They find that a teacher's belief is closely linked to their behavior and strategies in the classroom. This finding helps to better understand that in order to achieve the goals of interdisciplinary classrooms and specifically the integration of social studies and STEAM, it is crucial for teachers to see and understand the specifics of these benefits before they are expected to utilize them (B. W. et al. 2015). Through effective professional development, teachers can be given the opportunity to see the benefits of an integrated classroom and can be given the tools to bring incorporate their learning in future lessons and activities.

Qualities of Effective Professional Development

Professional development (PD) is defined by Bayar (2014) as being in-service teacher training designed to provide teachers with new methods for increasing student achievement. Abadiano and Turner (2004) describe professional development as a method to increase effective teaching by introducing teachers to the most up to date research on teaching and learning. Guskey (2003) claims Professional Development helps teachers understand the content they teach and the way students learn. The ultimate goal of professional development is to provide teachers with the newest resources and training to increase student achievement.

While the goals of professional development have largely stayed the same, methods for instruction have changed in recent decades. Bayer (2014) describes traditional and non-traditional professional development. In traditional methods of professional development consists of short workshops and conferences, while non-traditional methods involve mentoring, coaching, and peer-observation. Bayer (2014) indicates that duration of these two methods is the significant

difference, with traditional lasting as long as a several hour session and non-traditional involving many hours, days, and even potentially spanning the school year. Bayer (2014) finds that non-traditional methods are more effective than traditional in the ultimate goal of higher student achievement.

Three authors describe similar characteristics in effective professional development with the ultimate goal of higher student achievement. Bayer (2014), Guskey (2003), and Abadiano and Turner (2004) emphasise the importance of duration of professional development, opportunities for collaboration, practical and useful content, and thorough and ongoing training and evaluation.

Duration of professional development is a key component to effective sessions. Guskey (2003) describes time as being a significant factor in the success of professional development and that teachers need time to process what they have learned, analyze students' work, and consider new approaches to their instruction. Just as students need time to processes and retain new information, teachers do as well. In addition to time of sessions being a factor, time needs to be included in long term support for teachers to make required changes.

In addition to sufficient time for professional development Abadiano and Turner (2004) describe the success of professional development as being reliant on an ongoing approach rather a single session and that ongoing professional development is critical to its effectiveness. In order for professional development to be successful, teachers need ongoing support, time to processes new learnings, and continual feedback and evaluation in order for professional development skills to translate to increased student achievement in the classroom.

Another factor cited by the authors as being necessary for effective professional development sessions is the need for collaboration among teachers in both the creation of PD and

the within the sessions itself. These professional development sessions require teachers to not only be the students but to drive the direction of the learning itself. Bayer (2013) claims,

> Teachers' voices [are] important educational resources. The researchers agree that the voice of teachers are of utmost importance when deciding on the key components of PD; as they are not only the ones participating first-hand in these activities, but they are also those responsible for translating this knowledge into effective classroom teaching. (p. 320)

Since teachers will be the ones applying the PD learning into their classrooms, it is paramount that they have the opportunity to assist in the creation of PD sessions.

A study done by Bayer (2014) also found that teachers identified the outcomes of PD to be more beneficial when they were involved to some extent in the planning of the session. Bayer (2014) found that a majority of teachers complained when they had no input in the planning of PD and felt disconnected from the content taught. Without playing a role in the preparation, teachers felt no ownership of the outcomes. This study found that when teachers were not involved in some way in the planning of PD they felt disconnected from the learning. Had they been consulted, they likely would have reported higher levels of engagement and a buy-in to the information being presented.

Abadiano and Turner (2004) also emphasise the importance of collaboration in the creation and practice of professional development. Often, PD involves new teaching methods that many teachers may lack confidence in practicing. Collaboration among teachers in planning and evaluating can and effective way to support teachers as they take on new challenges presented in PD sessions. Collaboration gives teachers the opportunities to improve their practice using the newest research directed in PD while feeling confident and supported by their coworkers. Guskey

(2003) found that teachers of all levels valued opportunities to plan as a team, reflect together, and exchange ideas. All teachers can benefit when collaboration is purposefully and intentionally incorporated into PD.

A third factor in developing successful PD is ensuring that knowledge gained by teachers is practical and relevant to their needs and the needs of their students. Abadiano and Turner (2004) describe the importance of practical and useful PD training, which they call the reality principle saying:

> Teacher would ask themselves: Is the change feasible and fit for practice in the classroom? They may not be too eager to implement strategies that do not meet the immediate needs of their students, or are not relevant to their instructional goals/objectives. [. . .] Teachers would ask themselves: Is the change too broad or too radical to be overwhelming? Is it too narrow to be trivialized or ignored? They may not welcome change that threatens stability of consistency in their classroom. (p. 89)

Training presented in PD needs to be something teachers can imagine as being beneficial to their classrooms. If it is not something a teacher can use practically for the higher student achievement desired, teachers will be unlikely to make the changes to their classrooms directed by the PD.

Finally, effective PD needs to be thoroughly and continuously evaluated. When teachers are attempting to incorporate new learnings in their classroom, feedback is necessary for them to know if their changes are going to be effective towards the ultimate outcome of higher student achievement. For evaluation to be productive towards these goals, it is crucial that there is an established report between the teacher being evaluated and the fellow teacher or administrator completing the evaluation. Abadiano and Turner (2004) found that open lines of communication

between teachers and administrators built trust and value in PD. For evaluation and feedback to be well received, teachers should feel comfortable with the person completing the evaluation.

In addition to an evaluation, ongoing and productive feedback is also necessary for successful PD. Bayer (2014) also found in his study that long-term engagement and the opportunity to receive feedback and adapt to that feedback is an important quality in PD. Teachers require ongoing learning including feedback and evaluation in order fully incorporate the teachings in a PD session.

In order for professional development to attain the goals of increasing student achievement by training teachers in the newest researched-based effective strategies, certain qualities are required. PD should be long enough in order for teachers to processes information they have learned and authentically incorporate it into their classrooms. Effective PD should also give teachers the opportunity to collaborate within the session itself and in the creation of the content taught. Information provided in PD should always be practical and useful in ways that teachers would be capable to seamlessly transition it into their classrooms. Finally, PD training needs to include ongoing education, evaluation, and feedback in order for teachers to make the changes required to improve student achievement.

Summary

Integrating social studies with STEAM has many benefits including increased critical thinking skills, higher student engagement, and increased levels of achievement in the various content areas. Through various practices and strategies social studies and STEAM can be integrated to achieve these goals. Although there are significant challenges to this integration,

through effective and purposeful professional development social studies teachers can learn to incorporate the content from both areas in their lesson plans to improve student learning.

STEAM education helps to prepare students to live and work in the modern world. Many problems faced by communities today, have solutions that can be found in the STEM fields. While STEM can offer some solutions, it is the critical thinking, problem-solving, and socially conscious based approaches that make theses solutions a reality. Social studies, and the goals of social studies education, can bridge the gap between the technical aspects and the human requirements. Through proper training and education, social studies teachers can not only effectively integrate STEAM principles in their current curriculum, they can support students of diverse backgrounds to see where STEAM education fits in their community and in their lives.

In Chapter Three I will describe the rationale, design, and creation of the Professional Development series using the knowledge gained from the literature to encourage social studies teachers to collaborate and create STEAM lessons and projects within their current curriculum. In it I will address the question: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?* Through this PD, which is supported by the research, I hope to provide social studies teachers with the means to confidently attempt STEAM integration and provide the opportunity to reflect, adapt, and improve based on their experiences.

CHAPTER THREE

Rationale, Capstone Project Design and Creation

Introduction

Many U.S. schools are adopting a Science, Technology, Engineering, Math (STEM) or Science, Technology, Engineering, Arts, and Math (STEAM) focus for their curriculum. The research completed in the Chapter Two literature review for this capstone found an emphasis on the importance of STEAM education both for its relevance to STEAM based careers of the future and its development of students with higher critical thinking and problem-solving skills. While social studies is not part of the STEAM acronym, through targeted and deliberate integration, skills developed in both social studies and STEAM classrooms can be combined to achieve the desired outcomes of all involved core subjects.

This capstone project is intended to answer the question: *How does the research recommend changing the instructional practice of social studies educator that support integrating STEAM concepts in their core content?* The school for which my project was created is a STEAM magnet school that encourages all teachers to find and create STEAM connections to their content. While all of the social studies teachers in this school see the benefits of an interdisciplinary classroom, in informal conversations they often mention lacking the necessary professional development to successfully create one. The purpose of this project is to provide that training as well as provide an opportunity for collaboration, evaluation, and adoption of social studies and STEAM integrated lessons.

This chapter will provide an overview for the project. Next, I will describe the limitations to the professional development sessions and outline the research. Then, I will discuss the setting,

participants and timeline for capstone completion. This chapter will conclude with a final summary.

Overview of the Project

For my project, I created a two-hour professional development for grades 6 through 8 social studies teachers at my school. Through this professional development, teachers will research, learn, and share the best methods for STEAM and social studies integration. Professional development is an effective way to present information at my school as it is embedded throughout the year. We participate in professional development sessions during our inservice days in the fall and throughout the year, often with a STEAM focus.

In addition to this, content teachers meet twice a month in professional learning communities (PLCs) to focus on yearly goals, analyze data, provide collegial coaching evaluations, and collaborate on lessons and assessments. During PLC meetings teachers are engaged in discussions that address the school mission and district equity promise stating that all students will be college ready regardless of socioeconomic status. These meetings are relatively informal, with the team of teachers largely guiding the discussion and agenda. PLC meetings are held the second and fourth Wednesday of the month before the school day from 7:10 am to 7:40 am. The professional development series created for this capstone includes a twenty minute check up session for every other month during the social studies teacher PLC meeting totaling over three hours of professional development for this project.

The initial two-hour session will inform teachers on the research indicating the benefit of STEAM and social studies integration, will provide practical and job-embedded methods for integration, and will provide time for the teachers to work collaboratively to develop one in-depth

grade level STEAM project. The learning outcome for this session will be "I can create an effective STEAM and social studies integrated lesson that increases student learning." The bi-quarterly mini sessions will be used to evaluate the initial project, discuss the strengths and weaknesses found when the project was completed by students, discuss student feedback and assessment data, generate ideas for future projects, and work collaboratively to increase STEAM integration throughout the year.

The professional development is designed to assist social studies teachers in finding effective and practical methods for the integration of STEAM and project based learning (PBL) within their social studies curriculum. The design includes opportunities for feedback from these teachers and keep the goals and mission of the school in mind while creating the initial session as well as the follow-up sessions. While this professional development is targeted at social studies teachers, it is the students who will ultimately be impacted. Student feedback and achievement will be included as a focus for this professional development.

Teacher and student evaluation will be critical for this professional development. Teacher feedback will be gathered after the first professional development session asking for feedback on the structure, goals, and presentation of the professional development via Google Forms. Feedback from teachers will again be collected via Google Forms mid-year and at the end of the year to make changes to the learn outcomes looking into the future. Student feedback will be gathered also via Google Forms after the implementation of the PBL project developed in the initial session. Students will be asked to respond to questions about their engagement, interest, and learning when the project has concluded. This feedback will be analyzed by the teachers in a follow up PLC mini-session.

Research Supporting the Need for and Design of the Professional Development

The research that supports this project can be found in the section related to effective professional development in Chapter Two. In it, I outline effective professional development strategies for teacher retention and implementation of different ways to incorporate STEAM in their Social Studies curriculum.

Most notably, the research indicated that effective professional development shares common characteristics. Hunzicker (2010) describes how professional development should be supportive, job-embedded, instructional-focused, collaborative, and ongoing. Guskey (2003) also finds that sufficient time, collegial and collaborative exchange, and evaluation are also critical components of professional development. Guskey (2003) points out how, "helping teachers to understand more deeply the content they teach and the ways students learn that content appears to be a vital dimension of effective professional development" (p. 749). When effectively presented and evaluated, the research reviewed for this capstone suggests that professional development has a significant correlation to student achievement.

By using the research described in Chapter Two related to effective professional development and using instructional methods found to be effective, I created a professional development to support the growth and understanding of teachers in order to have a positive effect on the learning of their students.

Limitations

A significant limitation to this project is the lack of PLC time able to be dedicated to the learner outcomes. Ideally, this project would be implemented over several long sessions as well as additional follow up PLC meetings. Because of the demands and requirements of my school's

professional development schedule, this project will only be created for one two-hour session in the fall.

In addition to this limitation, the structure of our PLC group also creates some challenges to this project. Most PLC groups in this setting are composed of all teachers who teach the same content. For example, there is a seventh grade Science PLC, eighth grade English Language Arts PLC, and so on. Since social studies is the smallest department in our school, our PLC is made up of sixth, seventh, and eighth grade teachers. When the PLC group is collaboratively designing a PBL project as part of this professional development, the final product will only be able to be used by one teacher and not all three. While the learning will still be relevant to all teachers, the initial product will only be implemented by one.

Setting

My district serves over 10,000 students from seven suburban cities in the upper midwest. There are two kindergarten centers, seven elementary schools, three middle schools, and two high schools. This district has seen significant growth in the past decade and has a diverse population. The student population is 63.3% White, 11.5% Asian, 10.6% Black, 8.5% Hispanic, 5.6% two or more categories, .4% Native American, and .1% Hawaiian/Pacific Islander. For this project I will be focusing on one of the middle schools in the district.

This middle school is located in a midwestern suburb serving approximately 700 students in grades six through eight. The student population is 55% White, 15.1% Black, 12.7% Hispanic, 9.4% Asian, 6.7% two or more categories, 1% Native American, and .1% Hawaiian/Pacific Islander. The percentage of students who qualify for special education services is 16.2% and 3.8% of the students are English Language Learners. In addition to this 46.9% of the students qualify for

free or reduced lunch. After English, the top three spoken languages of the students are Spanish, Hmong, and Arabic.

In 2011/2012, the school in this study adopted a STEAM model. This model seeks to integrate science, technology, engineering, arts, and math through standards-based learning for students that integrate inquiry, creative expression, problem solving skills. This model is intended to apply these skills to engage students and promote understanding of relevant societal realities. While this middle school is the first school in the district to adopt the STEAM model several schools have adopted it since.

The community in which the school is located has approximately 12,000 residents and has a total area of 4.2 square miles. It is a primarily residential city and the public school district is the third largest employer.

Participants

The participants for this project are the three other social studies teachers in my school, assuming there will be no staff changes by fall of 2019. Of these teachers, one is a veteran with a Bachelor's of Arts degree and ten years of experience at this or any district, one is a new teacher with a Master's of Arts degree and one year experience at this or any other school, and the third is a new to district teacher with a Bachelor's of Arts degree. The third teacher is new to the district after having taken eight years off to raise her children. Previous to her leave she had been a social studies teacher at a small private school for five years.

All the teachers at my school, including the three other social studies teachers, have had a minimum of two years trainings on STEAM education. Though these teachers are familiar with what STEAM is and are aware of the benefits of STEAM education, they have not received

training specifically related to the integration of STEAM and social studies education. With this audience in consideration, this Professional Development has less of an emphasis on what STEAM is and will focus more on successful methods for integrating it within the social studies classroom.

Timeline for Project Completion

My project is planned for implementation during the 2019-2020 school year. During the months of February 2019-April 2019 the PD wase designed, planned, and refined. Google Slides are the main product to be used in this project. The initial professional development session is scheduled to be held August of 2019. Follow up sessions will be scheduled to take place during PLC meetings in October and December of 2019, and February and April of 2020. A final evaluation will be completed in May of 2020.

Summary

This chapter described the professional development sessions I will be creating to train social studies teachers on the best methods of STEAM and social studies integration. I have described the research that supports the use of professional development both in this chapter and in chapter two and explained several limitations my project will face. I described the setting where this project will be implemented as well as provided a description of the participants. Finally, I have outlined a timeline for the planned professional development sessions. In Chapter Four, I will share a conclusion to my project.

CHAPTER FOUR

Reflection and Conclusion

Introduction

For this capstone I have created a professional development session to answer the question: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?* This section will provide a discussion of my project. The first section will provide a context for my project and the knowledge I gained from my initial research of the topic. Next is a description research reviewed that was the most influential in creating my project followed by a review of the implications and limitations of my project. The following section will be recommendation for further research to be done on this topic. Finally, I conclude with a discussion of how this research and project has impacted my own teaching and my plans for bringing what I have learned into my classes throughout my career.

Capstone Context

This capstone and project was created to address the lack of adequate professional development (PD) I experienced for non-STEAM teachers and specifically social studies teachers in implementing STEAM practices and creating integrated classrooms. As a social studies teacher in a STEAM magnet school, I was familiar with the benefits of an integrated classroom but had been provided with few if any resources or PD to successfully integrate. Upon completing the literature review in Chapter Two, I created a five part professional development session for social studies teachers at my school. The goal of this professional development session is to provide teachers with training, models, and opportunity for collaboration to confidently and successfully create STEAM and social studies integrated lessons and activities.

I first created a two-hour professional development session for social studies teachers which outlined the benefits of integrating STEAM and social studies classes. This session provided lesson ideas as well as guide to getting started. Finally, this initial session gave teachers a STEAM and social studies integrated lesson plan outline and provided time for teachers to use the knowledge provided to collaborate, create, and receive feedback on a lesson they indented to teach at some point during the year.

This project also included information for four, twenty-minute follow up sessions to take place during the teachers' regularly scheduled professional learning community (PLC) meetings throughout the year. These sessions were designed to give teachers an opportunity to review and reflect on the progress they had made towards creating an integrated class. These meetings also give teachers the opportunity to receive feedback from their peers and to observer, reflect, and provide feedback for others.

Revisiting the Literature Review

The research reviewed for this capstone in Chapter Two influenced and drove the creation of my professional development session. Through my research of STEAM and social studies, the benefits of an integrated classroom, and the best practices for creating effective professional development, my project took form. The research I completed drove my ideas and helped me to reaffirm the importance and necessity of the project I wanted to create.

One of the first conclusions I was able to draw from the research was the benefits of both integrated classrooms in general and specifically the benefits of integrated social studies and STEAM. The four authors B. W. Pryor et. al (2016), Duke, Halvorsen, and Strachan (2016), ,

Sun (2017), and Allina (2018) were significant to my belief and confirmation that teaching effective methods for integration was worthwhile.

All four authors described the benefits STEAM and social studies education. B. W. Pryor et al. (2016) made the argument that social studies curriculum would foster more developed critical thinking skills with the integration of STEM subjects. Duke et al.(2016) describe how STEAM integration in general, and project-based learning specifically, utilize a variety of content skills found in social studies that are based around real-world problems and use STEAM techniques to imagine solutions. Sun (2017) explained the need for STEM curriculum to incorporate empathy and the needs of society into the solutions and argue that this can be done by integrating social studies concepts. Finally, Allina (2018) looked to the future to advocate how more integration in STEAM would benefit students and society by engaging a wider variety of students in the content, and thus preparing them to be productive citizens of the 21st century. Though each author made slightly different arguments, they all pointed to the significance of integrating STEAM and social studies

At the beginning of this project I had my own beliefs about the importance of connecting STEAM and social studies in integrated classroom. Many of the authors I read confirmed these beliefs and encouraged me in the direction of creating my project. Perhaps the most important argument I read was made by Sun (2017) in which she advocated for the integration of STEAM and social studies by saying it promotes culturally relevant teaching and helps students of all backgrounds see themselves in the work of STEAM and as being members of society that can provide solutions to improve the lives of people in their community.

In addition to the benefits of STEAM and social studies the authors I read led me to, several of the authors who pointed out the necessity of teacher buy-in to achieve these benefits. Two authors provided a detailed description of the significance of teacher buy-in. One author, Hoachlander (2015), pointed out the importance of teachers being aware of benefits of integration stated and that when teachers are supported and informed of these benefits they can more effectively create and implement integrated lessons. Another group of authors B. W. Pryor, et al. (2015) found that a teacher's beliefs in the benefits of integrating curriculum have a strong impacts of their planning and implementation of interdisciplinary lessons and activities. These two authors specifically helped confirm in me that my project had value and that professional development would be the best way for me to provide other teachers with the resources I had learned. Time spent motivating teachers to see the benefits would be time well spent.

Finally, in creating the professional development itself, the writing of three authors were crucial for me in the creation of my project. Bayer (2014), Guskey (2003), and Abadiano and Turner (2004) emphasised the importance of duration of professional development, opportunities for collaboration, practical and useful content, and thorough and ongoing training and evaluation. Through reading the work of these three authors, I was able to learn and apply the significant requirements to create an effective professional development session.

While completing the research for this project, I found many authors that confirmed the importance and potential for STEAM and social studies integration, highlighted the importance of teacher buy-in which led me to create a professional development session. I also identified several strategies to make my professional development session valuable to teachers, students, and as successful as as possible.

Implications and Limitations

This professional development session could lead to the adaptation and implementation of teachers effectively integrating STEAM into their social studies classrooms. Through this integration, the benefits of STEAM and social studies could be realized in students today, which has the potential to impact their futures. STEAM education is being favored by more and more school districts and social studies teachers have the potential to be an invaluable asset to their schools and districts.

My goal for this professional development session would be for it to not only open the eyes of social studies teachers to the benefits of STEAM, but could also encourage them to try new techniques. This would lead social studies teachers to the ultimate goal of increasing student engagement and learning. My own experience tells me that while many social studies teachers understand and believe in the benefits of integration, the actual practice and implementation presents a daunting challenge. Through this professional development, my goal is to support teachers in this challenge especially encouraging them to see that even failed activities and lessons are opportunities for growth through collaboration and feedback.

In addition to the benefits provided to students, I truly believe that this research and project can help elevate the value and importance of social studies education. Again, my own experience teaching social studies at a STEAM school has shown that the content of social studies can fall by the wayside, either because it is not explicitly STEAM or because there are no standardized tests for social studies. Through integration, I believe social studies teachers have the opportunity to highlight the crucial importance social studies has in developing students into productive members

of society. When social studies is used to elevate STEAM, STEAM education is elevating social studies.

While there are several limitations to this project, the most significant is simply time. There is so much on a teacher's plate at any given time during the school year that STEAM integration and this professional development can feel like an addition to an already overwhelming workload. If teachers are not given the full support to make these changes, collaborate, receive feedback, and make revisions it can easily become trivial. For this PD to have the most impact, time is crucial. Time in the school year is one of the most valuable resources.

Another limitation is teacher and school buy in. Despite the attempts I have made through research and planning to make this the best professional development I can, there is always the potential for teachers to resist the change. Teacher buy in is crucial for the goals of STEAM and social studies integration, and without it the change runs the risk of being superficial and ineffective.

Future Research

This project is designed to accommodate and encourage future changes. As teachers are provided with more feedback and resources to adapt to a STEAM and social studies integrated classroom, this plan would allow them to continue learning and improving. Through shared experiences, teachers should also continue to influence the direction of this initial session and their own PLC mini sessions. The survey at the end of the first PD session is designed to use the feedback of the teachers who participated to adapt and modify the session as needed.

Additional research could be made to see if the skills and abilities of students are influenced positively as a result of integration. Data could be collected looking for certain markers for growth

from students. While I do not believe that student progress can be successfully analyzed or interpreted from a standardized test alone, future research could be done to determine the exact data-driven results of STEAM integration.

Ultimately, the ideal future research for this project would be completed on a relatively small scale with PLC groups analyzing and determining their own needs. Through group work and feedback, PLC groups would have the potential to apply their learning from this capstone and to use it to continually improve future school years. By assessing the results, the team would be able to adapt and improve their own STEAM integration.

Conclusion

In the beginning of this project I sought to answer the question: *What strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?* The starting point was my own belief that the integration of STEAM and social studies classes could have significant impacts on student learning and to some degree even impact the future of many communities, both small scale and even global. Through my extensive research of the topic, it became clear that many authors not only agreed with my initial thinking but emphasized possibilities and benefits that I had not considered. Through the study of these authors my capstone created an opportunity for teachers like me to see the benefits and be willing to attempt the changes necessary to see them brought to life.

Looking to the future, not only does this capstone have the potential to benefit teachers who read it, creating it has enabled me to to be a strong voice in my own school to advocate and provide support for social studies and STEAM integrated classes. In my own practice, the creation of this capstone has supported me in developing the the confidence to go outside of my

comfort zone for the benefit of my students. Through the work completed and created my projects represents my answer to the question: *what strategies does the research recommend for supporting social studies educators in integrating STEAM practices into their core content?*

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APPENDIX A

Capstone Project Guide

Anna Penner

This capstone project is intended to answer the question: *How does the research recommend changing the instructional practice of social studies educator that support integrating STEAM concepts in their core content?* The school for which I created my project is a STEAM magnet school that encourages all teachers to find and create STEAM connections to their content. While all of the social studies teachers in this school see the benefits of an interdisciplinary classroom, the informal conversations they often mention lacking the necessary professional development to successfully create one. This project is intended to provide that training as well as provide an opportunity for collaboration, evaluation, and adoption of social studies and STEAM integrated lessons.

Professional Development Outline:

1st session: 2 hour PD in the fall before the school year starts

- Google Slides
- Handout 1 - Venn Diagram
- Handout 2 - STEAM and Social Studies Integration Concepts (could be printed on the back of Handout 1)
- Handout 3 - STEAM and Social Studies Integration Plan
- Handout 4 - Collaborative Feedback Guide
- Google Survey - Completed by participants to give feedback to the PD instructor

Follow up session: Four 20-minute sessions to happen once quarterly

- Directions included on final slide of main presentation
- One teacher per session will create and share out the STEAM and Social Studies Integration Plan
- When it is not a teacher's turn to share out, they will complete the Collaborative Feedback Guide (Handout 4) and work with the teacher sharing.

- End of Year Summative Survey - to be completed by each teacher at the end of the school year as a reflection of their growth and the professional development process