

A Narrative Inquiry into Elementary Teacher Experiences Transitioning from Traditional
Teaching Methods to Arts Integration in STEAM

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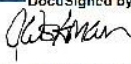
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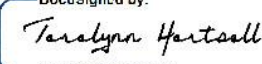
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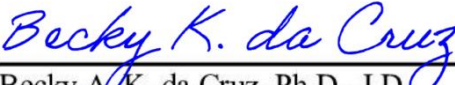
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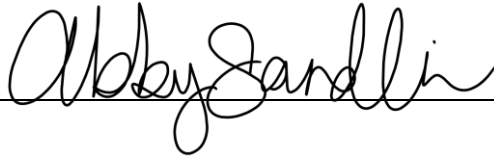
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ABSTRACT

This qualitative study explored elementary classroom teachers' experiences transitioning from traditional teaching methods to arts-integrated STEAM practices at STEAM-certified schools in Georgia. Guided by constructivism (Dewey, 1934) and Schlossberg's (1981) transition theory, I examined how teachers navigated the challenges of change, the supports that shaped their experiences, and the recommendations they offered for others making a similar transition to STEAM. I used narrative inquiry as the methodology to gather interview data, which was analyzed to identify overarching themes. Findings revealed that teachers initially described feelings of fear, confusion, and uncertainty as they adjusted to new expectations. Professional development played a central role in shaping teacher confidence, though concerns about time and training quality were evident. Teachers' prior experiences with the arts influenced the ease of integration, and collaboration among colleagues and administrators emerged as a critical support. Empathetic administration also played a key role in supporting teachers, specifically through the provision of supplies and making adjustments based on teacher feedback. Ultimately, participants highlighted the importance of support, mindset, flexibility, and strong leadership in sustaining arts-integrated STEAM practices. The results fill a gap in the existing literature by providing insight into the experiences of classroom teachers who had to transition their teaching practices to arts-integrated STEAM. Practical implications for educators, administrators, and policymakers include prioritizing meaningful professional development, protecting collaborative planning time, and fostering a culture that values both innovation and teacher voice.

TABLE OF CONTENTS

Chapter I: Introduction.....	1
Background.....	7
Overview of the Problem.....	10
Problem Statement.....	13
Purpose and Scope.....	14
Research Questions.....	15
Theoretical Framework.....	17
Alternative Theories.....	20
Significance of the Study.....	21
Definition of Terms.....	22
Summary.....	23
Chapter II: Review of Literature.....	25
Theoretical Framework.....	26
Constructivism.....	27
Transition Theory.....	28
Evolving Pedagogies.....	33
Traditional Teaching Methods.....	34
Interdisciplinary Teaching Methods.....	36
Transdisciplinary Teaching Methods.....	37
Arts Integration in STEAM.....	39
Innovation.....	41
Creativity.....	42

Inclusivity and Engagement.....	44
Arts Integration in STEAM Prepares Students for the Future	45
Creativity and Critical Thinking	46
Empathy and Cultural Responsiveness	48
Other Interpersonal Skills	49
STEAM Initiatives in Schools	51
Instructional Practices in STEAM	53
Cross Disciplinary Collaborative Planning.....	54
Teacher Experiences with STEAM	55
Sustained Professional Development.....	56
Self-Efficacy	58
Implementation Challenges	60
Administrative Support.....	61
Summary	62
Chapter III: Methodology	64
Purpose and Research Questions	64
Research Design.....	65
Research Setting and Population	67
Sample.....	68
Delimitations.....	69
Data Collection Procedures.....	70
Instrumentation	71
Data Analysis Procedures	73

Ethical Considerations	75
Validity	77
Internal and External Validity.....	78
Reflexivity and Researcher Bias.....	80
Assumptions.....	82
Summary	82
Chapter IV: Narrative Inquiry.....	84
Daisy’s Story.....	85
Sally’s Story.....	93
Aubrey’s Story	104
Nicole’s Story	112
Elizabeth’s Story	122
Mary’s Story	133
Conclusion	142
Chapter V: Themes	143
Theme I: Inclusive, Purposeful, and Interconnected Learning	144
Theme II: Fear to Empowerment.....	149
Theme III: Prior Experience	163
Chapter VI: Discussion and Conclusion.....	168
Theme I: Inclusive, Purposeful, and Interconnected Learning	169
Theme II: Fear to Empowerment.....	172
Theme III: Prior Experience	180
Implications for Practice.....	183

Implications for Future Research.....	186
Limitations	186
Conclusion	187
References.....	189
Appendix A: Email Containing Details of the Study.....	206
Appendix B: Semi-Structured Interview Questions	209
Appendix C: Interview Question Rationale Table.....	212
Appendix D: Institutional Review Board (IRB) Approval Letter	218
Appendix E: Participant Timelines.....	220
Appendix F: CITI Training Certificates	227

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Chapter I

Introduction

The rapid technological developments of the 21st century have transformed the landscape of today's workforce, increasing the demand for new skills such as digital literacy, problem-solving, and adaptability (World Economic Forum [WEF], 2023). The Institute for the Future (2019) predicted that many jobs today's young people will occupy have yet to be created, and soft skills such as creativity, collaboration, and inclusivity will be essential in the emerging workforce. The growing impact of technological advancements has emphasized the need for schools to rethink how they equip students with the skills necessary to thrive in an increasingly dynamic, technology-driven workforce. This call to action has not gone unnoticed. According to Teschers et al. (2024), there had been an educational trend to move away from *traditional teaching methods*—a single-discipline, teacher-centered teaching pedagogy—toward more innovative and cross-disciplinary teaching strategies. To teach the skills needed to be successful in the 21st century workforce, schools in the United States began to integrate real-world problem-solving with the integration of science, technology, engineering, and math, otherwise known as STEM (Erduran, 2020). A criticism of STEM education is that this method of teaching overly emphasizes technical skills and does not allow for creativity in problem-solving (Okwara & Pretorius, 2023). In addition, the United States' push for STEM education has had underwhelming results, with fewer graduates pursuing STEM fields (Okwara & Pretorius, 2023; Tsakeni, 2022) in addition to an

underrepresentation of marginalized groups (Fry et al., 2021). A recent solution to the STEM educational dilemma has been to blend the arts within the STEM disciplines, which became known as STEAM education (Marín-Marín et al., 2021). The addition of the arts in STEM fostered creative thinking and innovative, cross-disciplinary problem-solving in students (Wilson et al., 2020)—an aspect that was missing from STEM education. The integration of the arts also encouraged reluctant learners to engage in science, which aided in increasing their motivation and achievement in the subject (Lage-Gómez & Ros, 2021). Furthermore, STEAM education has been described as a holistic pedagogy that fosters inquiry, real-world problem-solving, and flexible thinking (Stone, 2022), preparing students for a more dynamic and interconnected future.

To illustrate the differences in teaching approaches, imagine you are tasked to observe three fourth-grade classrooms as they complete a unit on sound. When you walk into the first classroom, you notice the students are quietly seated at their desks as they take notes in their science journals about pertinent vocabulary words, such as *vibration*, *pitch*, and *volume*. The teacher takes out a rubber band and models how the pitch changes when she tightens and loosens the band. She places a handful of rice on a student's desk and asks him to demonstrate vibration by banging his fist. Some students are engaged, although others appear bored as they whisper to their neighbor, stare into space, or a pass note across the aisle. Soon, the teacher notices it is time for math, so she asks her students to put away their science journals and take out their math notebooks. This is an example of *single-discipline teaching* (Land, 2021), also known as *traditional teaching*. In a classroom using traditional methods, the teacher serves as the content expert who imparts knowledge onto the students. Traditional teaching is largely teacher-centered with

content areas taught in isolation (Tularam & Machisella, 2018). This single-discipline approach continues to be widely used in many classrooms because it allows teachers to efficiently cover the required standards in a shorter timeframe (Tularam & Machisella, 2018). Although single-discipline teaching is efficient, there are drawbacks. For example, some students may become disengaged and develop negative feelings towards a particular subject area (Schmidt, 2011). In addition, traditional teaching may limit students' creative thinking due to the rigidity of the way content is delivered (Schmidt, 2011). Teschers et al. (2024) explained that traditional teaching methods were intended to develop a workforce proficient in following instructions and excelling at a single task. While this style of teaching and learning may have been effective in the 19th and 20th centuries, the rapid advancements of the 21st century have emphasized the need for education to evolve to meet the demands of modern society (Institute for the Future, 2019). In response, innovative teaching strategies, such as content integration and problem-based learning (PBL) have been shown to promote creative thinking and real-world problem-solving (Torres et al., 2024), which are essential skills in the rapidly evolving global economy (WEF, 2023).

Now imagine you leave the traditional classroom and enter another fourth-grade class just down the hall. You immediately hear the difference—students are chatting in small groups stationed around the room. Students are working in flexible spaces—sprawled on the floor, at a group of desks, or at a table. As you walk around the room, you see that the students are busy constructing something using cotton balls, cups, and rubber bands. You barely notice the teacher as she walks around the room, monitoring the students' work. You inquire as to what the students are making, and before the

teacher can respond, an energetic boy chimes in, “The class next door complained that we were too noisy, so to solve that problem, we have to design a solution to muffle the sound. Come check mine out!” As you walk over to the boy’s group, you scan the room. You notice most of the students are engaged, although some groups have one person working while the others sit and watch. You also notice that a few of the projects lack the application of the scientific concepts needed to muffle sound, with their projects appearing as a muddled heap of masking tape, cotton balls, and string. This is an example of a classroom employing problem-based learning (PBL) in STEM. STEM is the integration of at least two disciplines involving science, technology, engineering, and math. PBL is a pedagogical approach where students solve a real-world problem using critical thinking. STEM and PBL have become increasingly popular in the United States to foster important skills necessary for the 21st century workforce such as collaboration, creativity, communication, and critical thinking (Myers & Berkowicz, 2015). Solving problems with an interdisciplinary lens allows students to use aspects within each discipline to solve problems. While the use of STEM is a more engaging and student-centered teaching approach, several concerns have emerged overtime. Herro and Quigley (2017) noted that students may not have an adequate content knowledge for the level of critical thinking needed to solve problems. In addition, a significant gender gap has emerged as females are underrepresented in STEM careers (Master & Meltzoff, 2020). Despite the growing emphasis on STEM in the United States, students continue to underperform in science and mathematics, producing fewer graduates with the skills necessary for STEM fields (Okwara & Pretorius, 2023; Tsakeni, 2022). As a result,

Herro and Quigley (2017) suggested the addition of the arts in the STEM disciplines to foster creative problem-solving, which was initially lacking in STEM.

Finally, you walk into the third classroom. Like the class you just left, you immediately notice the students are divided into groups and are focused on a project. Similar to the previous fourth grade class, the students are working in flexible spaces around the room. A light melody of classical guitar is playing in the background. You notice the teacher is working with a small group, giving each student a turn to strum guitar strings. You walk over and inquire what they are doing. One student explains that they are creating their own guitar using what they have learned about sound, vibration, and pitch. Another student excitedly explains that they also must use their guitars to compose and perform a song about sound for the class. The teacher smiles as she walks you around to some of the other groups who are busily working. The teacher explains that the students had the choice of various materials to construct their guitars, but you notice most chose to use a tissue box as the body. You ask one student why she chose a tissue box, and she explains, “The hole in the center helps the vibrations from the strings bounce around and amplify the sound.” Turning around, you notice another student is using masking tape to fasten a neck made from a ruler to his tissue box. He stretches a rubber band down the length of the ruler as his group partner tapes it to the bottom of the tissue box. They practice changing the pitch by strumming the rubber band and sliding their finger along the ruler. Intrigued, you ask the teacher how the students got to this point. She explains that they studied guitar making, paying close attention to the source of the sound—the vibrations—and how to manipulate the sound—volume and pitch. They studied *luthiers*, or guitar craftsman, to learn key elements of guitar making.

Groups then constructed a plan to create their own guitar using classroom supplies. To take the project one step further, the groups must use their guitars to perform a song. As you walk around, all students are working, and those who are not working on the guitar are busy composing the song about sound. This classroom is working on a transdisciplinary arts-integrated STEAM project. While interdisciplinary projects utilize aspects from two or more disciplines around a unifying theme, a *transdisciplinary* project blends the boundaries between the disciplines and allows learners to demonstrate their understanding with creative solutions (Liao, 2016). As Liao (2016) posited, “students view their work as created through engaging with all [the] subjects and beyond [the] subjects such that they can apply their work to and even solve problems in other settings” (p. 48). Liao (2016) explained that arts-integrated STEAM has the potential to give students skills to make the world a better place, which has led some schools to integrate STEAM education into their curriculum.

Georgia is a national leader in STEAM educational research (Marín-Marín et al., 2021) and one of the few states to offer state-level (Georgia Department of Education [GaDOE], 2023b), and county level (Cobb County School District [CCSD], 2024) STEAM certification for schools dedicated to continuous STEAM integration. GaDOE STEAM certification requires students to “engage in arts integration strategies daily across multiple disciplines with fidelity” involving “daily interdisciplinary instruction that supports mastery of the Georgia Standards” (GaDOE, 2023b). To support the development of interdisciplinary and transdisciplinary arts-integrated experiences, teachers must attend continuous professional development in arts integration, PBL, and STEAM topics. The incorporation of arts-integrated STEAM introduces an additional

layer of complexity to the already rigorous demands of classroom teaching. Furthermore, most classroom teachers lack a formal background in arts education (Evans, 2018; National Center for Education Statistics [NCES], 2002), which may make the regular integration of arts standards into existing content standards a challenge for some teachers. In this chapter, the background of STEAM education will be explored, followed by an overview of the problem, as well as the purpose and scope of the current study.

Background of Study

The rapid emerging technologies of the 21st century have been coined by the founder of the World Economic Forum [WEF], Klaus Schwab, as the Fourth Industrial Revolution (Schwab, 2016). The accelerated pace of innovation and its integration into society have also been exponentially faster compared to previous Industrial Revolutions (Ross & Maynard, 2021). To keep up with the rapid pace of global innovation, the United States began putting educational resources in the fields of science, technology, engineering, and mathematics (STEM) to better prepare students for the interdisciplinary demands of the evolving workforce (Tsakeni, 2022). Although STEM education has been shown to increase innovation, collaboration, and critical thinking in students (Tsakeni, 2022), several concerning trends have also emerged. While the demand for STEM jobs continues to increase, poor performance of American students in science and mathematics has created a shortage of graduates available to fill these positions (Okwara & Pretorius, 2023; Tsakeni, 2022). Because less American graduates are pursuing STEM careers, the United States has been falling behind other global innovators such as China and Europe (Okwara & Pretorius, 2023). To foster the innovation and creativity needed to stay relevant in the Fourth Industrial Revolution, China and Europe have put more

emphasis in the arts (Penprase, 2021; Zha, 2022). According to the *Future of Jobs* report conducted by the World Economic Forum (WEF, 2023), the responding companies indicated that they predict the most sought-after skills for the 2023-2027 workforce will be creativity, flexibility, and life-long learning. Research indicates that the intentional integration of the arts within the STEM disciplines can cultivate the essential skills needed for the 21st century workforce (Bedewy & Lavicza, 2023; Chang et al., 2023; Lage-Gómez & Ros, 2021). For example, arts integration in STEAM can increase creativity (Chang et al., 2023), promote innovative problem-solving (Bedewy & Lavicza, 2023), and boost engagement for reluctant learners, which can spark an interest in STEAM later in life (Lage-Gómez & Ros, 2021). To keep up with global competitors, there has been a shift in American classrooms to integrate the arts into the STEM disciplines, moving from STEM to STEAM education (Piro, 2010).

Integrating the arts into science is not a new concept. Some of the world's most innovative thinkers used a transdisciplinary approach of blending art within other disciplines to develop forward-thinking solutions. For example, Leonardo Da Vinci (1452–1519) was arguably one of the greatest masters of blending art and science. His meticulously detailed anatomical drawings not only showcased his artistic prowess but also advanced medical and scientific understanding (West, 2017). Albert Einstein (1879–1955), the famous physicist known for his theory of relativity, was an avid violinist. Einstein found inspiration in music, which he then applied to the mysteries of the physical world (Hobbs, 2019, p. 240). Additionally, Niels Bohr (1885–1962), a prominent physicist known for his work in quantum physics, was influenced by the Cubist artwork of Jean Metzinger in the development of his complementarity principle in

atomic theory (Schinckus, 2017). The transdisciplinary approach of using art to solve problems can foster innovation by breaking traditional boundaries between disciplines and facilitating new ways of understanding and exploring complex ideas (Daneshpour & Kwegyir-Afful, 2022).

Despite historical implications, the intentional and systematic integration of the arts into the STEM disciplines—referred to as STEAM—is still a relatively new approach in modern education. A bibliometric analysis by Marín-Marín et al. (2021) revealed that the earliest published work on STEAM education did not appear until 2006. The authors also noted that the amount of published STEAM educational research was relatively low in comparison to other fields of study. The United States produced the most STEAM research, with the University System of Georgia producing the highest volume of published works. As Marín-Marín et al. (2021) acknowledged, Georgia is a leading pioneer in STEAM education. In addition, Georgia is one of the few states in the United States to offer state-level STEAM certification for schools committed to STEAM implementation (GaDOE, 2023b). STEAM certification is a prestigious designation that only a limited number of Georgia schools have achieved. As of 2023, there were only 10 elementary schools, 4 middle schools, and 1 high school with GaDOE STEAM certification (GaDOE, 2023b). In 2025, the number grew to 41 total schools actively pursuing or obtaining STEAM certification. Cobb County is the only district in Georgia with a local STEAM certification criterion (CCSD, 2024). The certification process requires multiple school visits from GaDOE STEAM program specialists to identify strengths and areas of improvement using the elementary STEAM certification rubric as a guide. According to the certification rubric, all teachers, instructional coaches, and

administrators must have ongoing professional development with arts integration demonstrating “pervasive evidence of implementation in classroom instruction” (GaDOE, 2023b, pp. 10-11). Implementing arts-integrated STEAM is not easy. STEAM education requires extensive planning, professional development, and collaboration to be implemented with fidelity (Caton, 2021; Dira, 2022). Spyropoulou and Kameas (2024) compiled a framework of the specific teacher competencies necessary for transdisciplinary STEAM education that extended beyond typical classroom teaching. According to their framework, there were 41 teacher competencies necessary for effective STEAM implementation, exemplifying how rigorous transdisciplinary teaching can be for teachers (Spyropoulou & Kameas, 2024). The expectations set forth by the GaDOE (2023b) and the competency frameworks of Spyropoulou and Kameas (2024) highlighted the complexity and rigor of arts integration in STEAM. Understanding classroom teachers’ experiences with arts integration at schools pursuing STEAM certification will potentially shed light on the successes and challenges teachers face in the field, providing insights that could inform strategies to improve the sustainability of STEAM implementation at these schools.

Overview of the Problem

STEAM education has been gaining momentum in American schools (Delaney, 2014). The integration of the arts in STEAM encourages students to pursue creative problem solving through a transdisciplinary approach (Okwara & Pretorius, 2023). In the United States, Georgia is one of the few states to offer STEAM certification for schools committed to ongoing STEAM implementation. According to state (GaDOE, 2023b) and county (CCSD, 2024) guidelines teachers at schools pursuing STEAM certification are

required to integrate the arts across multiple disciplines, embedding arts instruction within their teaching of the required content standards and, in some cases, assessing the arts standards to support interdisciplinary learning. According to survey results conducted by the National Center for Education Statistics (NCES, 2002), only 10% of surveyed classroom teachers had an arts major or minor at the time of the survey. With 90% of teachers lacking formal training in arts education, many may feel uncertain or uncomfortable when tasked with teaching and assessing the arts. As part of doctoral research, Evans (2018) investigated the visual arts training requirements of general education teacher preparation programs at the top 50 universities on the U.S. News Report for 2015-16. Evans' (2018) analysis found that only eight of the top 50 universities required pre-service teachers to take between one and three credits in visual arts. These findings align with the NCES (2002) statistical report indicating that most general education teachers may lack formal training in arts education. However, teachers at schools pursuing STEAM certification are required to regularly integrate arts standards into their curriculum, which may prove to be difficult for those without an arts education background.

Studies have shown that overall, teachers had a perceived value of STEAM and believed in the benefits for students (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Kartini & Widodo, 2020). Although teachers valued STEAM, there was an overall lack of understanding regarding STEAM implementation and an expressed need for additional professional development (Alghamdi, 2023; Herro & Quigley, 2017; S. Kim & Lee, 2018). Kim and Lee (2018) surveyed 9,990 teachers in South Korea and found that they were generally unfamiliar with STEAM, which

impacted the effectiveness of STEAM implementation and curriculum development. This initial lack of understanding was supported by the findings of a study conducted by Herro and Quigley (2017). Their study involved middle school math and science teacher perceptions of STEAM. The findings indicated that teachers did not initially understand how to integrate the arts into STEAM experiences, which negatively impacted their self-efficacy with implementation. When teachers lacked the understanding, it negatively impacted their self-efficacy (Herro & Quigley, 2017). In other studies, teachers reported low self-efficacy and a lack of confidence with arts integration in STEAM (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Kartini & Widodo, 2020; S. Kim & Lee, 2018; Romero-Ariza et al., 2021). Chapman and Yates (2023) found that teachers indicated an overall lack of self-efficacy when implementing arts-integrated activities before a teacher mentoring program was used as a support. Findings from Herro et al. (2019) also indicated that teachers lacked confidence when initially incorporating arts-integrated activities into STEAM before their participation in an extensive professional development program. When teachers were given specific professional development to hone STEAM competencies, self-efficacy, confidence, and overall understanding increased (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Romero-Ariza et al., 2021). Data were collected through open and close-ended surveys, except in Herro and Quigley's study, which used interviews to collect data. While these studies examined the positive impact of professional development on self-efficacy, teacher experiences regarding the nuances of their transition to arts integration and the meanings they assigned as a result were not explored, revealing a gap in literature that this current study has the potential to resolve.

The decision to pursue STEAM certification is typically made by the school's administration team, which rarely includes teacher input. A goal of this study is to amplify teacher voices regarding their experiences transitioning from the use of traditional teaching methods to rigorous arts integration in STEAM and illuminate the contexts and meanings made throughout their experience. This study will contribute to the current body of research by providing insight into elementary educators' experiences at schools pursuing STEAM certification, how they transitioned their pedagogical paradigm to include arts integration in STEAM, and the meanings they assigned throughout the process. This study is significant because it may provide insight and encouragement to other educators in similar situations by giving them relatable scenarios and voices with which they can identify. Their narratives shed light on the possibility of practical changes and supports needed to facilitate a smooth transition for future teachers and encourage administrators to pursue STEAM certification for their schools.

Problem Statement

The focus of this study was to gain insight into elementary teachers' experiences as they transitioned from traditional teaching methods to arts integration at schools pursuing STEAM certification in Georgia. Using narrative inquiry, I aimed to explore how an individual's historical contextual factors, prior experiences, and their network of support impacted their transition to arts integration in STEAM. Although teacher perceptions of STEAM (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Kartini & Widodo, 2020) and ways to support teacher self-efficacy with STEAM (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Romero-Ariza et al., 2021) have been studied, a gap in the literature exists when

exploring the deep meanings, beliefs, and assumptions teachers constructed as a result of their transition to arts integration in STEAM. Additionally, teacher experiences at STEAM-certified schools have yet to be studied. The teacher narratives painted a picture of what it was like in the field for them, which can inform administrators and STEAM program developers of practical supports to ensure a smoother transition for teachers, reduce teacher burnout, and encourage teachers on similar STEAM certification journeys.

Purpose and Scope

Despite the growing national interest in STEAM (Delaney, 2014), teacher experiences at STEAM-certified schools have yet to be studied. The purpose of this qualitative study was to elevate the voices of teachers at STEAM-certified schools by sharing their experiences as they transitioned their teaching practices to include regular arts integration and the meanings those experiences had for them. By highlighting teacher experiences during STEAM certification, the results of this study can be used to advocate for necessary resources and support systems to make the STEAM certification process more manageable and sustainable for educators. Highlighting teachers' experiences at schools pursuing STEAM certification could inspire educators, administrators, and program developers to seek GaDOE STEAM certification for their schools or to establish similar certification programs in other states.

The scope of this study focuses on elementary teacher experiences at schools pursuing STEAM certification. GaDOE STEAM certification and CCSD STEAM certification requires teachers to demonstrate a high level of arts integration throughout their curriculum (CCSD, 2024; GaDOE, 2023b). Participating teachers had at least three years of experience teaching with traditional methods and a minimum of one year at a

fully STEAM-certified school. To recruit participants, I sent an email with details of the study (see Appendix A) to all classroom teachers at the schools pursuing STEAM certification on the GaDOE STEM/STEAM website. I chose two participants from three different schools, totaling six participants. The participants took part in an interview as the main source of data collection.

Research Questions

I developed three research questions to fulfill the purpose of this study. The research questions are as follows:

RQ1: How do elementary classroom teachers describe their experiences with traditional teaching methods as compared to their experiences with arts integration at schools pursuing STEAM certification?

RQ2: How did the participants navigate the transition to arts-integrated STEAM?

RQ3: What are the participants' recommendations for transitioning from traditional teaching methods to arts-integrated STEAM?

RQ1 is the overarching research question that establishes the foundation for the qualitative framework that was used to gain insight into the narratives educators told regarding their experiences transitioning to and implementing arts integration at schools pursuing STEAM certification. I created a semi-structured interview guide (see Appendix B) to allow participants space to tell stories regarding their prior experiences in the classroom, current realities, and the meanings they assigned throughout their experience. Investigating how prior experiences shaped the participants' views during their transition to arts-integrated STEAM revealed key factors that influenced their perspectives and attitudes. Understanding these factors helped me identify which past experiences

positively or negatively impacted their transition to arts integration. In addition, understanding the context of the participants' current realities and giving them space to reflect on their experiences and meanings provided deep insight into the factors that contributed to their transition to arts integration in STEAM. Encouraging participants to reflect on their past and current experiences was essential for meaning making, and their insights provided valuable recommendations for teachers and administrators in RQ3.

I designed RQ2 to allow participants space to reflect on their prior and current experiences and discuss the meanings they assigned as a result of their transition to arts integration in STEAM. Investigating the meanings participants constructed as they navigated the transition provided valuable insight into how they internalized and interpreted the process of integrating the arts into STEAM education. Reflecting on the meanings and outlooks participants constructed highlighted the emotional and cognitive shifts associated with pedagogical changes, which offered a deeper understanding of their overall journey. I used Schlossberg's (1981) transition theory to analyze the personal and professional impacts of the transition, highlighting significant aspects of their experiences, which informed their recommendations for future practice in RQ3.

I designed RQ3 to give participants a platform to share practical advice with the intent to help teachers and administrators navigate the STEAM certification process. Exploring how the participants' experiences shaped their recommendations offered valuable insight into the practical implications of the results from this study. Understanding these influences revealed how the participants past encounters and pedagogical outlooks shaped their advice for effective STEAM implementation. This knowledge was essential for developing informed recommendations that were grounded

in real-world experiences, which may be beneficial to administrators and program developers as they designed effective and sustainable arts integration initiatives. In addition, teachers may find practical advice that they can implement in their own classrooms to help ease their own transition to arts integration.

I designed the research questions for this study to gain insight into how classroom teachers navigated the transition from using traditional methods to using regular arts integration at a school pursuing STEAM certification. I placed emphasis on the participants' prior and current experiences to gain insight into how their personal and professional contexts influenced the transition. Finally, I asked the participants to reflect on their experiences to develop recommendations for teachers and administrators to support smoother transitions to arts integration in STEAM.

Theoretical Framework

A theoretical framework is a tool used in research to provide structure for a study using connecting ideas from existing theories (Varpio et al., 2020). According to Maxwell (2013), the use of a theoretical framework in research supports the development of research questions, methodologies, and interpretation of findings for a study. Developing a theoretical framework is important because it informs the lens the researcher will use to understand and interpret findings (Kivunja, 2018). The theoretical framework for this study was designed using constructivism (Piaget, 1973) and transition theory (Schlossberg, 1981), which offered complementary perspectives to better understand how the transition to arts integration in STEAM affected an individual's pedagogical outlook, attitudes, and values.

For the current study, I employed a constructivist paradigm. Constructivism is a way of looking at the world that claims the human experience and acquisition of knowledge is a construction of prior experiences, relationships, and interactions (Fosnot, 1996; Piaget, 1973). Prior to the defining of constructivism, Dewey (1934) suggested that an individual's prior experience with the arts builds an unconscious intuition, making new artistic situations easier to navigate. He also explained that prior experiences with the arts builds interest, which motivates the individual to want to create more. Furthermore, Dewey's theory implies that prior experiences with art can foster future interest, intuition, and engagement with arts integration in other aspects of an individual's life. Constructivism can also be applied to learning theory. Since knowledge is constructed through an individual's experience, student-centered learning grounded in real-world experiences aids in the construction of knowledge (Bada, 2015). STEAM education is grounded in constructivism because learning is interactive, built on the exchanging of ideas, and is transferrable to other situations (Bada, 2015). The idea that knowledge is constructed through hands-on experiences can also be applied to professional development. As teachers actively participate in arts-integrated professional development, they construct knowledge of arts-integrated practices that they can apply in their classrooms.

The second guiding theory in the conceptual framework was Schlossberg's (1981) transition theory. Transition theory is shaped by the constructivist idea that a person's prior and current realities influence their beliefs, assumptions, and meanings as they embark on a change in life. Additionally, an individual's character traits, network of support, current situation, and coping strategies also impact the way individuals

formulate meaning around a transition in life, described as the *4S System* (Schlossberg et al., 1995). Schlossberg (1981) suggested people could have different reactions to the same transition depending on their present circumstances, which was supported by the constructivist idea that an individual's reality was constructed within context. The context in which a person experiences transition impacts their reaction and ability to cope and respond to transitional experiences. Additionally, transition theory can be applied to a wide range of events, whether they are anticipated, unanticipated, or non-events. This theory was relevant to the current study because it utilized the four components of transition theory—character traits, network of support, experiential situations, and coping strategies—which influenced elementary teachers' experiences and the significance they assigned to them during their transition from traditional teaching to arts integration in STEAM. The intent was to conduct in-depth interviews using narrative inquiry to capture the nuanced experiences and insights of these educators as they recounted their journey from traditional teaching methods to arts integration in STEAM. Specific interview questions regarding the participants' character traits, network of support, experiential situations, and coping strategies aided in providing context for the impact these factors had on their transitional journey. Transition theory highlighted the importance of personal and contextual factors in understanding the nature of an individual's transition. Schlossberg's transition theory best suited the needs of this study because it provided a framework to explore how teachers formulated meanings around their transition to arts integration in STEAM, which directly related to the second research question.

I chose the constructivist idea of transition theory (Schlossberg, 1981) to develop the theoretical framework for this study. Constructivism and transition theory offered

complementary perspectives for understanding how prior and current experiences shaped a teacher's present reality as they implemented arts integration in STEAM in their classroom. Transition theory offered insight into the personal and contextual factors that affected a teacher's transition to arts integration in STEAM, while constructivism highlighted how these experiences were actively constructed and interpreted by the teacher, which influenced their attitudes, pedagogical outlooks, and values as they adapted to a new teaching method. The combination of these theories provided a theoretical foundation to explain how a teacher's prior experiences, support systems, and beliefs influenced their transition to and implementation of arts integration in STEAM. Transition theory and constructivism also provided theoretical backing for the recommendations participants give to improve arts integration in STEAM, which were grounded by their personal experiences.

Alternative Theories

There are alternative theories similar to Schlossberg's (1981) transition theory. Lewin's change theory (1947) and Bridges' transition model (Bridges & Bridges, 2009) also focused on the process of adapting to change, while highlighting the emotional, cognitive, and behavioral shifts individuals experience during a transition. Kurt Lewin's change theory (1947) involves three stages of adjusting to change. The first is the *unfreezing* of one's current routine, *changing* to the new routine, and finally *refreezing* in the new routine. Lewin's change theory is often used for organizational change but can also be used for individuals. Another theory similar to Lewin's change theory is Bridges' transition model (Bridges & Bridges, 2009). Like change theory, Bridges' transition model also includes three elements of change: endings, the neutral zone, and new

beginnings. Individuals must first end the processes or routines to which they were accustomed, followed by a neutral zone characterized by the realignment of their new processes. In the final stage, individuals embark on new beginnings, which mark the use of the new processes as individuals embark on a new path.

Schlossberg's transition theory best suited the needs of this current study because it provided a framework to better understand the context behind how teachers formulated meanings around their transition to arts integration in STEAM, relating directly to the second research question. The transition model (Bridges & Bridges, 2009) and change theory (Lewin, 1947) only skim the surface of an individual's transition by exploring the ending (freezing), neutral zone (change), and new beginning (refreezing) of a change. Transition theory allowed me to explore the impact an individual's character traits, network of support, coping strategies, and current situation had on the way they formulated meanings around their transition to include arts integration in STEAM as teaching methodology. Schlossberg's transition theory was the best theory to help me explore the participants' meanings surrounding their transition to arts integration in STEAM from traditional teaching methods.

Significance of this Study

Exploring how teachers transitioned their teaching methods to include arts integration in STEAM was a problem worth studying because each teacher's unique story illuminated specific challenges, successes, and needs they faced in the field. Most general classroom teachers lack a background in arts education (Evans, 2018; NCES, 2002), yet with STEAM certification, they are required to regularly integrate arts standards into their curriculum (GaDOE, 2023b). In addition, the literature has shown several barriers

teachers faced when implementing arts integration in STEAM including a lack of self-efficacy with arts integration (Chapman & Yates, 2023), a lack of STEAM understanding (S. Kim & Lee, 2018), and a lack of time for planning and implementation (Herro et al., 2019). While teacher perceptions of STEAM (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Kartini & Widodo, 2020; S. Kim & Lee, 2018; Romero-Ariza et al., 2021), the impact of professional development on STEAM implementation (Chapman & Yates, 2023; Herro & Quigley, 2017; Romero-Ariza et al., 2021), and the barriers of STEAM implementation (Caton, 2021; Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Herro et al., 2022) have been explored, teacher experiences at STEAM-certified schools have yet to be studied and reveal a gap in the literature. Highlighting teacher experiences with arts integration at schools pursuing STEAM certification is significant because it may inspire educators, administrators, and STEAM program developers to pursue STEAM certification for their schools or to create similar certifications in other states or counties. In addition, most of the qualitative data from the aforementioned studies were collected using surveys, and in-depth interviews were not used to collect experiential data. In this study, authentic insights from in-depth teacher interviews were used to create narratives that illustrated real-life experiences in the field, which may potentially bridge the gap between administrative decisions and teachers' day-to-day realities.

Definition of Terms

Arts instruction: teaching and learning involving the study and production of creative arts including music, visual arts, dance, media arts, and drama

Arts integration: a teaching approach where students demonstrate understanding of another content area through an art form

Fine arts: dance, media arts, music, theatre, and visual arts

Transdisciplinary arts-integrated STEAM: “the creation of art that is simultaneously applied through additional disciplines; not confined to respective disciplines, yet used in concert to construct applications, especially those with real-world implications” (Liao, 2016, p. 46).

Interdisciplinary studies: the integration of two or more disciplines around a unifying theme

Single-discipline teaching: a teaching approach characterized by disciplines being taught in isolation without the integration of other disciplines

Traditional teaching methods: a teacher-centered teaching approach, typically single-discipline in nature, where the teacher is responsible for imparting knowledge to the students

Transdisciplinary approach to teaching: a teaching approach involving multiple disciplines that transcend their respective boundaries and rely upon the understanding of all involved content areas to produce a product

Twenty-first century skills: competencies required of the modern workforce, comprised of a variety of interpersonal skills needed to be successful in contemporary society

Summary

The purpose of this study was to give classroom teachers a voice to describe what it was like to transition their teaching methods to include regular arts integration in

STEAM for the purpose of learning what it was like in the field for them. Additionally, I aimed to identify how administrators, program developers, and fellow educators can learn from these experiences to support a more manageable and appealing transition to state-level STEAM certification for schools and teachers considering this path. Careers in the science, technology, engineering, and math fields continue to grow, yet the United States continues to underperform global competitors in these areas (Tsakeni, 2022). The addition of the arts into the STEM disciplines has been shown to foster creativity (Bertrand & Namukasa, 2023), innovative thinking (Bush et al., 2020), and cross-disciplinary problem solving (Bedewy & Lavicza, 2023), offering a potential solution for students who are disinterested or disengaged in these subjects (Lage-Gómez & Ros, 2021). Classroom teachers at STEAM-certified schools must exhibit daily arts integration across multiple disciplines, while still teaching the required content standards (GaDOE, 2023b). This process requires rigorous professional development in arts integration within STEAM, as well as a comprehensive shift in teaching pedagogy. The purpose of chapter 2 will be to examine the existing literature on arts integration in STEAM, the benefits, challenges, and teacher perceptions of implementation.

Chapter II

Review of Literature

The purpose of this literature review is to examine the existing literature on arts integration in STEAM, the benefits, challenges, and teacher perceptions of implementation. I used two theoretical frameworks to design the current qualitative study: constructivism (Fosnot, 1996; Piaget, 1973) and transition theory (Schlossberg, 1981). I will explore constructivist literature to examine the active role participants have in constructing their own realities, understandings, and beliefs based on their experiences (Dewey, 1934; Fosnot, 1996; Piaget, 1973). I will also explore literature on transition theory (Schlossberg, 1981) to better understand how experiences, interactions, and situational context influenced the way an individual perceived a personal transition. In addition, literature on transdisciplinary arts integration in STEAM will also be discussed. The literature revealed the addition of the arts in STEAM required teachers to develop complex learning experiences to teach both artistic and scientific concepts simultaneously, commonly referred to as transdisciplinary STEAM (Đira, 2022). Results from several studies indicated that the use of transdisciplinary teaching in STEAM increased innovative science thinking (Bedewy & Lavicza, 2023; Daneshpour & Kwegyir-Afful, 2022; Đira, 2022). Additionally, the integration of transdisciplinary teaching in STEAM was reported to strengthen creativity, critical thinking, and served as a holistic approach to real-world problem-solving (Bertrand & Namukasa, 2023; Braund & Reiss, 2019; Daneshpour & Kwegyir-Afful, 2022; Mohd Hawari & Mohd Noor, 2020).

Although transdisciplinary arts integration in STEAM is a beneficial teaching method, studies have shown that it was difficult to implement and required specific professional development (Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Spyropoulou & Kameas, 2024). Additionally, I analyzed studies examining teacher perceptions of STEAM implementation. Results revealed that while teachers saw the value in STEAM (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Kartini & Widodo, 2020), their confidence in implementation was low due to their perceived lack of STEAM related skills (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Kartini & Widodo, 2020; S. Kim & Lee, 2018). The research questions for this study are as follows:

RQ1: How do elementary classroom teachers describe their experiences with traditional teaching methods as compared to their experiences with arts integration at a school pursuing STEAM certification?

RQ2: How did the participants navigate the transition to arts-integrated STEAM?

RQ3: What are the participants' recommendations for transitioning from traditional teaching methods to arts-integrated STEAM?

Theoretical Framework

A theoretical framework uses connecting ideas from existing theories to structure a research study (Varpio et al., 2020). Existing theories are used to support the development of research questions, methodologies, and interpretation of findings for a study. Developing a theoretical framework is a crucial step in research because it informs the lens the researcher will use to understand and interpret findings (Kivunja, 2018). I developed the theoretical framework for this study using constructivism (Fosnot, 1996;

Piaget, 1973) and Schlossberg's (1981) transition theory, which offered complementary perspectives to better understand how transition affected an individual's beliefs, attitudes, and assumptions.

Constructivism

Constructivism is a philosophy grounded in the belief an individual's life experiences contribute to their cumulative knowledge and understanding of the world (Creswell & Creswell, 2018; Fosnot, 1996; Piaget, 1973). Furthermore, reality is a subjective construct, meaning an individual's reality is a construction of their lived experiences, which vary from person to person (Lincoln & Guba, 1985). As individual realities are unique and cannot be generalized, one must first understand the context of an individual's experiences to gain deeper insight into their reality (Patton, 2015). To do this, researchers can listen to stories, analyze metaphors, and ask questions (Fosnot, 1996). When constructivism is used to guide qualitative research, "[t]he researcher's intent is to make sense of (or interpret) the meanings others have about the world," (Creswell & Creswell, 2018, p. 8). Humans are constantly organizing new information and making meaning to explain the world around them (Kegan, 1980). The *meaning* a person makes is how they make sense of their experiences. Clarifying this further, Lincoln and Guba (1985) explained, "[r]eality is . . . a multiple set of mental constructions" (p. 295) based on the meanings made throughout the context of an individual's life experiences. Qualitative researchers who employ a constructivist paradigm must first understand the contexts that surround an individual's experiences and how the individual assigned meaning to those experiences. Only then will the researcher

begin to understand the participant's meaning making (Kegan, 1980), or as Lincoln and Guba (1985) explained it, understanding the participant's "truth" (p. 290).

Since the focus of this study is to gain insight into teacher experiences as they transitioned from traditional teaching methods to arts integration in STEAM, I used constructivism to explain how each teacher's prior experiences, interactions, and relationships shaped their current reality, understanding, and beliefs regarding arts integration in STEAM.

Transition Theory

Rooted in constructivism, transition theory offers a framework to better understand how adults cope with and navigate transition in their lives. Nancy Schlossberg introduced transition theory in 1981, publishing her foundational work in journal *The Counseling Psychologist*. In the article entitled *A Model for Analyzing Human Adaptation to Transition*, Schlossberg explained that adults ". . . continually experience change and transition, and that these changes often result in new networks of relationships, new behaviors, and new self-perceptions" (Schlossberg, 1981, p. 1). While change is inevitable, individuals react differently to events based on their personal characteristics, external factors, and the timing in which it occurs. Schlossberg defined *transition* as ". . . an event or non-event [that] results in a change in assumptions about oneself and the world and thus requires a corresponding change in one's behavior and relationships" (Schlossberg, 1981, p. 5). Schlossberg explained that transitions can happen with significant life events, such as the birth of a child or a job change, as well as with non-events, like the unfulfilled hope of a promotion.

As Schlossberg (1981) posited, “A transition is not so much a matter of change as of the individual’s *perception* of change. A transition is a transition if it is so defined by the person experiencing it” (p. 7). Schlossberg described one’s ability to adapt to change as a balance between resources and deficits, otherwise known as a resource-deficit ratio. If the resources outweigh the deficits, the person will have an easier time adapting to the change. Consequently, if deficits outweigh an individual’s resources, their ability to adapt to the change may be more difficult. In addition, Schlossberg suggested that gradual transitions are easier for individuals to navigate because they allow time to “rehearse for these future roles” (p. 9). In contrast, abrupt changes often lead to greater resistance, as individuals may struggle to adapt to their new reality.

The 4 S System of Transition Theory

Schlossberg (1981) suggested that an individual’s ability to adapt to a transition depends on the surrounding environment before and after the change, their sense of competency, well-being, access to necessary resources, and overall health. These factors of transition theory are collectively known as the *4 S System* (Schlossberg et al., 1995). The 4 S System includes *situation*, *self*, *support*, and *strategies*, which I will describe in more detail below.

Situation. *Situation* can be described as the duration of the current transition, one’s sense of control, concurrent stress, and previous experience with a similar transition (Anderson et al., 2022). The duration of the transition may impact how it is perceived by the individual. For example, an individual may adapt differently to what they perceive as a permanent change as opposed to one that they view as temporary (Anderson et al., 2022). For example, a teacher who perceives STEAM to be a fleeting educational trend

may cope differently than one who views STEAM as a long-term pedagogical shift. In addition to the duration, one's sense of control plays a role in the situational context. For instance, an individual may have an easier time adapting to a transition they initiated as opposed to one that was forced upon them. This is relevant to the current study, as teachers who voluntarily adopted STEAM may have a different perspective than those for whom it was mandated. In addition to one's sense of control, concurrent stress also plays a crucial role when understanding an individual's situation. External stressors, such as the sickness of a family member or divorce, may impact how a person navigates a transition. Sometimes people must navigate several transitions at once, which may have a positive or negative impact (Anderson et al., 2022). The final environmental factor that is pertinent to the current study is an individual's experience with a similar transition. Schlossberg (1981) posited that individuals are more successful adapting to life changes if they have weathered something similar in the past. Schlossberg explained that individuals who have positive experiences overcoming a previous transition will be more likely to successfully adapt to a new change. Conversely, individuals who were defeated by a previous transition may be less likely to cope with a similar transition. Similar transitions the participants have experienced in the current study include a school-wide STEM transition, county-level STEM or STEAM certification, or a school-wide arts integration initiative. Together, duration, sense of control, concurrent stress, and previous experience with a similar transition shapes the situational context of an individual's transition (Anderson et al., 2022).

Self. In addition to the situational context of a transition, Schlossberg (1981) explained that the individual's characteristics, referred to as *self*, influence their

adaptation to change. Individual characteristics are broken down into several categories: psychosocial competence, gender and identification, age and life-stage, state of health, race-ethnicity, socioeconomic status, value of orientation, and behavioral attitudes (Schlossberg, 1981, p. 12). For the current study, pertinent individual characteristics include psychosocial competence, life-stage, and behavioral attitudes. Psychosocial competence is used to describe one's self-attitudes and world-attitudes. Individuals with positive attitudes are more likely to have an easier time adapting to transitions and may have higher self-efficacy when tackling challenges (Anderson et al., 2022). *Life-stage* is another factor in an individual's ability to adapt to change. Schlossberg (1981) defined one's life-stage as the group of peers with similar ages and characteristics as the individual. Consequently, Schlossberg suggested that life-stage may play a more significant role to an individual's adaptation than chronological age. According to Schlossberg, younger people tend to view stress as a motivator, while older people may prefer to reduce obligations and stress. Additionally, older people may not perceive events with the same "density" (Schlossberg, 1981, p. 13) of stress as younger people due to the breadth of their lived experience. For the current study, the life-stages of the participants include young teachers, veteran teachers, and teachers near retirement. The last characteristic pertinent to this study is behavioral attitudes. Behavioral attitudes are coping behaviors such as goal setting, planning, initiative, effort, and resilience (Schlossberg, 1981). People who exhibit positive behavioral attitudes and coping skills are more likely to have an easier time adapting to a transition in life than those who lack coping skills (Anderson et al., 2022). Throughout a transition, an individual's sense of self plays a crucial role in their ability to navigate and cope with change.

Support. An individual's *situation* and *self* provide context for the transition, while *support* allows the individual to move forward through the transition (Anderson et al., 2022). Schlossberg (1981) emphasized that the success of an individual's adaptation to change depends on the degree of difference between their pre-transition and post-transition environments. An individual's environment is characterized by their interpersonal support systems, institutional supports, and physical setting (Schlossberg, 1981, p. 10). Interpersonal supports encompass the relationships in an individual's life that provide encouragement, guidance, reassurance, and a sense of self-worth. Schlossberg (1981) suggested that interpersonal supports are one of the strongest indicators of a successful transition. This could include the guidance of friends, mentors, or family during a time of transition. Institutional supports are structured organizations that offer support in some capacity. For the current study, institutional supports include administration, professional development, district or state-level support or guidance, and committees. While institutional supports may offer varying degrees of guidance to the individual experiencing transition, their presence plays a crucial role in easing the transition for the individual. In addition to institutional supports, an individual's physical setting is also influential to their ability to adapt to change. For the current study, one's physical setting may include classroom or school layout, access to materials, class size, and student behavior. Support, whether interpersonal, institutional, or environmental, aids individuals in navigating and adapting to transitions successfully.

Strategies. In addition to *support*, *strategies* are tools that can be used to help individuals cope with their transition. An individual's strategies may vary based on their specific *situation*, *self*, and *support* (Anderson et al., 2022). Anderson et al. (2022)

referenced three types of coping strategies that were pioneered by Pearlin and Schooler (1978): modifying the problem, understanding the meaning of the problem, and managing the stress after the problem has occurred (Anderson et al., 2022, p. 54). Modifying the problem includes an individual's attempt to control the situation, such as educating oneself to better address the situation. Understanding the meaning of the problem includes "positive comparisons, selective ignoring, and substitution of rewards" (Anderson et al., 2022, p. 179). Finally, an individual may manage the stress of the problem by participating in an individual stress relieving activity, such as jogging (Anderson et al., 2022, p. 56). By utilizing coping strategies, individuals may navigate transitions more effectively (Schlossberg, 1981).

Summary

Transition theory (1981) was used as a relevant framework for analyzing the narrative data from this study. The population for this study were classroom teachers who were required to transition their teaching methods from traditional teaching to arts-integrated STEAM at schools pursuing STEAM certification. The 4S System of transition theory (Schlossberg et al., 1995) provided a valuable framework to better understand the context surrounding each participant's *situation, self, support, and strategies*, offering a deeper understanding of the challenges and supports that shaped their experiences.

Evolving Pedagogies

The rapidly changing landscape of the modern workforce has inspired a global shift in teaching pedagogies (Teschers et al., 2024). While a teacher-centered traditional teaching approach has been favored in the past for its efficiency, innovative approaches such as interdisciplinary and transdisciplinary instruction have proven more effective in

fostering critical thinking, creativity, and problem-solving skills—areas often underdeveloped in traditional teaching methods (Teschers et al., 2024). The integration of multiple disciplines allowed students to solve real-world problems collaboratively and creatively, fostering important 21st century skills such as adaptability and innovation (Wu et al., 2024). The evolution of traditional, interdisciplinary, and transdisciplinary teaching practices will be discussed.

Traditional Teaching Methods

Commonly referred to as the “sage on the stage” method of teaching, the traditional teaching method is a teacher-centered, lecture style approach with content areas taught in isolation (Tularam & Machisella, 2018). This style of teaching is considered teacher-centered because the teacher is the content expert who imparts knowledge onto students. Traditional teaching methods continue to be widely used in many classrooms because it allows teachers to cover the required standards in a more efficient timeframe (Tularam & Machisella, 2018).

Another reason why teachers may rely on a teacher-centered approach to learning is because it is efficient for test preparation (Asilevi et al., 2024). Elementary school students are required to take a plethora of standardized assessments annually, with teacher evaluations being linked to student assessment performance in some districts. The emphasis on standardized assessments may cause teachers to narrow their focus on test preparation at the expense of giving students a broader and more holistic educational experience. Tularam and Machisella (2018) argued that while the traditional teaching method of rote memorization and practicing skills in isolation is important, students became better problem solvers when they focused on connections and structures within

problem-based learning (PBL) tasks. Even though problem solving was explicitly taught in mathematics classrooms beginning in first-grade, Tularam and Machisella (2018) explained that university students in Australia continued to lack proficiency in this skill, believing traditional teaching methods are to blame.

Another drawback of traditional teaching methods is the rigidity and lack of creative thinking, which may cause some students to become disengaged or develop negative feelings towards a particular subject area (Schmidt, 2011). For example, a study conducted by Asilevi et al. (2024) compared seventh-grade students' ($n = 237$) perceptions of traditional teaching and inquiry-based learning in science in Namibia. Data were gathered using an online survey and analyzed using descriptive statistics. Results indicated that students had a negative perception of science after traditional instruction, while they had a positive perception of science after inquiry-based learning. This supports the notion that traditional teaching methods can be boring to students and create a negative connotation to a particular subject area (Schmidt, 2011).

While traditional teaching methods were intended to prepare a workforce adept at following directions and mastering specific tasks, they do not cultivate the skills required for success in the modern, evolving workforce (Teschers et al., 2024). While this style of teaching may have been effective at developing skills needed in the 19th and 20th centuries, the rapid technological advancements of the 21st century have emphasized the need for education to evolve to meet the demands of modern society (Institute for the Future, 2019). In response, there has been an educational trend to move away from traditional teaching methods toward more innovative and cross-disciplinary teaching

strategies that foster important 21st century skills such as creativity, collaboration, and problem-solving (Teschers et al., 2024).

Interdisciplinary Teaching Methods

The goal of modern education is to equip students with the skills to be productive citizens in society (Ravitch & Viteritti, 2001). Real-world problems are complex and require innovative and cross-disciplinary solutions to solve them. To prepare students for the complex demands of modern society, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) highlighted the importance of incorporating interdisciplinary experiences in education (Tawil & Camille, 2023). Interdisciplinary experiences integrate elements from two or more distinct disciplines around a unifying theme (NCES, 2002), allowing students to solve real-world problems using critical thinking (Wu et al., 2024). Teschers et al. (2024) acknowledged interdisciplinary experiences fostered soft skills such as diligence, openness, and flexibility that are needed in a modern labor market. To illustrate this, a quantitative study conducted by López-Belmonte et al. (2022) compared interdisciplinary STEM-based learning to traditional, expository learning at a secondary school in Spain. Results indicated that the students in the STEM-based learning group exhibited greater autonomy, collaboration, motivation, and improved teacher-student interaction compared to the traditional instruction group. Results also indicated that the students' problem-solving behaviors were more developed than those in the traditional teaching group.

Županec et al. (2023) conducted a similar study to compare the effectiveness of interdisciplinary teaching strategies with traditional teaching strategies in fifth grade science. A total of 180 fifth graders in Serbia participated in this study, with 90 students

in the control group and 90 students in the experimental group. The mixed methods study measured the students' achievement on a final test as the quantitative data and the quality of knowledge acquisition, understanding, and application of the material as the qualitative data. Results from the study indicated that students in the interdisciplinary group outperformed the students in the traditional teaching group in higher-thinking skills, understanding, and application. Županec et al. (2023) noted that integrated teaching enabled students to recognize the interconnectedness of real-world phenomena, a skill essential for addressing the cross-disciplinary challenges in the 21st century. STEM and STEAM education encourages teachers to teach with an interdisciplinary lens and significantly enhances their ability to teach across the disciplines (Wu et al., 2024).

Although interdisciplinary teaching is beneficial, pre-service teachers are not adequately taught how to create or deliver interdisciplinary units (Boche et al., 2021). Moreover, although it is often assumed that elementary teachers excel at content integration, it remains a significant area of weakness, particularly at the elementary level (Boche et al., 2021; Wu et al., 2024). Nevertheless, teachers perceive themselves to be competent with interdisciplinary teaching, although they may lack confidence with arts integration (Olivato & Castro Silva, 2023).

Transdisciplinary Teaching Methods

Teaching students how to solve problems across multiple disciplines is essential, as real-world problems are complex and are seldom isolated to a single discipline (Tawil & Camille, 2023). Closely aligned to Dewey's (1934) philosophy of integrated, real-world learning experiences, Jantsch (1972) introduced an innovative approach to university level science education known as transdisciplinary education. Jantsch (1972)

defined transdisciplinary education as a “*multilevel multi-goal system,*” (p. 17) coordinated toward meeting a common goal. Similarly, Piaget (1972) described transdisciplinarity as “higher stage succeeding interdisciplinary relationships . . . without any firm boundaries between disciplines” (p. 138). Transdisciplinary education is a teaching approach that blurs the lines between disciplines, fostering innovative and imaginative problem-solving using a multi-disciplinary lens (Bernstein, 2015). In transdisciplinary integration, multiple disciplines are interdependent and rely upon the understanding of all involved content areas to solve a problem or complete a project (Liao, 2016).

When compared to interdisciplinary integration, in which two or more disciplines are used in tandem to solve a problem, transdisciplinary integration goes one step further, by blurring the lines between the disciplines (Liao, 2016). This seamless merging of the disciplines is especially evident when the arts are incorporated into STEM, giving rise to the acronym STEAM. The transdisciplinary integration of the arts in STEAM allows students to think creatively and imaginatively when solving problems. According to a review from Costantino (2018), the transdisciplinary integration of art into other disciplines encouraged students to solve problems using creative inquiry, abstract thinking, and view the problem from multiple perspectives. Similarly, a study conducted by Bush et al. (2020) had similar results. Researchers administered open-ended surveys to better understand student perceptions of how they solved problems when they completed arts-integrated STEAM projects. Results indicated that when they solved problems that transcended disciplines, many students used an empathetic lens and experienced a higher sense of humanistic connection to the problems they solved. A study conducted by Mohd

Hawari and Mohd Noor (2020) also had similar findings. In this study, STEAM problem-based learning (PBL) experiences were planned for two multidisciplinary art classrooms. Teacher interview data suggested that the integration of multiple disciplines within the STEAM PBL project helped students hone their artistic skills and increased their overall confidence, communication, and collaboration. Results from this study demonstrated how transdisciplinary arts integration gave students multi-disciplinary connections, which allowed them to view the problem from multiple perspectives. According to several studies (Bush et al., 2020; Chang et al., 2023; Daneshpour & Kwegyir-Afful, 2022; Āira, 2022; Mohd Hawari & Mohd Noor, 2020; Salehjee & Watts, 2023), transdisciplinary arts integration fostered creativity, engagement, innovation, and problem-solving abilities, all of which are important 21st century skills necessary to be successful in a rapidly evolving global workforce (WEF, 2023).

Arts Integration in STEAM

Given the underwhelming outcomes of the United States' STEM initiative, many educators are drawing inspiration from global competitors such as China and Europe, which place a greater emphasis on the arts within STEM (Hobbs, 2019; Penprase, 2021; Zha, 2022). Arts integration is a teaching approach where students demonstrate their understanding in a subject area through the creation of art (The Kennedy Center, 2020). Moreover, Clapp and Jimenez (2016) explained the 'A' in STEAM could include traditional arts integration, aesthetics, or innovative creativity. While arts integration is a well-researched topic, the integration of the arts within STEAM is a relatively new concept (Marín-Marín et al., 2021). Research has indicated that the arts in STEAM are often treated as an afterthought (Liu et al., 2023; Clapp & Jimenez, 2016). For example,

Clapp and Jimenez (2016) analyzed the role the arts played in various STEAM activities and categorized three different trends: the *STEM-with-stickers* effect, the *arts-and-crafts* effect, and the *artless STEM* effect (p. 486). The *STEM-with-stickers* effect was used to describe ornamental art enhancement “that lacked deep engagement in arts concepts” (Clapp & Jimenez, p. 486). The *arts-and-crafts* effect described arts-based projects that lacked scientific or other integrated aspects. Finally, the most prevalent trend the authors found was the *artless STEM* effect, which were activities that lacked the integration of the arts entirely despite being labeled as a STEAM activity. Clapp and Jimenez’s (2016) analysis demonstrated that the arts were often an afterthought in STEAM activities or entirely left out altogether.

Liu et al. (2023) examined the quality of art in STEAM activities. Their findings were consistent with Clapp and Jimenez (2016), which indicated that the arts in STEAM were frequently reduced to mere decoration or omitted entirely. To counteract this trend, both Clapp and Jimenez (2016) and Liu et al. (2023) suggested teachers must prioritize the arts within STEAM, giving it an equitable role in integration. Liao (2016) reinforced this idea, stating the arts and STEM disciplines should have a reciprocal relationship, where each is a vehicle for learning the other. Although the arts are not equitably represented in STEAM education, arts integration in STEAM has many benefits—it can foster a higher level of motivation and engagement in math and science, encouraging reluctant learners to return to these subjects later in life (Braund & Reiss, 2019). I will further explore the advantages of arts integration in STEAM below.

Arts Integration in STEAM Promoted Innovation

Transdisciplinary education draws on the expertise from diverse disciplines to create innovative solutions to real-world problems (Costantino, 2018). Hobbs (2019) explained that the United States was at risk of falling behind other nations that valued the arts because creative and artistic thinking were needed to create innovative solutions to 21st century problems. One aspect that differentiates STEAM from STEM is the transdisciplinary integration that occurs between the disciplines (Amelink et al., 2024). A study conducted by Salmi et al. (2021) suggested transdisciplinary arts integration encouraged students to take risks and solve problems in imaginative and unconventional ways. When the lines were blurred between disciplines, students were able to draw on a variety of principles to develop innovative solutions not bound by a single discipline.

Another example of innovative problem solving was demonstrated in a study by Bedewy and Lavicza (2023) using the “STEAM + X” (p. 2) educational approach for transdisciplinary learning. Bedewy and Lavicza realized that many disciplines can be integrated into STEAM, hence the addition of the X which represented architecture, history, and culture in this study. Transdisciplinary experiences were designed to teach historical concepts through the creation of mathematically correct architectural structures using technology and artistic principles. Participants were also responsible for making cultural connections throughout the transdisciplinary project. The project was a highly iterative process, which allowed the participating in-service teachers to learn from each other, continually revise their designs, and receive continuous professional development. The results from this study demonstrated the robust nature of integration in transdisciplinary STEAM teaching.

Similarly, a study conducted by Đira (2022) also explored the integrative nature of transdisciplinary arts integration. Participating teachers studied the work of artist Olafur Eliasson and his unique use of color, movement, and shadow. After studying the science behind Eliasson's art, teachers had to reproduce preexisting artwork in a method called *aesthetic transfer* to simultaneously demonstrate their understanding of artistic and scientific principles. Đira explained that focus should be placed on the learning process and not the final product in transdisciplinary integration because the application of both science and artistic principles demonstrated a deeper understanding than the finished product.

In the previously mentioned studies, transdisciplinary arts integration blurred the boundaries between disciplines which fostered innovative solutions and allowed students to demonstrate a deeper understanding of both scientific and artistic principles through application (Amelink et al., 2024; Bedewy & Lavicza, 2023; Costantino, 2018; Đira, 2022; Hobbs, 2019; Salmi et al., 2021). Innovation was fueled by creative thinking, which was promoted through arts integration and blurred boundaries between subjects. The ways in which arts integration fostered creativity in STEAM will be discussed.

Arts Integration in STEAM Promoted Creativity

Creativity is a highly desirable skill in today's workforce based on the World Economic Forum (2023), especially in the sciences. Science is innately creative, as creative thinking drives innovation (Braund & Reiss, 2019). Unlike STEM, which does not allow for creative thinking in science (Okwara & Pretorius, 2023), the integration of the arts in STEAM encouraged creative problem-solving through a transdisciplinary approach (Amelink et al., 2024; Braund & Reiss, 2019; Chang et al., 2023; Lage-Gómez

& Ros, 2021; Okwara & Pretorius, 2023; Wilson et al., 2020). To illustrate this, Amelink et al. (2024) explored how creativity and critical thinking were impacted when students ($n = 592$) worked transdisciplinarily across the disciplines to solve problems. Students were asked three open-ended survey questions regarding how well they felt prepared to address socio-technical challenges using transdisciplinary problem-solving. In addition, the Systems Thinking Assessment Tool (STAT) was used to help researchers better understand the extent to which participants used transdisciplinary problem-solving. Based on the results, students were more likely to develop innovative and creative solutions when solving problems using a transdisciplinary lens.

Another way STEAM promotes creativity is through problem-based learning (PBL). Chang et al. (2023) found that after completing STEAM PBL activities, seventh grade students exhibited significant improvements in their creativity skills as opposed to the control group which used traditional teaching methods. Like the findings of Chang et al. (2023), Wilson et al. (2020) found the incorporation of transdisciplinary arts integration in STEAM increased student creativity as measured by open-ended survey questions administered to students ranging from kindergarten to 12th grade. Many themes were coded throughout the analysis of the survey responses; among them was a shared growth in creative thinking, specifically in terms of generating new ideas and using imaginative thinking. Students in the intervention group had more complex survey responses than the control group. In addition, the integration of the arts in STEAM encouraged students to draw on artistic principles and apply them to scientific concepts, which resulted in a more creative and innovative product. Arts integration in STEAM

encouraged students to expand their thinking, take risks, and explore science through a creative lens (Wilson et al., 2020).

Arts Integration in STEAM Fostered Inclusivity and Engagement

While studies have shown arts integration in STEAM encouraged creativity (Amelink et al., 2024; Braund & Reiss, 2019; Chang et al., 2023; Lage-Gómez & Ros, 2021; Okwara & Pretorius, 2023; Wilson et al., 2020), there is also evidence that it can foster inclusivity and engagement, appealing to a greater number of students (Braund & Reiss, 2019; Lage-Gómez & Ros, 2021; Okwara & Pretorius, 2023). For instance, Okwara and Pretorius (2023) suggested STEAM was more engaging than traditional science instruction because it was student-centered, fostered curiosity, and empowered students to create innovative solutions to the world's biggest problems. Specifically, the integration of the arts gave students multiple ways to express scientific concepts in unconventional ways. This helped increase motivation and overall self-efficacy towards science (Okwara & Pretorius, 2023).

Like the findings of Okwara and Pretorius (2023), a mixed methods study by Lage-Gómez and Ros (2021) found that students felt a higher sense of engagement and meaning after they completed transdisciplinary STEAM projects that involved both artistic and scientific concepts. When students focused their thinking around a *big idea* that involved an artistic and scientific principle, findings showed students exhibited a higher level of motivation and were likely to make lasting connections between the concepts. As a culmination to the *big idea* unit, students created an integrated performance of what they had learned. In doing so, some students expressed the feeling of empowerment and ownership to their learning.

Since arts integration in STEAM has been described as motivating for students (Lage-Gómez & Ros, 2021), it may also stimulate interest for students who are typically uninterested in science. Braund and Reiss (2019) suggested arts integration in STEAM could be a remedy for students who believe science to be boring. They suggested the intentional integration of artistic concepts within STEAM may foster a higher level of motivation and engagement for students who were typically uninterested in science, making them more likely to return to science later in life. The findings from these studies demonstrated how arts integration in STEAM increased science engagement for reluctant learners, while also establishing an inclusive environment where abstract thinking in science was valued (Braund & Reiss, 2019; Lage-Gómez & Ros, 2021; Okwara & Pretorius, 2023).

Preparing Students for the Future

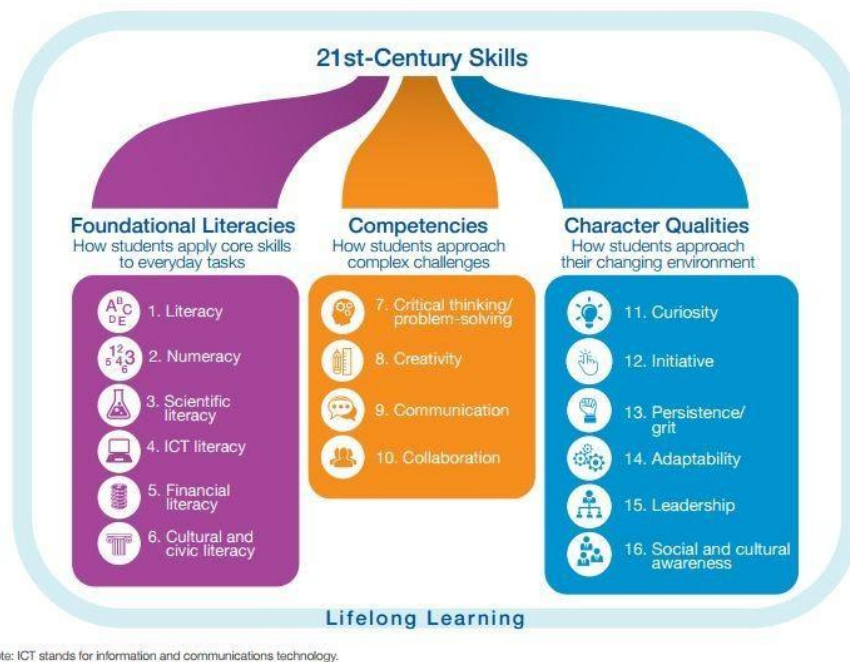
Twenty-first century skills are defined as the competencies required of the modern workforce, comprised of a variety of soft skills needed to be successful in contemporary society (van Baalen et al., 2021). According to the World Economic Forum (2020), among the top skills needed for the modern workforce were innovative thinking, problem-solving, critical thinking, and creativity. These skills are illustrated in an earlier infographic, Figure 1, published by the World Economic Forum (2016). According to Hobbs (2019), the addition of STEAM in the workplace has been shown to increase inclusivity and diversity. Additionally, Hobbs noted companies that valued the arts were more likely to hire people who offered alternative points of view, which led to innovative designs and solutions. In addition, studies have shown that transdisciplinary arts integration strengthened creativity (Chang et al., 2023), critical thinking (Wilson et al.,

2020), empathy (Bush et al., 2020), and collaboration (Salehjee & Watts, 2023) among other relevant 21st century skills. The 21st century skills honed through transdisciplinary arts integration in STEAM will be discussed (see Figure 1).

Figure 1

21st-century Skills for Students.

Exhibit 1: Students require 16 skills for the 21st century



Note. Adapted from *The Future of Jobs Report*, by World Economic Forum, 2016.

Creativity and Critical Thinking Skills

Several important 21st century skills can be developed through transdisciplinary arts integration in STEAM (Chang et al., 2023; Wilson et al., 2020). The World Economic Forum (2023) reported creative thinking and critical thinking to be among the top skills 21st century companies look for when hiring. The results from two studies (Chang et al., 2023; Wilson et al., 2020) illustrated ways transdisciplinary arts integration in STEAM developed student creativity and critical thinking. The first study conducted

by Chang et al. (2023) explored critical thinking and creativity development through problem-based learning (PBL) in STEAM. Students in the experimental group were tasked with designing a device to recognize and correct bad posture while utilizing transdisciplinary arts integration. Students also had to design an aesthetically pleasing device which was tested and presented to experts in the field. Critical thinking and creativity were measured using various instruments such as the International Challenge on Informatics and Computational Thinking (Bebras Challenge) and the Torrance Test of Creative Thinking. Results from this study indicated the seventh-grade students' creativity and critical thinking skills increased with transdisciplinary STEAM PBL as opposed to the control group who were taught using traditional teaching methods. Results from this study also supported the findings of Wilson et al. (2020). Educational researchers and fellows at the nonprofit organization, Innovation Collaborative, explored how critical thinking, creativity, and problem-solving differed between students who participated in arts-integrated STEAM experiences as opposed to students who did not. In this study, students participated in a transdisciplinary learning activity where science and art were taught in a way where each subject area informs decisions made in the other. The fellows, Wilson and Presley, designed transdisciplinary STEAM lessons with mentee teachers who then taught the lesson to students in grades K-12. Students were given open-ended surveys before and after completing the STEAM projects where they described examples of creativity, critical thinking, and problem-solving. Many themes were coded throughout the analysis of the survey responses; among them was a shared growth in creative thinking, specifically in terms of generating new ideas and using their imagination. Students in the intervention group had more complex responses than those

in the control group. Implications from both studies suggested transdisciplinary arts integration in STEAM deepened students' critical thinking, problem-solving, and creativity. Results from these studies illustrated how STEAM PBL strengthened essential 21st century skills, further demonstrating the benefits of this pedagogical approach.

Empathy and Cultural Responsiveness

In addition to creativity and critical thinking, The World Economic Forum (2023) indicated empathy and global citizenship were also important 21st century skills needed in the modern workforce. According to Garner et al. (2018), global citizenship is the respect and social awareness of global cultures and societal issues. Social and societal awareness requires empathy and cultural responsiveness (Gay, 2018). According to the results from several studies, arts integration in STEAM has been shown to encourage empathy and cultural responsiveness in students (Bedewy & Lavicza, 2023; Bush et al., 2020; Chang et al., 2023; Herro et al., 2022; Hobbs, 2019; Salehjee & Watts, 2023; Torres et al., 2024). For instance, Bush et al. (2020) found that students demonstrated empathetic problem-solving when completing STEAM PBL challenges. In this study, students were required to design a solution involving transdisciplinary skills to help another person. According to the researchers, empathetic problem-solving made the problem relevant and more meaningful to the students, resulting in a transformative experience. Similarly, Chang et al. (2023) found that the incorporation of design thinking with STEAM PBL allowed students to solve problems using an empathetic lens. In this study, students designed a device to correct bad posture. Design thinking prompted students to view the problem from the user's perspective, which further encouraged empathetic problem-solving. Yeung and Ng (2023) integrated empathy maps into

transdisciplinary projects which aided students when solving real-world problems in a humanistic way. These empathy maps encouraged students to spend time during the *empathize* stage of design thinking to design the best product for the target population. Although students had varying degrees of empathy, empathy maps were helpful when students used design thinking to develop solutions in an empathetic and holistic manner. In addition to empathy, arts integration in STEAM also encouraged cultural responsiveness in several studies (Bedewy & Lavicza, 2023; Herro et al., 2022; Torres et al., 2024). For instance, a study conducted by Bedewy and Lavicza (2023) demonstrated the culturally relevant nature of the A in STEAM. In this study, teachers integrated architecture, culture, and history into a transdisciplinary STEAM project where they used a mathematical modeling program to design a culturally relevant architectural structure. Another study conducted by Salehjee and Watts (2023) explored the cultural responsiveness of STEAM and found that transdisciplinary arts integration not only encouraged culturally responsive pedagogy but also promoted the “wearing of STEAM culture” (p. 9). In other words, arts integration in STEAM empowered individuals to embrace “intersecting differences” (p. 9) and pursue STEAM careers and hobbies later in life. These studies explored the empathic and culturally responsive impact of arts integration in STEAM. Purposeful arts integration in STEAM provided teachers with the tools to cultivate culturally responsive global citizens, which Gay (2018) emphasized as a crucial element for the future generation.

Other Relevant Interpersonal Skills

Other relevant soft skills developed using arts integration in STEAM were collaboration, communication, motivation, and making connections (Herro et al., 2022;

Lage-Gómez & Ros, 2021; Mohd Hawari & Mohd Noor, 2020; Okwara & Pretorius, 2023). Several studies expressed the collaborative nature of arts integration in STEAM (Herro et al., 2022; Mohd Hawari & Mohd Noor, 2020). Herro et al. (2022) conducted a study that examined instructional practices in STEAM, which revealed a culture of support emerged throughout the projects. After completing a transdisciplinary STEAM project involving the design of a robotic zoo and a backdrop using found materials, this qualitative study revealed that teachers perceived a collaborative culture developed throughout the activities. Students felt comfortable making mistakes and taking risks in their group. Researchers explained that this was due to the teachers building a culture of iteration rather than using a summative grade-based criterion. Similarly, collaboration and communication were developed simultaneously in a study conducted by Mohd Hawari and Mohd Noor (2020). The researchers explored the 21st century soft skills developed using STEAM PBL in a transdisciplinary arts classroom. Results indicated that in addition to an increase in collaboration, students grew in their communication skills, confidence, and overall leadership skills by the end of the project. In addition to communication and collaboration, an increase in motivation and connection making has been noted in the literature (Lage-Gómez & Ros, 2021; Okwara & Pretorius, 2023). For example, Lage-Gómez and Ros (2021) found that students were highly motivated when completing arts-integrated STEAM projects, which resulted in an increase in engagement and overall ability to make connections between disciplines. Similarly, Okwara and Pretorius (2023) explored how the transdisciplinary construction of puppets allowed students to make connections across several disciplines, which increased their motivation to learn both science and artistic principles. The results of these studies illustrate how

transdisciplinary arts integration can foster essential soft skills such as communication, collaboration, motivation, and connection making, which are crucial for the growing workforce in the 21st century (World Economic Forum, 2023).

STEAM Initiatives in Schools

The demands of the modern workforce have sparked an educational call to action, placing greater emphasis on skills such as problem-solving, critical thinking, and creativity in schools (Erduran, 2020; Teschers et al., 2024; WEF, 2023). Because of this, the integration of science, technology, engineering, and math, otherwise known as STEM, has become increasingly popular in many schools (Erduran, 2020).

Unfortunately, the United States' push for STEM education has had underwhelming results, with fewer graduates pursuing STEM fields (Okwara & Pretorius, 2023; Tsakeni, 2022) in addition to an underrepresentation of marginalized groups (Fry et al., 2021). In response, the integration of the arts within the STEM disciplines introduces the potential for enhanced creativity and innovative problem-solving, addressing a gap that STEM alone could not fill. While many schools have embraced STEAM as an educational framework to better prepare students for the demands of the 21st century, only a few states have established state-level certification programs for schools committed to STEAM. According to the Education Commission of the States (2022) and a bibliometric analysis conducted by Marín-Marín et al. (2021), Georgia is a national leader in STEAM education. Furthermore, Georgia is one of the few states to offer state-level STEAM certification for elementary, middle, and high schools (GaDOE, 2023b). Similarly, states like Ohio (Ohio Department of Education, 2021), South Carolina (South Carolina Department of Education, 2014), and Tennessee (Tennessee Department of Education,

2022) also offer state-level certification programs for schools dedicated to ongoing STEAM implementation. Each of these states uses a rubric or continuum to track the progress of schools pursuing certification. In Georgia, “[s]tate certification involves an application with appropriate documentation, an exploratory visit by state officials, and a final alignment consultation analyzing the documentation and the results of the visit by Department of Education officials” (GaDOE, 2023a, para. 1). According to the GaDOE in 2023, only 10 elementary schools had achieved STEAM certification. By 2025, however, the number of elementary schools in the process of obtaining STEAM certification had grown to 29 (GaDOE, 2025).

While state-level certification for STEAM is rare in the United States, several states offer graduate-level certification programs in STEAM. States such as California (University of San Diego, 2024), Connecticut (Sacred Heart University, 2025), Maine (University of Maine at Farmington, 2024), Missouri (Rockhurst University, 2025), Pennsylvania (University of Pittsburgh, 2025), and South Carolina (Clemson University, 2025) offer graduate programs for educators seeking to earn a STEAM certificate. A STEAM certificate is a teaching certificate add-on teachers can pursue to enhance their understanding of implementing STEAM within their classrooms (Clemson University, 2025). In Georgia, teachers do not receive additional income for endorsements other than advanced degrees awarded from accredited institutions. Local schools do not receive direct monetary benefits from pursuing state-level STEAM certification, aside from potential grant opportunities. Georgia schools that are considered “exemplary” (GaDOEa, 2023) in their STEAM implementation are awarded a banner as recognition of the accomplishment.

Georgia is one of the few states offering state-level (GaDOE, 2023b; GaDOE, 2025) and county level (CCSD, 2024) certification for schools committed to ongoing STEAM implementation. This distinction provided a valuable opportunity to learn from the experiences of classroom teachers at STEAM-certified schools, a population that has yet to be studied. Through the current study, I sought to address this critical gap in the literature by offering insights to guide future STEAM education initiatives and support administrators and teachers in similar contexts.

Instructional Practices in STEAM

The GaDOE (2023) has specific requirements for schools obtaining STEAM certification. Teachers must utilize transdisciplinary arts integration across multiple disciplines daily and engage students in STEAM PBL activities involving inquiry, creativity, and innovation (GaDOE, 2023b). To accomplish this, studies have recommended teachers collaboratively plan in multidisciplinary teams to develop high quality transdisciplinary STEAM experiences (Bedewy & Lavicza, 2023; Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Đira, 2022; Herro et al., 2022; Liu et al., 2023; Mohd Hawari & Mohd Noor, 2020; Spyropoulou & Kameas, 2024; Wilson et al., 2020). Additionally, to ensure the adequate representation of the arts in STEAM activities, researchers from several studies recommended the intentional integration of artistic principles to enhance the depth of transdisciplinary integration in STEAM (Clapp & Jimenez, 2016; Đira, 2022; Liu et al., 2023; Okwara & Pretorius, 2023; Wilson et al., 2020). To integrate real-world problem solving, several studies suggested STEAM PBL as a framework to increase creativity, critical thinking, and empathy (Chang et al., 2023; Mohd Hawari & Mohd Noor, 2020; Torres et al., 2024). Due to the complex nature

required of STEAM implementation, researchers have recommended specific teacher training to increase understanding and skills related to STEAM implementation (Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Herro & Quigley, 2017; S. Kim & Lee, 2018; Liu et al., 2023; Spyropoulou & Kameas, 2024). Teaching practices related to transdisciplinary arts integration in STEAM will be discussed.

Cross-Disciplinary Collaborative Planning

Arts integration in STEAM is fundamentally a multidisciplinary practice, and several educational scholars have recommended teachers collaboratively plan experiences in multidisciplinary teams to adequately integrate the arts across multiple disciplines (Bedewy & Lavicza, 2023; Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Āira, 2022; Herro et al., 2022; Liu et al., 2023; Mohd Hawari & Mohd Noor, 2020; Spyropoulou & Kameas, 2024; Wilson et al., 2020). For example, a study conducted by Liu et al. (2023) regarding the quality of arts integration in STEAM activities found that STEAM experiences were “significantly higher quality” (p. 389) when developed as a team compared to experiences planned by individuals. This was due to the diverse perspectives and areas of expertise multidisciplinary teams bring to transdisciplinary planning. The findings from Liu et al. (2023) supported the findings of Spyropoulou and Kameas (2024) in their study regarding the development of a competency framework for STEAM teaching and learning. The authors found collaborative planning was necessary among teachers from various disciplines to ensure a higher level of integration within the STEAM subjects. Additionally, the importance of cross-disciplinary collaborative planning was demonstrated in Āira’s (2021) study regarding the transdisciplinary integration of color and light based on the work of Olafur Eliasson. Āira mentioned the

complexity of both scientific and artistic concepts present in the transdisciplinary unit, which required “productive cooperation with other experts in order to enrich different types of content and connect them in a more functional way” (p. 23). Each aspect from the transdisciplinary STEAM experience required a deep understanding of both the arts and scientific concepts, which could only be accomplished by the collaboration of experts in each field. To further illustrate the importance of cross-disciplinary planning, Daneshpour and Kwegyir-Afful (2022) completed a scoping review of transdisciplinary STEAM practices and found many studies recommended collaborative cross-disciplinary planning in STEAM. Although cross-disciplinary planning is recommended, it is rarely executed due to a lack of planning time and support from administration (Caton, 2021). To address this issue, Herro et al. (2022) suggested teachers attend professional development geared toward designing transdisciplinary STEAM experiences, search for transdisciplinary STEAM experiences online, and discuss the importance of common planning time with administration as a team. The findings from these studies highlight the importance of collaboration in designing more dynamic and integrated STEAM experiences that authentically reflect the arts.

Teacher Experiences with STEAM

The focus of the current study is to understand the experiences of elementary classroom teachers as they transitioned their teaching methods from traditional teaching to arts-integrated STEAM at STEAM-certified schools. Studies have shown that overall, teachers value STEAM and believe in the 21st century benefits for students (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Kartini & Widodo, 2020). Although teachers valued STEAM, there was an overall lack of

understanding regarding STEAM implementation and an expressed need for additional professional development (Alghamdi, 2023; S. Kim & Lee, 2018). When teachers were given professional development to hone STEAM competencies, self-efficacy, confidence, and overall understanding increased (Alghamdi, 2023; Chapman & Yates, 2023; Herro & Quigley, 2017; Kartini & Widodo, 2020; S. Kim & Lee, 2018; Romero-Ariza et al., 2021). Teacher frustrations regarding STEAM implementation were also expressed (Caton, 2021). Teachers felt there was an overall lack of time to collaboratively plan STEAM experiences and attend professional development for STEAM (Chapman & Yates, 2023; Herro et al., 2019; Liu & Wu, 2023). In addition, rigidity in district-provided scope and sequence made integration difficult, along with a lack of in-depth content area learning within STEAM disciplines (Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Liu & Wu, 2023).

Sustained Professional Development

Due to the complex nature of arts integration in STEAM, studies have shown that sustained professional development is needed to educate teachers on how to effectively plan and implement STEAM experiences (Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Herro & Quigley, 2017; S. Kim & Lee, 2018; Liu et al., 2023; Spyropoulou & Kameas, 2024). Sustained professional development is the ongoing process of improving one's teaching practice through planned learning experiences, peer discussions, self-reflection, and observation (Smith & Waegerle, 2016). Sustained professional development is at the core of GaDOE STEAM certification. The GaDOE continuum for STEAM certification (GaDOE, 2023b) states, "Teachers, instructional coaches, and administrators [must] have on-going STEM/STEAM professional learning and

STEM/STEAM specific strategies relating to the school’s identified overarching PBL focus topic . . . For STEAM certification, documentation should include training in arts integration into a STEM curriculum for all teachers” (pp.9–10). Successful STEAM implementation requires the development of specific teacher competencies. To illustrate this, Spyropoulou and Kameas (2024) explored a framework of STEAM teacher competencies to address the specific skills required by STEAM educators. Findings revealed that teachers required 41 specific competencies to “navigate the complexities of STEAM education” (p.21). Researchers explained that teachers required tailored professional development to continuously enhance STEAM competencies and strengthen teacher understanding. Caton (2021) shared similar recommendations regarding sustained STEAM professional development. In her article exploring the barriers to STEAM implementation, Caton explained that effective STEAM implementation took practice and required increased professional development to educate teachers on effective ways to plan and deliver quality transdisciplinary STEAM experiences. Additionally, Herro and Quigley (2017) found that increased STEAM professional development resulted in increased teacher confidence with STEAM implementation. In this study, Herro and Quigley described an in-depth 50-hour professional development program developed to expose teachers to real-world collaborative STEAM PBL experiences focused on the sustainability of a local river. As a result of this in-depth professional development, the teachers’ perceptions of STEAM implementation changed. Teacher perceptions before the professional development indicated they believed in the value of arts integration in STEAM but lacked understanding, although one-third had previous STEAM training. After the professional development, participants indicated they had an increased

understanding of STEAM and transdisciplinary methods which positively impacted their self-efficacy and confidence. Similar results were found in a study conducted by Romero-Ariza et al. (2021) where STEAM professional development positively influenced teacher self-efficacy.

The results from the aforementioned studies highlight the importance of ongoing professional development to strengthen teacher understanding, self-efficacy, and confidence with STEAM implementation. Moreover, because of the multifaceted competencies required of STEAM educators (Spyropoulou & Kameas, 2024) and the inherent complexity of STEAM implementation, sustained professional development is essential for effectively planning and delivering transdisciplinary STEAM experiences (Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Herro & Quigley, 2017; S. Kim & Lee, 2018; Liu et al., 2023; Spyropoulou & Kameas, 2024)

Teacher Self-Efficacy with STEAM Implementation

One barrier to arts-integrated STEAM implementation was a lack of understanding and self-efficacy among teachers (Caton, 2021). Results from a survey conducted by Kim and Lee (2018) indicated a lack of teacher understanding in STEAM impacted the teacher's self-efficacy. Of the 9,990 South Korean teachers surveyed for the study, 40% of respondents indicated they lacked confidence to integrate arts-integrated STEAM into the curriculum due to a lack of understanding. Elementary teachers were more confident in STEAM implementation than middle and high school teachers due to their prior experiences with integration and collaboration. Results also indicated that many teachers were dissatisfied with the STEAM training they received, which influenced their lack of implementation in schools. It has been shown that increased

professional development positively impacts teacher self-efficacy with arts-integration (Herro & Quigley, 2017). Specifically, Herro and Quigley found that a 50-hour professional development program designed to strengthen STEAM and project-based learning (PBL) competencies significantly boosted teachers' self-efficacy in implementing arts-integrated STEAM practices. After completing the program, participants reported a deeper understanding of STEAM, which positively influenced both their self-efficacy and confidence.

Another way to increase teacher self-efficacy in STEAM is through teacher mentorships. A study conducted by Chapman and Yates (2023) found that many Australian teachers had a perceived lack of confidence and competence with arts integration in STEAM. To remedy the lack of confidence, the authors engaged in action research and developed a mentorship program which paired a skilled arts specialist with a collaborating teacher. The collaborating teacher engaged in planning and co-designing of *art immersion* activities. In this study, art immersion was used to describe the transdisciplinary teaching practice of using the arts to teach core subjects. The mentorship increased the participating teacher's self-efficacy and willingness to continue using an arts immersion approach to teaching. Echoing the findings of Chapman and Yates (2023), Espinoza (2024) highlighted the importance of teacher-peer interactions in increasing self-efficacy with arts integration. Her dissertation research revealed that teachers experienced a stronger sense of self-efficacy after learning from peers who had successfully implemented specific techniques or arts-based ideas.

Findings revealed that although teachers may have a perceived lack of self-efficacy with STEAM implementation, sustained professional development (Herro &

Quigley, 2017) and mentorship (Chapman & Yates, 2023) can have a positive impact on teacher self-efficacy, confidence, and overall understanding of STEAM. However, many educators face significant obstacles when applying these practices in the classroom. The following section will explore STEAM implementation challenges.

Implementation Challenges

As Herro et al. (2019) reflected, “STEAM instruction is complex and difficult” (p. 188). Arts-integrated STEAM requires specific teacher competencies that must be developed through sustained professional development (Herro & Quigley, 2017; Spyropoulou & Kameas, 2024). Because of the specific conditions required to design and implement arts-integrated STEAM, several studies have revealed concerns and challenges regarding teacher perceptions on implementation (Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019). An earlier study conducted by Herro and Quigley (2017) revealed that teachers were concerned about finding collaborative planning time to create STEAM experiences in addition to their regular planning duties during the school day. A perceived lack of planning was supported in the findings of Chapman and Yates (2023) and Herro et al., (2019). Teachers indicated collaborative planning was a lengthy and messy process and could be difficult if collaborating teachers were resistant to change (Herro et al., 2019).

Teachers also indicated that there was a lack of flexibility in the district-provided scope and sequence which made it difficult to integrate multiple disciplines (Chapman & Yates, 2023; Herro et al., 2019). According to teacher reflective journals in a study conducted by Herro et al. (2019), the participating teachers indicated they had to forcibly integrate standards that did not appropriately align due to the inflexibility of the scope

and sequence and the volume of standards that must be covered. The teachers in this study also indicated they needed extensive time to implement transdisciplinary units with fidelity but had to shorten projects to cover other concepts required by the scope and sequence. The study also revealed teachers had concerns about accurately assessing group work on STEAM projects. The teachers in this study were reluctant to give group grades and struggled to identify individual learning demonstrated in transdisciplinary STEAM projects. Herro et al. (2019) suggested teachers should rethink new methods to assess students when implementing transdisciplinary STEAM.

As Daneshpour and Kwegyir-Afful (2022) found, the traditional teaching model currently utilized in most schools does not support transdisciplinary arts integration in STEAM. To effectively implement transdisciplinary arts integration in schools, policy makers, administrators, and teachers must undergo a paradigm shift to change their attitudes, beliefs, and assumptions to make space for transdisciplinary arts integration in STEAM.

Administrative Support

While teachers commonly faced challenges when implementing STEAM, studies have shown that administrative support helped offset those difficulties (Boice et al., 2021; Razi & Zhou, 2022). For example, a study conducted by Boice et al. (2021) found administrative supports such as additional professional development, funding for supplies, and providing common planning time helped increase teacher buy-in with STEAM implementation. While administrative support aided in boosting teacher morale, the findings showed that administrative support alone was not sufficient to help teachers fully implement STEAM. Similarly, findings from a literature review conducted by Razi

and Zhou (2022) showed that due to the expensive and time-consuming nature of STEAM, teachers relied on administrative support, particularly through the provision of supplies and the flexibility to adjust scope and sequence to foster interdisciplinary connections. While these findings highlight the importance of administrative support in easing the challenges of STEAM and fostering teacher buy-in, additional supports are necessary to ensure teachers are successful and sustained in their implementation of STEAM.

Summary

The use of transdisciplinary arts integration in STEAM had many reported benefits including increased student engagement from reluctant learners and student acquisition of pertinent 21st century skills (Braund & Reiss, 2019; Lage-Gómez & Ros, 2021; Mohd Hawari & Mohd Noor, 2020; Okwara & Pretorius, 2023; Ramli et al., 2022; Salehjee & Watts, 2023; Salmi et al., 2021). To implement transdisciplinary arts integration in the classroom, researchers recommended the STEAM PBL framework, intentionally integrating artistic principles, and utilizing multidisciplinary planning to ensure integration (Bedewy & Lavicza, 2023; Braund & Reiss, 2019; Caton, 2021; Đira, 2022; Herro et al., 2022; Liu et al., 2023; Mohd Hawari & Mohd Noor, 2020; Wilson et al., 2020). There were several implementation challenges with this unique style of teaching. For example, many teachers lacked basic understanding of STEAM concepts and required intense professional development to increase self-efficacy with implementation (Caton, 2021; Chapman & Yates, 2023; Daneshpour & Kwegyir-Afful, 2022; Herro et al., 2019; Liu et al., 2023; Spyropoulou & Kameas, 2024). Additionally, teachers were concerned with a lack of time for collaborative planning, inflexibility in the

district scope and sequence, and ambiguity surrounding individual assessment practices (Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019). Despite these challenges, schools continued to champion the STEAM initiative and undergo STEAM certification under the GaDOE guidelines (GaDOE, 2023b). As per the GaDOE guidelines (2023b), teachers were required to embed transdisciplinary arts integration across multiple disciplines daily, which required a huge pedagogical shift from traditional teaching practices to STEAM integrated practices. To better understand this transition, I took a qualitative approach to gain insight into the personal experiences, attitudes, and beliefs of elementary educators as they navigated the transition to arts integration at STEAM-certified elementary schools in Georgia.

Chapter III

Methodology

The purpose of this methodology chapter is to describe the qualitative research design and procedures for exploring elementary educators' experiences as they transitioned to arts-integrated teaching methods at STEAM-certified schools in Georgia. These schools represent a prestigious designation, with only 10 elementary schools certified statewide as of 2023 (GaDOE, 2023b), and a total of 29 elementary schools pursuing STEAM certification in 2025 (GaDOE, 2025). The population for this study was full-time classroom teachers at STEAM-certified elementary schools. To better understand the nuances and specific contexts behind each teacher's experience, I used narrative inquiry as the research design. By reporting findings in narrative form, readers have an immersive view into the teachers' experiences as they transitioned their teaching methods to include arts-integrated STEAM. These narratives may provide educators, administrators, and policymakers with actionable recommendations grounded in teacher experiences while also offering deeper insights into the realities of teaching at schools where arts integration is a requirement. I will now discuss specific research procedures, including the specific population, sample, research design, delimitations, and validity for the current study.

Purpose and Research Questions

The purpose of this qualitative research study is to explore the experiences of elementary educators as they transitioned their teaching pedagogy to include regular arts

integration at STEAM-certified schools in Georgia. Most elementary classroom teachers do not have extensive training in arts education (Evans, 2018; NCES, 2002), yet at STEAM-certified schools, they are required to regularly integrate the arts into their curriculum through problem-based learning (PBL) and interdisciplinary STEAM experiences (GaDOE, 2023b). This shift in teaching pedagogy may be challenging for individuals who lack a background in arts education. Georgia has a population of teachers whose voices have not been heard regarding their experiences transitioning their teaching methods away from traditional teaching to rigorous arts integration in STEAM. The current study will contribute to the existing body of research by providing insights into elementary educators' experiences as they transitioned their pedagogical paradigms to include extensive arts integration in STEAM. Additionally, this study provides stories in which other educators in similar situations can identify, while informing administrators and curriculum developers how to support elementary educators at STEAM-certified schools. The research questions for the current study are as follows:

RQ1: How do elementary classroom teachers describe their experiences with traditional teaching methods as compared to their experiences with arts integration at STEAM-certified schools?

RQ2: How did the participants navigate the transition to arts-integrated STEAM?

RQ3: What are the participants' recommendations for transitioning from traditional teaching methods to arts-integrated STEAM?

Research Design

The purpose of this study is to amplify the voices of classroom teachers at GaDOE STEAM-certified schools by sharing their experiences of integrating the arts into

their teaching practices within the STEAM framework and uncovering the personal and professional significance the transition had for them. To fulfill this purpose, I employed qualitative research methods using the narrative inquiry approach. I chose narrative inquiry as the research design for the current study because it provided a framework for gaining deep insight into the stories educators shared about their experiences with implementing arts-integrated STEAM.

Each teacher participated in a single semi-structured interview designed to gather the necessary data for each research question while allowing flexibility for follow-up prompts (Patton, 2015). Each interview question was developed based on the study's research questions (see Appendix C). During the interview, I asked the participants to reconstruct their prior experiences with the arts, prior educational experiences, and their previous experiences with traditional teaching methods. The intention was to analyze the participants' prior experiences to uncover foundational experiences that shaped their current perspectives and attitudes towards arts integration in STEAM. I then asked participants to describe their journey leading them to their current situation with arts integration, reflecting on the meaning the key experiences had for them. Having the participants reflect on their personal and professional journey with arts-integrated STEAM provided valuable insights into how they internalized and interpreted the process of integrating the arts into STEAM education. Finally, I asked participants to reflect on practical recommendations for administrators, program developers, and fellow teachers based on their personal experiences. Their recommendations provided insight into the practical implications of their unique experiences, which revealed how the participants past encounters shaped their advice and strategies for effective arts-integrated STEAM

implementation. This knowledge was essential for developing informed recommendations grounded in real-world experiences, which may be beneficial to administrators and program developers as they design and implement effective and sustainable arts integration initiatives in STEAM.

Research Setting and Population

Georgia is a leading pioneer in STEAM education (Marín-Marín et al., 2021) and one of the few states to offer state-level (GaDOE, 2023b) and county-level (CCSD, 2024) STEAM certification for schools committed to ongoing interdisciplinary instruction. STEAM certification is a prestigious designation that only a limited number of Georgia's schools have achieved. In 2025, the GaDOE updated their certified school list with more specific designations for schools. The updated list contained schools that were either *launching*, *advancing*, or *executing* GaDOE STEAM certification. Schools in the *launching* category were beginning their STEAM journey, while schools in the *advancing* category were “well on their way to adopting a STEM / STEAM pedagogy” (GaDOE, 2025, p.1). Schools in the *executing* category were officially STEM/STEAM certified schools and have been awarded an official banner. As of 2025, a total of 30 elementary schools were engaged in the STEAM certification process: 8 schools were executing, 8 were advancing, and 14 were in the initial launch phase (GaDOE, 2025). The number of schools actively pursuing or obtaining GaDOE STEAM certification has grown significantly, rising from 15 total schools in 2023 to 42 total schools in 2025.

The population for the current study includes elementary classroom teachers at schools pursuing STEAM certification. Estimating between 12 and 36 homeroom teachers per school, there are between 360 and 1,080 teachers who are an accessible

population for this study. To ensure participants have adequate experience with both traditional teaching methods and arts integration in STEAM, participating teachers needed at least three years of teaching experience using traditional methods and at least one full year of experience utilizing arts-integrated STEAM. Only one participant had fewer than three years of experience in the traditional classroom. I collected data through virtual interviews, so the location of the participants was not a factor when selecting the sample.

Sample

I used homogeneous sampling (Patton, 2015) when selecting participants for the current study because I aimed to gather stories from teachers who experienced the phenomenon of transitioning their teaching methods to include arts-integration in STEAM. After receiving IRB approval (see Appendix D), I sent an email with details of the study (see Appendix A) to all the classroom teachers at the GaDOE STEAM-certified elementary schools on the GaDOE STEM/STEAM website. I initially planned to select three participants from two districts to capture diverse perspectives and experiences across various schools, totaling at least six participants. Two participants from Jackson County responded and fit the requirements for the study. After repeatedly emailing with no response, I elected to broaden the population to include schools with county-level STEAM certification. I then emailed the classroom teachers at the four STEAM-certified schools in Cobb County, and four teachers responded who fit the criterion for the study. In total, I was able to choose two teachers from three different STEAM-certified schools: one with GaDOE STEAM certification, and two schools with county-level STEAM certification. The selection of schools also represented diverse perspectives from across

Georgia: one school was considered rural, one school had a Title I designation, and one school was located in a more affluent suburban area.

Participants were limited to teachers at schools pursuing STEAM certification so they would likely have similar expectations with the level of arts integration required for STEAM certification (GaDOE, 2023b). While qualitative research is not meant to be externally generalized to the greater population without first explaining the specific contexts that contributed to the specific phenomenon, internal generalization is necessary to ensure generalizability within the specific setting being studied (Maxwell, 2013). To avoid inappropriate external generalization and ensure internal generalization, I described the specific contexts through participant narrative, while detailing the variation among the participants rather than relying solely on the similarities. Discussing the similarities and variations among the contexts of the participants aided in more accurately painting a picture of their realities that others can apply to their own situations.

Delimitations

Delimitations define the boundaries of the current study. The delimitations are controlled by the researcher and identify the scope of the research (Hyatt & Roberts, 2024). The population for this study includes teachers at elementary schools pursuing STEAM certification to account for similar requirements of STEAM arts integration evident throughout the school. To become STEAM-certified, there must be consistent evidence of STEAM implementation throughout the entire school (CCSD, 2024; GaDOE, 2023b). I also did not include schools actively obtaining GaDOE STEAM certification (*advancing* and *launching*) if they were not in the *executing* category on the GaDOE STEM/STEAM website at the time the emails are sent to teachers. To ensure participants

had adequate experience with both traditional teaching methods and arts integration in STEAM, all participating teachers had at least three years of teaching experience using traditional methods and at least one year of experience at a school with GaDOE STEAM certification, with the exception of one teacher. Because the focus of this qualitative study was to give teachers a voice regarding their experiences with arts integration in STEAM, I used in-depth interviews to gather data as opposed to an open-ended survey, which may not capture the nuanced experiences of the participants. In addition, I used narrative inquiry to analyze and interpret data to immerse the reader in the context and nuanced experiences of the participants as opposed to basic qualitative research which lacks the depth of narrative inquiry.

Data Collection Procedures

The initial population for this study included full-time classroom teachers at STEAM-certified elementary schools in the *executing* category as detailed by the GaDOE STEM/STEAM website (2025). After obtaining approval from Valdosta State University's Institutional Review Board (IRB) (see Appendix D), I contacted each eligible school on the GaDOE STEM/STEAM website (2025) with details of the study (see Appendix A). I sent a follow-up email after 7 days if there was no initial response. After not receiving responses within 14 days, I emailed the principals from each school to ask if they would share the details of the study with their staff. Two teachers replied and fit the criterion of the study. I then emailed the IRB committee and asked if I could extend the population to include teachers at county-level STEAM-certified schools. This was approved, so I emailed teachers at the four STEAM-certified schools in Cobb County—the only county in Georgia with its own STEAM certification protocol. I

followed the same procedure detailed above and had four teachers respond who fit the needs of the study. The total population includes six teachers: two from a rural school, two from a Title I school, and two from an upper-middle class suburban school. Each collaborating teacher participated in one online semi-structured interview to collect data. A semi-structured interview guide was used to focus the interview, while allowing space for follow-up questions (Patton, 2015). All interviews took place virtually through Microsoft Teams with video and audio recordings that were transcribed and destroyed after transcription.

Interviewing is a relevant data collection method for this study because the act of storytelling requires participants to reflect on previous events and make meaning of their experiences (Seidman, 2019). As Maxwell (2013) explained, “There is no way to mechanically convert research questions into methods; your methods are the *means* to answering your research questions, not a logical transformation of the latter” (p.100). I will detail the specific data collection methods necessary to gather the required information to answer each research question below.

Instrumentation

In his book, *Research Interviewing: Context and Narrative*, Elliot Mishler (1986) described the interviewing process as a co-construction of knowledge between the researcher and the interviewee (p. 34). Mishler posited moving beyond the traditional interview approach of “interviewer dominance and respondent acquiescence” (p. 54) characterized by rigid question-answer responses. Instead, he suggested the rich practice of storytelling as a data collection method, because “. . . telling stories is one of the significant ways individuals construct and express meaning” (p. 67).

To answer RQ1, I asked participants to reflect on their prior experiences and construct personal stories to illustrate their life before transitioning to arts-integrated STEAM. Specifically, I asked participants to start with their earliest memories with art and work through their life story, including their pre-service college preparation, prior teaching experiences in a traditional classroom, and their professional journey that led them to teach arts-integrated STEAM at their current school. This laid the foundation for the context of each participant's unique narrative. To answer RQ2, I asked participants to reflect on important stories and events from their prior experience and describe how those events impacted their current attitudes, beliefs, and values towards arts-integrated STEAM. To answer RQ3, I asked participants to reflect on their personal experiences and offer suggestions for administrators, program developers, and fellow teachers who are transitioning to arts-integrated STEAM. This data helped me to decipher the deeper meanings these events had for the participants and how the events impacted their recommendations for future practice.

I used a semi-structured interview guide (see Appendix B) to guide the interview, while allowing me, the interviewer, space to spontaneously ask follow-up questions using notes I took to gain deeper insight and clarity within each interview (Patton, 2015). I crafted each interview question using the research questions as a guide to collect the necessary data to answer each research question (see Appendix C). The use of open-ended questions framed for storytelling allowed the participants to explore the deep meanings they constructed as a result of their experiences.

Data Analysis Procedures

After I collected interview data, the first step of data analysis was to transcribe the interviews. I used the transcription feature of Microsoft Teams to transcribe the bulk of the interviews. Then, I rewatched each interview recording to ensure the accuracy of the transcription and to capture any emotional responses and details the automated transcription missed. Once transcription was complete, I deleted the audio/visual interview recordings to ensure anonymity of the participants. After transcribing the data, I coded the interviews using five different coding methods: In Vivo, descriptive, narrative coding values, and pattern coding (Saldaña, 2021).

After transcribing the data, I began the data analysis procedure by printing out each interview and utilizing In Vivo coding by hand to gain deeper insight into the “heightened awareness of the individual’s unique circumstances” (Saldaña, 2021, p. 94). In Vivo coding is the exploratory coding method of using the participant’s unique wording and phrases to get a better sense of their context and life story as they see it. I organized the codes that emerged through In Vivo coding in a separate document and categorized them. While I was doing In Vivo coding, I also used descriptive coding to “assign labels to data to summarize in a word or a short phrase” (Saldaña, 2021, p. 362). This allowed me to isolate specific and relevant information as I created the timeline and corresponding narrative for each participant.

Next, I used narrative coding (Saldaña, 2021) to identify narrative elements throughout each participant’s story and make sense of the overarching timeline that I sequentially reformed in their final narrative. Throughout the data analysis process, I utilized Maxwell and Miller’s (2008) connecting strategies to identify cause and effect

relationships, which helped me identify how different factors interacted and influenced each other within the data.

While analyzing and memoing about each participant, I used the coded interview data to create a timeline of each participant's story (see Appendix E), including details of temporality, sociality, and place (Clandinin & Connelly, 2000) to help me craft the participant's final narrative. After constructing the timeline, I used J. H. Kim's (2016) technique of *narrative thinking*, which is "making a story out of experience" using the participant's data (p. 156). After gathering enough data to construct a narrative on the participant, I used *narrative smoothing* (Kim, 2016), which is a technique in narrative inquiry where researchers fill in any gaps in a participant's story to make it coherent and interesting to read. Kim (2016) explained that while narrative smoothing is important to a coherent narrative, researchers must use it with caution. Excessive additions or omissions by the researcher can skew the participant's narrative, which may not represent the participant's actual views or experiences. To avoid this, researchers must be sensitive to the data, while still guaranteeing the participant's confidentiality even if that means sacrificing some of the data's richness (Kim, 2016, p. 193). After composing narratives for each participant, I reflected on the internal and external factors that may have influenced my interpretation of the participants' stories to reduce bias.

I then used values coding (Saldaña, 2021) in MAXQDA as the fourth coding cycle for each interview. Values coding ". . . explore[s] the origins of the participant's value, attitude, and beliefs systems" (Saldaña, 2021, p.172), which helped me gather data to answer RQ2. To begin values coding, I reread the interviews from each participant and created codes based on the participant's values (V), attitudes (A), and beliefs (B). Saldaña

(2021) explained that values are moral codes and principles, attitudes are how the individual thinks of themselves and others, and beliefs are the system that includes our values and attitudes. After coding each interview, I organized the VAB codes into categories and then memoed on their collective and interconnected meanings (Saldaña, 2021, p. 170). This gave me greater insight into the values, beliefs, and attitudes each participant had throughout their transitional journey, which was necessary to help me better understand the impact of their transition to arts-integrated STEAM using Schlossberg's transition theory (1981) as a framework for analysis.

Finally, I used pattern coding to synthesize and analyze the results from In Vivo and values coding. Saldaña (2021) described pattern coding as a way to pull together material into meaningful units of analysis (p. 322). I constructed patterns by combing through each interview and memoed on the codes and similarities I noticed, which helped me construct themes from the data.

Narrative inquiry provided a framework that allowed me to immerse the reader in the rich context surrounding each narrative. This aided the reader in “understand[ing] the meaning of human actions and experiences, the changes and challenges of life events, and the differences and complexity of people's actions” (Kim, 2016, p. 11). Furthermore, this approach enabled me to explore the nuanced and personal dimensions of each participating teachers' experiences, offering a deeper insight into their pedagogical transition to arts-integrated STEAM.

Ethical Considerations

Ethical considerations and validity are an integral part of the research process. It is the researcher's role to protect participants and promote integrity within their research

(Creswell & Creswell, 2018). I will now discuss the risks, benefits, and ethical considerations of the current study. I am the sole interviewer for this research project and have completed the Human Research and Basic CITI training modules (see Appendix F), therefore I have been trained regarding the ethical guidelines and best practices for conducting research involving human subjects. The nature of the study does not involve sensitive subjects, so psychological counseling is not necessary for participants. I maintained participant privacy and anonymity through the use of pseudonyms and redacting any identifying information such as school district, school or county name. Each participant chose a personal pseudonym. This study did not place the participants at risk for criminal or civil liability, be damaging to their financial standing, employability, insurability, reputation, or be stigmatizing. Because the nature of the research involved exploring teacher experiences as they transitioned their teaching to include arts-integrated STEAM, the participants were not asked to discuss sensitive topics. To reduce risks related to invasion of privacy and/or a breach of confidentiality, I deleted interview recordings immediately after they were transcribed. I will retain transcriptions, data gathering memos, and data analysis memos for 3 years after completion of the final report. I reported data in combination with information obtained from other participants, not associated with participants by name, and not individually identifiable through the use of pseudonyms to protect participant anonymity. There were no known risks associated with the research procedures.

A benefit of this study is that each participant received a carefully crafted narrative describing their experiences. This study will also benefit the educational and scientific communities because the participants' stories will shed light on their arts

integration experiences at schools pursuing state-level STEAM certification, which is a topic that has yet to be thoroughly studied. The results from this study will contribute to the growing body of STEAM research, provide encouragement for teachers in similar situations, and inform administrators and STEAM program developers of the realities teachers face in the field and changes that need to be made to facilitate a smoother transition.

Validity

The researcher is the sole research instrument in qualitative research (Creswell & Creswell, 2018). In the current study, I was solely responsible for participant selection, data collection, and data analysis, which made it essential to minimize bias and ensure validity throughout the research process. Unlike quantitative research, which utilizes various controls to ensure validity throughout the study, qualitative researchers must intentionally “rule out specific plausible alternatives and threats to [their] interpretations and explanations” (Maxwell, 2013, p. 124). In his book *Qualitative Research Design*, Maxwell (2013) explained that qualitative researchers must continuously ask themselves: *How might I be wrong?* Maxwell explained the two main threats to validity in qualitative research were researcher bias and reactivity. Researcher bias is the selection of data to confirm the researcher’s preexisting theory or research goals. To reduce researcher bias, Maxwell suggested that the researcher explain their potential biases before research begins and the ways they plan to address them. Another threat to validity is reactivity, which is the “influence of the researcher on the setting or individuals studied” (Maxwell, 2013, p. 124). Researchers can reduce reflexivity by monitoring how they may influence

the participants, by avoiding leading questions in interviews, and remaining subjective throughout the analysis of the data.

Similarly, Lincoln and Guba (1985) explained four questions qualitative researchers can use to determine the “trustworthiness” (p. 290) of the study’s findings. The first question addresses the “truth value” of the findings, otherwise known as *internal validity*—how can the researcher determine if the findings represent the “truth” of the participants and the contexts of their experiences? The second question addresses the applicability of the findings, also known as *external validity*—how can the findings be applicable in other contexts or with other participants? The third question addresses consistency, or *reliability*—would the findings be similar with the similar subjects in a similar context? Finally, the fourth question addresses neutrality, or *objectivity*—are the findings free from the biases of the researcher? I will now discuss ways to reduce these threats to validity below.

Internal and External Validity

Using the constructivist assumption that reality is multiple and subjective, it is impossible to fully understand another individual’s reality as it was originally constructed. To determine if research findings accurately represent the participant’s “truth” to the best of the researcher’s ability, Lincoln and Guba (1985) suggested internal validity could be established by eliminating the possibility of a “rival” (p. 295) hypothesis. To do this, I must ensure that I accurately represent the participant’s reality by having their interpretation approved by the participant. This is often called *member checking* (Lincoln & Guba, 1985), where an open dialogue exists between the participant and the researcher to ensure the findings and interpretations accurately represent the

participant's meanings and reality. In the current study, I have utilized member checking by sharing the narrative, timeline, and analyses with each respective participant to ensure that I accurately represented their "truth" as originally constructed to the best of my ability. I worked closely with each participant to make the necessary changes and ensure accuracy.

As reality is a multiple mental construction, qualitative research results are not meant to be generalized to the greater population without first explaining the specific contexts in which the phenomena took place (Patton, 2015). Regarding external validity, Lincoln and Guba (1985) suggested the researcher should provide ". . . sufficient descriptive data to make such similarity judgements possible" (p. 298). Prolonged engagement with participants is also necessary to ensure the researcher can gather enough data to accurately represent the participants' realities (Lincoln & Guba, 1985). To maintain external validity in the current study, I gathered sufficient data over the interview session to tell the participants' life stories and detail the specific contexts that contributed to their transition to arts-integrated STEAM. In addition, I detailed the dimensions of temporality, sociality, and place (Clandinin & Connelly, 2000) in each participant narrative that will immerse the reader into the specific contexts of each participant to make transferability possible within similar contexts. To further support transferability, I can ensure external validity by triangulating the interview data. Lincoln and Guba (1985) suggested triangulating interview data through contextual validation, which is collecting enough data to identify patterns of "distortion" (p. 306). By spending adequate time and establishing trust with the participants, researchers can triangulate data

by comparing patterns of distortion to other participant data in an effort to uphold external validity.

While triangulation enhances credibility, it is equally important to address other potential threats to validity, including researcher bias. Researcher bias can influence the interpretation and representation of data that does not accurately reflect the participant's true reality. Ways to reduce researcher bias will be explored.

Reflexivity and Researcher Bias

Researcher bias is another threat to validity (Lincoln & Guba, 1985). Addressing researcher bias requires intentional strategies to ensure credibility and trustworthiness in the research process (Lincoln & Guba, 1985). Reflexivity refers to the process by which researchers acknowledge and examine the specific experiences and biases they bring to their research. To monitor reflexivity, Creswell and Creswell (2018) suggested that researchers identify their biases, comment on their past experiences, and explain how their past experiences may influence their interpretations to reduce bias (p. 184). Similarly, Maxwell (2013) suggested that qualitative researchers examine their assumptions and beliefs by writing *researcher identity memos* throughout the research process (p. 46). This practice is also supported by Lincoln and Guba (1985) who suggested researchers keep regular reflexivity journals. A researcher's subjectivities are the experiences, assumptions, and biases that may influence the researcher's conclusions or interpretation of the data. Peshkin (1992) described a researcher's subjectivity as the different "I's" or perspectives the researcher subconsciously engages throughout the research process. Knowing a researcher's subjectivities can offer valuable insight into the researcher's unique perspective, experiential knowledge, and biases that are inevitably

interwoven into the study (Patton, 2015). Examining the researcher's subjectivities at the onset of the research process helps the reader understand the researcher's biases, which can make the results more trustworthy and valid (Seidman, 2019).

My prior experiences as a classroom teacher have led me to value arts integration in STEAM, which may bias my interpretation of the participants' experiences if left unmonitored. I have 15 years of classroom teaching experience and have worked in both traditional and arts-integrated settings. While I have not worked at a GaDOE STEAM-certified school, I have worked at a school striving to obtain county-level STEAM certification, so I am aware of the processes, challenges, and commitments involved in pursuing STEAM certification at the local level. One aspect of STEAM certification is ongoing professional development. Because of this, I received at least 20 hours of arts-integrated STEAM professional development through my district. These experiences, among others, have led me to value arts integration in STEAM.

Throughout the research process, I must stay keenly aware of my subjectivity and reflect on my biases, so they do not impact the study. As Peshkin (1992) mentioned, the researcher must refrain from assigning value to things they also value. This means I must stay objective and represent the participants' experiences as authentically and accurately as possible, whether they align with or challenge my existing beliefs. To identify and monitor my subjectivities, I kept detailed memos to reflect on my personal biases throughout the data collection and analysis process, especially when I felt my subjectivities were engaged. In qualitative research, the researcher *is* the data gathering instrument, so it is essential for them to be aware of their own subjectivities to minimize bias and enhance the credibility of the study (Seidman, 2019).

Assumptions

To account for potential bias and validity threats, I will explain personal values and assumptions that may impact data collection and analysis (Maxwell, 2013).

Assumptions are elements that researchers and their audience consider to be true or reasonably believable within the context of a study (Nkwake, 2012). I framed the current study around the assumption that reality is multiple and constructed. This means each person's unique experiences and situational context shaped their personal reality and the meanings they assign to their experiences. In the current study, I assumed that teacher voices were not considered before administration decided to attempt STEAM certification. I also assumed that participants were open and truthful when discussing their experiences. Additionally, because participants worked at a school pursuing STEAM certification, I assumed that they understood subject-specific terminology and participated in some form of arts integration professional development. I also assumed that the participants have experience implementing arts-integrated STEAM in their classrooms, as well as prior experience teaching in a traditional classroom.

Summary

This chapter outlined the qualitative research design and procedures for the current study, using interviews and narrative inquiry to gather data. Once IRB approval was secured, I emailed the eligible teachers at schools in the eligible districts with details of the study. Interested participants responded to the initial email, and I chose six participants from three schools to gather diverse perspectives. Selected participants participated in one interview conducted via Microsoft TEAMS. I used an interview protocol to guide the interview where I explored the participants' life histories, focusing

on their early experiences with art, teacher preparation, and professional background before and during their pedagogical transition to arts-integrated STEAM. I had the participants reflect on key stories with the intention to uncover the deeper meanings of their experiences and provide recommendations for administrators and educators implementing arts-integrated STEAM. I analyzed the data with several coding methods to uncover themes and deeper meanings. I used In Vivo coding to describe experiences in participants' own words, values coding to uncover beliefs and attitudes, and pattern coding to identify themes. In addition, I used narrative coding and extensive memoing to reconstruct the participants' stories and incorporate elements like temporality, sociality, and place (Clandinin & Connelly, 2000). Narrative smoothing (Kim, 2016) aided in coherent storytelling while maintaining fidelity to participants' experiences. The findings of the study will be discussed in the following chapter.

Chapter IV

Narrative Inquiry

I chose narrative inquiry as the methodological framework to interpret the interview data for this study because it allowed the participants space to tell their stories, while building context for their individual experiences. After transcribing each interview, I created a timeline (see Appendix E) for each participant using connecting strategies (Maxwell & Miller, 2008) to identify cause and effect relationships to help me understand how specific events influenced the greater narrative. While writing the narratives, I identified the temporality, sociality, and place (Clandinin & Connelly, 2000) within the participant data to help me piece together smaller stories to tell the greater narrative. Finally, I used narrative smoothing (Kim, 2016) to make the narratives flow and improve readability. All identifying information was changed into pseudonyms to protect the participants' anonymity. All quotes are the exact words spoken by the participants, aside from editorial additions made within brackets to clarify meaning or maintain grammatical flow.

Below is a table of the background information for each participant (see Table 1). Six participants were interviewed from three different STEAM-certified schools. Daisy and Sally taught at Willowbrook Elementary, which was the only school in this study with GaDOE STEAM certification. Aubrey and Nicole taught at Cedar Ridge Elementary which had county-level STEAM certification, and Elizabeth and Mary taught at Maple Grove Elementary which also had county-level STEAM certification. I began each narrative by detailing the participants' prior experiences with the arts and details from

their early teaching career. Then, I explained their transition to arts-integrated STEAM, any challenges they faced, their support system, and recommendations they provided based on their experiences.

Table 1

Participant Background Information

Participant Name	Total Years Teaching	School	STEAM Certification Level	Prior Life Experience with The Arts	Arts Education Course in College	Experience With Similar Transition	Schlossberg's "Life Stage"
Daisy	10	Willowbrook	State	No	No	None	Mid-career
Sally	11	Willowbrook	State	Yes	No	STEM	Mid-career
Aubrey	13	Cedar Ridge	County	Yes	Yes	STEM & AI	Mid-career
Nicole	6	Cedar Ridge	County	Yes	No	STEM & AI	Beginning of career
Elizabeth	18	Maple Grove	County	No	Yes	STEM	Near end of career
Mary	13	Maple Grove	County	Yes	Yes	None	Mid-career

Note. AI = Arts Integration Certification

Daisy's Story

Prior Experience

Daisy always wanted to help people. Her interest in caring for people led her to take a high school elective similar to student teaching, where students spent time observing teachers in a local elementary school. Despite this early exposure to the education field, she initially chose a different path pursuing a degree in nursing to continue her passion for caring for people. However, after visiting her friend's mother who was an elementary teacher, she was inspired to change her major and follow a different path. That was when she realized teaching was something she really wanted to do.

Daisy was not initially interested in the arts and described herself as “very sporty”; she even played tennis in college. Her undergraduate teacher preparation program did not require her to take any arts education courses, so as an elective, she opted for yoga. She graduated with an undergraduate degree in education and continued to complete her master’s degree in education a while later. Daisy began her teaching career as a fourth-grade teacher in Dunley County. She described her fourth-grade classroom as following the traditional model—teaching math, science, reading, and language arts in isolation. She described the art projects she conducted in Dunley County as primarily “basic arts and crafts that are just enhancements.” After three years, Daisy transferred to Willowbrook Elementary School in Lenhart County. This was where she was first introduced to the ideas of STEAM and arts integration. She was now in her seventh year at Willowbrook Elementary, where she taught first grade.

Transition to STEAM

When Daisy initially joined Willowbrook’s staff, the principal was very passionate about STEAM and explained that the school would be pursuing GaDOE STEAM certification in the near future. Sally recalled the moment she learned about the transition to STEAM, describing it as “very scary,” “nerve-wracking,” and a “big learning curve.” She explained how the entire staff had to “completely change how [they were] doing everything . . . Everyone had to learn how to change how they taught.” The transition was also isolating because Willowbrook was “the only [school] in [the] county doing [STEAM],” leaving them with no one to lean on for support. She explained:

It was a big transition for sure. Trying to learn how to base everything off of a

problem—coming up with something that the kids would kind of relate to, be able to fix, and figuring out how to make literally every standard match it . . . I think that was the hardest change, [going from] Ok, here’s my math subject, here’s my reading, and here’s my science and social studies. You know, very subject based, whereas STEAM is not. It is very intertwined and so, going from [traditional] planning, to having to change to intertwining it all—that was very difficult. And that took a lot of collaboration with a lot of minds, because you can get stuck in your ways for sure.

As part of ongoing STEAM professional development, Daisy was required to attend monthly STEAM trainings for a year, where she learned to implement year-long problem-based learning (PBL) tasks, incorporate STEAM journals, design integrated units centered on real-world problems, and intentionally integrate the arts. She described the trainings as “very minimal” and that it “wasn’t as intense as it probably should have been.” She explained:

We kind of learned as we went, but we also—the whole school—had a specific county gentleman come and teach us. Specific teachers would go and observe other schools that are already STEAM-certified and would . . . come back and redeliver what they saw and how they were doing things and how we needed to change things.

Much of the professional learning Daisy attended was through Alliance Theater, a dramatic arts based professional learning organization. When asked if she drew upon any of the trainings in her classroom, she explained:

Not really. I kind of feel like actually doing it . . . actually getting in the classroom and doing it—going through the design thinking process—You know, what’s our problem? Let’s imagine, let’s investigate. All of those types of things of actually going through that process . . . You’ve got to practice to do it.

Daisy recalled the certification process as “nerve wracking,” especially because it occurred during the global COVID-19 Pandemic in 2020. She recalled the first visit from the STEAM department as a surreal experience: “They [the GaDOE STEAM representatives] had people carrying them around on computers . . . and all our kids are in masks trying to talk to the computers and show their journals.” During this visit, Daisy and the staff at Willowbrook learned that they were not actually implementing arts integration in STEAM, but rather, art enhancements. She recalled, “They came back and told us that we didn’t have the arts, and we were like, ‘What are you talking about? We have all these art projects.’ And they were like, ‘No, it’s enhancements—it’s not integrated.’” To remedy the problem, the teachers created posters outlining the different artistic domains—visual, dramatic, musical, and media arts—for teachers to reference during planning and instruction. She also explained that the teachers began to collaborate with the art and music teacher for lesson ideas—something that had not occurred prior to STEAM certification.

Daisy has been utilizing arts-integrated STEAM for five years and reflected on how she has changed as a teacher:

Things are more relatable throughout the day [and integrated] around something instead of, more or less, like focused on one thing. Now again, we still teach, you know certain . . . things throughout the day. But when it comes to other things like

in science or shadows and things like that, you know, we can make things [integrated]. So, for example, when I taught light for first grade, we did shadow puppets, and so we talked about shadows in a day and how shadows are created. But we did a reader's theater, so that was our reading time as well, because they had to be able to read the script and be able to act out the puppets to show the arts within it. And so, you get multiple things with one . . . I would say that everything is not [isolated].

Daisy was not the only one who changed as a result of the transition to arts-integrated STEAM. She reflected on the change she saw in her students:

There's a lot of collaboration within all of it . . . The kids are more excited . . . the more hands on they get, they just get excited. Like knowing, 'Ok, I'm learning this, but I'm going to have a final product at the end, showing someone something or proving something,' and so . . . it makes learning exciting for them . . . If someone asked me to go teach [like I used to], I don't know how I would do it. Because . . . we intertwine literally everything into a problem, and making something out of it, or communicating it with others.

While Daisy expressed enthusiasm for the meaningful integration and increased student engagement fostered through arts-integrated STEAM, she also acknowledged the shift has not come without its challenges. Daisy explained how it can be difficult to make specific standards integrate with one another and continue extended projects over time:

How are you even going to make this [standard] work within something STEAM related. Or in fourth grade [with our extended PBL] being only goats, there's only so much you can do, and that was our yearlong project every year that I was there in

fourth grade, and it still is for them. And so, we were the creature caretakers, and so we had to come up with ways to take care of the goats in the best way we could at the school. You know, as much as we could as fourth graders. And so, we had to have a lot of community helpers to help us supply wood because we built a shelter one year. Then another year, we tried to make feeding a little bit easier, instead of having to walk into their cage every time and give them food. So, we created pipes to come out of the cage and so we could just drop the food in and so I would say challenging parts are . . . continuing those projects that constantly need to have problems to solve and there's not always problems to solve.

In-depth STEAM projects also require a lot of time, money, and training. Daisy recounted:

[I don't think administration knows] the amount of money and resources that we use on our own to help create these projects and make them happen. That's also very hard because we don't get the funds that I think we should as a STEAM school . . . Time is another factor. Time in a day . . . it takes time to do these things, time for planning . . . We only get 40 minutes of planning each day, but then we have PLCs [professional learning committees] twice a week [which doesn't leave much time for planning]. We were given two days over the summer to come in, and we did get a stipend for that, so that was helpful, but it's also like, I have little babies, and I'm very precious of my time. Like when I leave school, I leave school. And so, I told [my principal] that I wasn't coming in unless you were going to pay me because, that's me leaving my babies, and that's my time with my babies. So, realizing that it takes a lot of time and effort on us.

Support

Despite the challenges, Daisy emphasized the support from her colleagues, a STEAM committee, and her administration played a key role in helping her transition from traditional methods to arts-integrated STEAM. Daisy feels most supported when collaborating with her team. Through this collaboration, they share the planning responsibilities, which was a challenge Daisy had previously faced, and exchange ideas to develop innovative, integrated lessons. When asked about the colleague she turns to for support, without hesitation, she began to describe the media arts teacher at her school:

I'm very lucky because my room is right next door to the media arts teacher, and she [used to teach] fourth grade with me. We both moved down here to first grade the same year, and she's a specialist teacher. She is an amazing art teacher, and she is someone that, you know, loves what she does, and she will figure it out—a way to make an art project out of something and make it for a purpose . . . The [students] walk out knowing exactly why they're doing that.

In addition to support from her colleagues, Daisy also receives guidance from a school-based committee aptly named the STEAM Team. Made up of classroom teachers and specialists, this team provides a collaborative space where members can exchange ideas, ask questions about STEAM or arts integration, and offer support in areas where others may need assistance.

Finally, Daisy noted that her administration plays an active role in supporting teachers as they work to successfully implement STEAM. She explained that while she has the flexibility to move standards on the curriculum map to create purposeful integration, teachers at non-STEAM schools are not as lucky. Her administration also

prioritizes STEAM by establishing the STEAM Team and providing teachers with access to professional learning opportunities. Lastly, Daisy mentioned how her administration team makes an effort to see what students are making, giving them an audience to showcase their learning.

Recommendations

Based on her experiences, Daisy offered several insights and recommendations for both teachers and administrators seeking to implement arts-integrated STEAM and pursue STEAM certification at their own schools. For teachers who are adding arts-integrated STEAM into their daily routine, Daisy suggested finding ways to make integration natural and not making it “an extra added task.” She also suggested collaborating with teammates to develop innovative ideas while sharing the increased planning load. To make meaningful experiences for students, Daisy also suggested increased collaboration from the art, physical education, and music teachers.

Daisy had more specific recommendations for administrators. She previously mentioned how arts-integrated STEAM required increased time, money, and effort. To remedy this challenge for teachers, she suggested that administrators should find a way to provide sample plans with integrated standards and supplies to get new teachers started. This recommendation aligns with her belief that the best way to learn arts-integrated STEAM is through hands-on experience. To further support teachers, she also suggested partnering teachers with a mentor teacher to give teachers an opportunity to learn from an expert. She explained:

We spend so much time planning and making our units match everything, that if someone came in and said, “Here are you units, here’s the list of materials you’re

going to need for each day, here is the person you need to talk to and collaborate with about this,” and then let them walk you through the process and stay with you for that second unit and be like a co-teacher . . . then slowly step back and be like, ‘OK, I think you can go off and do it by yourself . . . That would be amazing and so helpful.

Summary

Though initially unfamiliar with the arts, Daisy embraced a new way of teaching that required deep collaboration, creative planning, and a willingness to step outside her comfort zone. Although her college coursework offered limited preparation, Daisy persisted with support from her colleagues, the STEAM Team, professional development, and her administration. Over time, she witnessed a positive shift in her own teaching in addition to increased student engagement and excitement. Daisy’s experience underscores the importance of hands-on learning for teachers, thoughtful collaboration among colleagues and across disciplines, and administrative support in sustaining meaningful STEAM instruction.

Sally’s Story

Prior Experience

Sally always knew she wanted to be a teacher. Reflecting on the moment that confirmed her path, she recalled a powerful childhood memory of a teacher who poured time and heart into helping her succeed—an experience that inspired her to do the same for others:

I struggled with math. [My teacher] took the time to work with me one-on-one and made me love math and excel in math after that. I really, honestly just believe

the heart that she put into me to help me become better at math really solidified that I wanted to help others just like she did with me.

Sally remained focused on her goal to become a teacher and later attended a Christian university majoring in elementary education. Sally completed her undergraduate teacher preparation program and felt very prepared as she entered her first year of teaching. She explained:

They had us do two years of just watching practicums to really see how a teacher runs her classroom. Then our last year as a senior was full on teaching that whole year . . . So, very rigorous. I felt like it did prepare me for the most part—how they trained us at my college really helped me become what I am today.

While her teacher preparation did not require any art education electives, Sally explained that she did take a Christian art history class. In this class, she would critique and study the symbolism in artwork; a similar strategy she employs in her STEAM classroom today. Sally reflected that although she did not have any background in the arts, she did participate in chorus in middle school. Although she joked about not having the singing voice she thought she did, she does tend to gravitate towards music integration in her classroom.

Sally began student teaching at Riverview Elementary and was fortunate to be hired there for her first official year of teaching. Although she always thought she would work with the younger students, she was hired as a fourth-grade teacher and has remained in the upper-elementary grades ever since. She taught at Riverview Elementary for three years. While she taught there, Riverview began the STEM certification process and she was exposed to integration, data-digging, room transformations, and project-based

learning (PBL). She then transferred to Willowbrook Elementary in Lenhart County to be closer to home. While Sally gained some experience with STEM and integration at Riverview, her time at Willowbrook marked her first exposure to STEAM and arts integration. She has been at Willowbrook Elementary for seven years teaching fifth grade.

Transition to STEAM

Sally experienced the beginning stages of STEM certification at Riverview Elementary, which somewhat prepared her for STEAM certification requirements at Willowbrook. Although she had prior experience with a similar transition, Sally was not initially on-board with STEAM certification. She remembered the first time she learned about Willowbrook's STEAM initiative:

[It was] scary . . . it seemed like a lot of work. It seemed like we were trying to fit a round peg into a square hole because . . . we were being introduced to [STEAM] ourselves, so we didn't know what we were doing, but it seemed like we were just trying to force it just so that we could have certification . . .

This sense of fear and being overwhelmed was in part due to the change she was having to make to her regular teaching methods. Sally described her classroom prior to STEAM as:

. . .very traditional. I guess I portrayed my classroom how I was [taught] when I was in school. You sit down, you [do] worksheets, the teacher teaches a lesson . . . I taught a whole group lesson, and I had small groups. We didn't have that when I was in school, but it was very worksheet based.

Sally and the staff at Willowbrook were required to attend rigorous training in arts integration and STEAM. Sally explained that they had one STEAM training a week in addition to monthly after school trainings with Alliance Theater, a dramatic arts based professional development company. While the rigorous professional development helped Sally better understand how to implement arts-integrated STEAM, it came at a cost:

[I felt] stressed and overwhelmed. I thought [administration] didn't care for our time and our personal lives after school. But . . . [pauses] I guess after a full year of it and seeing what it did bring to us [pauses] . . . And where it got me, it was all worth it in the end.

Sally initially described herself as “a Negative Nancy” and “a control freak.” She liked her classroom to be managed in a “certain way and I wasn't changing.” Once Sally started to see the change in her students, her perspective began to shift. She reflected on the transformation STEAM brought to her classroom and students:

Since STEAM, I still have mini-lessons, I still have the *you do* [student work] part, but it's more hands-on. Every now and then, I do have to have worksheets because I do have to have some grades . . . but it's very hands-on. The kids collaborate more. If you came in my room, you would think the kids are out of hand because they're talking so loudly and they're up out of their chairs. They're creating, but they're really working. So, with STEAM, my classroom has gone from traditional—sit and do your work—to collaborating and working together and building as a team.

What really changed Sally's mindset was the positive change she saw in student behavior and engagement:

Those kids that normally would get in trouble because they can't sit still—they're thriving in this environment because of STEAM . . . I slowly saw the change in my classroom's behavior . . . because now they're not in trouble for talking [because] they're talking about something they want to talk about. And the behavior management, it was almost like it fixed itself. So, when I realized that the positives that were coming out of this change in my classroom, my negative mindset went to a positive. Almost like a breath of fresh air . . . It really just transformed the way that I see teaching. Teaching doesn't have to be traditional in the way it used to be . . . I look back and laugh at myself because I was so upset about the change, but it's a breath of fresh air. And to see the way that my kids collaborate and work together and the ideas they come up with—it was well worth the change.

To illustrate the change in her classroom, Sally described one of her favorite yearlong PBL projects she does with her fifth graders. Students are tasked to create public service announcements to prevent the transmission of germs. These PSAs are shared across the school through the morning news and other means. Students are applying their knowledge of infectious diseases and microorganisms while collaborating to solve a real-world problem and communicating with others. Sally beamed as she recounted:

We create public service announcements every quarter to remind the school about hand washing, covering your coughs, and covering your sneezes . . . We started this during COVID, and we still continue it because COVID is still around [along with] the flu and strep. Now [the PSAs] could be a commercial, a song, an

advertisement . . . a game, a PowerPoint, a book. It's really just whatever the kids choose. And the kids always go to songs. I guess, I don't know what it is. They just love it. I've had a few choose commercials, so they get to do their acting, and that involves script writing. So, I get a narrative writing [grade] out of it, which is awesome. But I just really love to see their minds [at work] . Like this past one, I had kids take that famous song by Rose and Bruno Mars called "APT," and they made it all about covering your sneezes and coughs and handwashing, and it's just, it's amazing. And the way they perform is just phenomenal.

Although Sally initially described herself as having "zero" interest in the arts, she realized she unknowingly draws upon her previous experience in chorus and her love of music when integrating the arts in STEAM. She explained that her experience in chorus helps her incorporate specific vocabulary, count musical notes, and teach students how to rewrite lyrics to familiar songs. She explained:

I really do enjoy the musical part of it. I think because it's just so fun to see the way that these kids create with [music] and the music they love—that's not always appropriate. They can take that beat and change the words all around. So it is an appropriate song that really grabs the kids' attention when they're doing their PSA.

I mean, I love visual arts, but I would say I'm more drawn to the musical arts.

The journey to STEAM certification has not come without its share of challenges. Sally described the difficulty of creating extended PBL activities without much guidance. She explained:

Thinking back to the first few years of this, [a major challenge would be] creating a PBL from scratch. So, we had all our arts training with Alliance, and they did a

great job with giving us little mini units and how to integrate art. But it was time for us to truly plan a year-long PBL, and that just felt . . . [pauses] stressful, overwhelming. I mean it. It caused me to have a little mental breakdown. I did start to cry. It's very stressful, especially when our admin . . . our school . . . doesn't fully know . . . So truly, learning how to make a year-long PBL [because] we're all just kind of learning together. [It was] hard because at first, I thought you had to make every single standard fit together. It was stressful because you can't. You can't tie in classification and multiplication, like it doesn't work. But you know, multiplying and dividing does fit with microorganisms because the size of the microorganisms and how they grow. So, it was just very stressful and really defeating because I would come up with one thing, but then none of the other standards fit . . . I felt like I wasn't a good teacher. I honestly contemplated if I was supposed to be a teacher anymore because it was . . . it was very hard.

Sally took pride in having a well-managed classroom with thoughtful lessons. She knew in her heart that she was a strong teacher, but she couldn't help but feel "heartbroken and defeated" when her vision for a year-long PBL didn't align with the required standards. She felt isolated, as Willowbrook was the only school pursuing STEAM certification in her district, leaving her without any models or peers to look to for guidance. Then, she had the opportunity to observe other STEAM-certified schools, and she learned that year-long PBLs did not have to encompass every standard like she previously thought:

. . .[S]itting down with other schools and observing them and hearing that the year-long PBL doesn't have to hit every standard . . . it was a breath of fresh air . . . You can have many units within your year-long PBL because classifications do not go

with our year-long PBL, but we can have a small unit that's still STEAM based and then go back to our year-long PBL.

Support

As Sally explained, STEAM certification was isolating because there were no nearby schools she could look to for guidance. As a result, she had to rely heavily on her colleagues, administration, and professional learning specialists for support. Without hesitation, Sally commented on how she collaborates with her team for support. On their collaboration process, she detailed:

We honestly talk all day every single day, but during our [professional learning communities] that we have twice a week—one of those is required for STEAM—we do a check-in to see where everybody's at. And we see if anybody needs help anywhere because we're all about making STEAM less stressful, especially for our new teachers that we constantly get in . . . It comes natural to us . . . We used to have a lot of negative people. We've had a huge change in it this past year with the new school being open. A couple people left and we're like a whole new team this year. We vibe very well together . . . so we share all of the things we create.

Sally also leans on the music, arts, and PE specialists at her school for support when planning integrated lessons. She said:

Our specials teachers are phenomenal. Just the ideas they have. And how I can say I want to do *this*, and they'll just be like, 'Oh but can we add this part of STEAM into it and turn it into *this* . . . I start it in my classroom, and then they finish it in specials. It's just a wonderful collaboration.

As for administration, Sally explained that it is important that they “. . . truly understand that [STEAM] is a change in our normalcy, and they understand that we’re under pressure and the stress. They really tried to alleviate any of those worries we had.” One way administration helped ease teacher’s fears was through ongoing professional development. Although Sally said the time commitment was intense, it was worth it in the end.

While [the professional development] was a lot of work, especially after school meetings, they did a phenomenal job of helping us understand arts . . . because not all of us were certified in arts, so we needed that training.

Administration also demonstrated their commitment to STEAM through the creation of the STEAM Team— a committee comprised of classroom teachers and specialists tasked with developing, supporting, and sustaining STEAM initiatives across grade levels. Sally “. . . joined the STEAM Team right away just to get my feet into it”—to learn more about STEAM and collaborate across disciplines with her colleagues.

Sally also felt supported from the state STEAM representatives. When they came to visit Willowbrook, they offered constructive and actionable feedback. She explained, “[The STEAM representative] told us exactly what they were looking for . . . Everything was clear, cut and dry. She told us what they’re looking for and examples of what it looks like.” This clear feedback helped Sally and the staff at Willowbrook adjust their STEAM practices for the future.

Willowbrook’s STEAM journey has not come without a cost. Arts integration and extended PBL projects require a lot of materials and funds, which are not always provided by the school. Sally explained that Willowbrook relies heavily on community

involvement for these items. Sally explained, “You know, the community really [came] through for us in the area that we’re in. Lots of donations, lots of giving time to help us build a greenhouse.” The community also donates time, money, and resources to sustain chickens, goats, fish, and frogs, among other extended PBL projects.

Recommendations

Sally’s rich experiences have given her the expertise to offer meaningful recommendations to teachers, administrators, and program developers on how to make the transition to arts-integrated STEAM more manageable for teachers. For administrators, Sally suggested having supplies needed for arts integration activities, such as pastels, watercolor paints, and different types of paper, among others. She said, “I think about all the projects that we do, and we have great parents at the school that always send in those supplies, but it does get expensive depending on the projects that you pick.” In addition to supplies, Sally suggested administrators begin the STEAM process by showing a video to explain what STEAM “really is and what it looks like.” This would have been especially helpful, as Willowbrook was the only school pursuing STEAM certification at the time, leaving her with no other examples to follow. In addition to informational videos on STEAM, Sally suggested administrators should provide sample year-long PBL projects “so that it would be more understandable for [new teachers] . . . because that was a struggle for us . . . [W]e didn’t know what it had to look like.” After using the example PBL as a guide, teams could then create their own. Finally, she suggested administrators demonstrate “understanding with their teachers [and] know that the teachers are going to resist at first. If they keep a positive outlook and

help their teachers out when these problems arise, the teachers will get on board.” Sally also had recommendations for teachers. She said:

[H]ave an open mind. It’s going to seem stressful at first, but it is well worth it in the end. The end result is 100% better than what you thought teaching was going to be. Just go in with an open mind and an open heart. There are going to be hard days, but the good days outweigh all of it. And I would say, just be a team player. You can’t do STEAM solo. It’s hard to try and do it all by yourself.

Finally, her recommendations for program developers encompassed clear feedback, clear expectations, and provide examples and opportunities to observe other teachers and schools who are already STEAM-certified. Having a model helped Sally overcome her doubts and empowered her to become a STEAM leader at her school.

Summary

Sally’s journey toward arts-integrated STEAM reflects a powerful transformation from initial fear and resistance to confidence and empowerment. At first, she felt overwhelmed and stressed by the rigorous demands of STEAM certification and doubted whether the changes were worth the effort. However, with time, support, and ongoing professional learning, Sally began to see the positive impact on student engagement and behavior. These changes shifted her mindset, and what once felt like an impossible task became a source of pride and inspiration. Today, Sally advocates for STEAM within her school and empowers others to approach the process with an open mind and heart.

Aubrey's Story

Prior Experience

Aubrey has wanted to be a teacher ever since she was four years old. As a child, she would “play school with [her] stuffed animals and give them homework,” fully immersing herself in the role. She described herself as a “weird kid,” but recalled how her teachers consistently made her feel special, fostering a deep love for school. Reflecting on those early experiences, she said, “I think that influence made me want to do that one day.”

Aubrey had many creative interests and described herself as a crafty person, often dabbling in painting and experimenting with her Cricut smart cutting machine. She recalled a moment she felt very proud of her craftiness:

This past Christmas, I designed a shirt for my husband's admin team and made them all [on my Cricut machine]. It took forever. But everyone was like, ‘It turned out really good!’ and everyone was super excited about them. So, it was a positive, fun experience.

Aubrey also participated in high school theater. While she did not like to be the center of attention, most of her contributions were behind the scenes.

After high school, Aubrey pursued her dream of becoming a teacher and went to college for education. When asked about her teaching courses, she explained, “I know it was a lot of teaching methods that I feel like didn't really apply when I actually got into the classroom.” While in college, she described an art history elective that was required for her program: “[It] was either art history or theater history . . . I know we had to go to so many plays and then we had to write a script and perform it, which was terrible

[laughs].” While she did not directly draw from any of her college experiences as a teacher, her experience with the arts fostered a comfort with integrating artistic elements into her classroom later in her career.

Transition to STEAM

Aubrey began her teaching career in pre-K, where she spent five years—an experience she recalled with fondness. While arts integration was not explicitly taught, Aubrey’s time in pre-K continued to foster a comfort with the arts as a regular part of her teaching methods. She explained, “I mean, [art] is kind of the bulk of what we did while doing our projects to work on fine motor skills. You know, at that age, most of them can’t write, so we do a lot of painting, coloring, finger painting, and Play-Doh . . .”

Unfortunately, pre-K teachers do not make the same salary as elementary education teachers, so Aubrey interviewed for a third-grade position at Cedar Ridge Elementary in Silverleaf County. Cedar Ridge was already pursuing arts integration as a school, so the transition from pre-K to elementary school was a big leap for Aubrey. She recalled:

The arts integration was kind of overwhelming because . . . I was kind of thrown in, and it was also my first year [at Cedar Ridge]—I started after Fall break, so after my first couple of days, I had to go to a full day art training. It was a lot of neat stuff, but it was very overwhelming . . . At first, it felt like a lot of extra stuff we were going to have to do on top of all the stuff we already have to do . . . It seemed like a lot of planning in the beginning. But I was also excited. The first training I went to, I was just really excited about how the kids would be excited about it [and] the buy-in we would get from the kids.

Although the move to arts integration was overwhelming, Aubrey was excited and felt confident in her abilities as a teacher and with the arts. She credits that first training as a turning point for her. Although she was initially “overwhelmed,” once she saw how to integrate the arts seamlessly within the standards, she began to see the value in it. Aubrey demonstrated a positive outlook and embraced challenges with an open mind. Reflecting on her relationship with the arts, she shared, “I’m always trying something new.” Because of her willingness to try new things, she embraced arts integration from the start. Aubrey recalled some of the activities from that training and how she felt:

One of the ones we did was with vocabulary, and like coming up with a movement for each word. Then [we] turned it into a dance, which a lot of it is outside my comfort zone. But I can also see how it makes the kids remember stuff. The [activity] that really stood out to me [was when] they had us sit back-to-back with a partner. One person had a photograph of a landscape of a scene from a story. The other person had a pencil and paper, and the person holding the picture was trying to describe it to this person, and then they would compare. That was really neat. I did that with my kids, and it was really fun working on story elements. That one really stood out to me because it was fun and challenging.

Aubrey’s school, Cedar Ridge, had already begun the process of pursuing arts integration certification prior to her arrival in 2017. A few years later, they pursued district level STEM certification and then district level STEAM certification in 2024. The expectations for arts integration and STEAM were very high, Aubrey recalled:

[My principal] would go through lesson plans and make sure you were incorporating STEAM and the arts, and if she wanted elaboration, she could call

you down and ask you to explain this activity. Yeah, so she was very hands on with the process. She would sit in on some of the beginning planning stages, especially when we would sit down with the STEAM teacher and go through the steps. She retired the year before we got our STEAM certification, so the new principal was the one who got the STEAM certification. But I feel like the previous principal did all of the back work.

Aubrey and her team spent a lot of time integrating real-world problems within their planning. Aubrey recalled an interesting problem her second graders had to solve:

There was a STEAM project we did last year when we were doing life cycles— We had a garden at Cedar Ridge, and these hornworms kept eating all the tomatoes in the garden. So, we were able to take the kids outside and show them [gestures] ‘Here’s the problem.’ And the kids had to come up with some kind of solution to keep the worms off the plants. They had to build a prototype. They had to create a digital advertisement for it, and then . . . we were going to try to get a gardener to come in to talk about it, but we didn’t get to that point. We couldn’t find anybody . . . It was a long process, but it was really fun, and I think having that real—like, the kids being able to see the tomatoes have been eaten by this thing, and then we did a whole thing on the life cycle of the hornworm . . . It was fun. I mean, it took a long time. Like I said, it took probably two weeks to get through everything, but it was really fun, and the kids loved it.

While Aubrey had a natural inclination towards trying new things and arts integration, the journey did not come without its share of challenges. She explained that planning new units during STEAM certification was especially challenging. She also

expressed that finding ways to make the required standards integrate and culminate in a “big STEAM project and then nail down all of the moving pieces and gather materials was kind of daunting in the beginning.”

Aubrey was thrust into a path of arts integration after five years of teaching pre-K. After seven years of arts integration and STEAM, Aubrey transferred to Pinehurst Elementary this past year to be closer to home. Pinehurst Elementary follows a traditional instructional model, which contrasts sharply with the integrated approach Aubrey had grown accustomed to at Cedar Ridge. She recalled the differences in the teacher’s roles between the two models:

I guess [the way I teach at Pinehurst] is just the standard workshop model. Like, I teach a lesson, we review, and then the kids do a worksheet or an activity, and that’s that cycle for every subject. I mean, I think the arts integration in STEAM takes more preparation in the beginning, but then it’s more hands-off as the kids are going through the activity. You have to do a lot of teaching upfront, a lot of expectations, but you’re not—you know—if we’re doing a project by the end of the week, the kids were kind of on their own, and I was just facilitating. Whereas, you know, traditional model is very much teacher led a lot of the time.

Aubrey also noticed a difference in student engagement between the two models:

I can definitely tell the difference [between the two models], especially [because we did] more projects. I would do a STEAM project every Friday with my kids, and just the engagement, the hands-on [nature], and the excitement [from the students]. Like, sometimes I feel like my kids in the traditional model are like [mimicking a complaining tone], ‘*Another* worksheet . . .’. So, I definitely feel like

it is just more hands-on and more engaging for the most part . . . Like, the STEAM stuff is not as teacher-led. It's not as much of me up in front of the class talking. The kids have more discussion and kind of almost like us learning together, even though I already know the content. Let's practice it together.

Aubrey also credited the inclusive and integrated nature of STEAM with bringing out the best in her students, emphasizing how the approach allowed each learner to thrive:

I co-taught [in a classroom with a mixture of general and special education students], so I had several [students] who were still on a kindergarten reading level [in second grade]. But in those arts integration projects, [the special education students] were really able to show what they knew and participate because it wasn't [about] having to sit down and read something or write out the answers. So, just watching some of those lower kids really come out of their shell and be excited to participate and show that they were learning [was really powerful].

STEAM has also had a significant impact on Aubrey's professional growth. She shared that throughout the certification process, she learned to "incorporate more technology into the classroom," which expanded her instructional toolkit. With a background in craftiness, Aubrey naturally gravitated toward the integration of visual arts into her lessons. While she acknowledges that singing and dancing were outside of her comfort zone, she tended to focus on visual and, more recently, digital arts to engage her students creatively.

Support

Building close relationships with her team helped alleviate some of the planning burden Aubrey initially feared. She would sit down with the team and find ways they

could integrate the arts and STEAM within each subject, then “. . .bounce ideas off of each other until we got something that we all felt like worked and fit each part of the standard.” Aubrey described the constant arts integration as “. . .a struggle at first. I mean, [in] some areas, it comes easy, like your language arts—you know, reader’s theater, acting out vocabulary words. Math was always hard to tie in because there’s already so much to teach.” Meaningful collaboration helped Aubrey overcome this challenge. She said:

For the most part, [constant arts integration] wasn’t too bad. I mean, we had a team that was pretty collaborative and could come up with ideas. For a while, the head art person at our school was on the second-grade team, which helped because she had wonderful ideas.

Aubrey also leaned on the help of professional learning specialists at the district level. Aubrey was able to glean new skills and techniques after watching the professional learning specialist demonstrate model lessons with second grade standards. She explained, “[The professional learning specialist] was amazing. She would come do model lessons, and those were super helpful just to see how simple some of it can be and how to incorporate it without it being super overwhelming.”

Recommendations

Aubrey’s time in both traditional and arts-integrated classrooms inspired specific recommendations for teachers, administrators, and program developers on ways to make the transition to arts-integrated STEAM more manageable for teachers. For teachers, Aubrey recommended:

To trust the process . . .it feels very overwhelming at first. So, if you have a team that you can work with and bounce ideas off of, it's not as overwhelming as it seems to go through the process . . . Don't overcomplicate it. Like, I thought, starting out, that it had to be like this big huge change [in] the way I do everything in my classroom. And, you know, it is. You can incorporate little bits of [STEAM], and it still makes it meaningful and kind of more hands-on . . . Everything doesn't have to be a big STEAM project. There's way to do little activities or add in an art activity here and there without it changing everything.

For administrators, Aubrey requested that teachers have ample access to supplies. Due to the material requirements for multiple STEAM projects, Aubrey suggested having "kits that have a little bit of everything. That would be helpful just to have on hand instead of having to piece things together or wait to order something." She also suggested that administrators make it a priority to invest in new technology, such as iPads and 3D printing pens. She also suggested having professional learning specialists come to demonstrate model lessons for new teachers because, "seeing someone else do [STEAM] with actual kids makes it easier to understand instead of doing the activity in a room full of adults that aren't going to participate the same way kids will." Finally, Aubrey emphasized how critical it is for administrators to "be supportive," explaining:

The certification process is a lot with people coming out and doing walks and coming into your classroom. I think have a supportive admin [that] will sit down in meetings and help come up with ideas . . . and listening to the teachers when they say something might be too much or not manageable."

Summary

Aubrey's journey illustrated how early artistic experiences and an open mind positively influenced her transition to arts-integrated STEAM. Her natural creativity and eagerness to try new things helped her thrive with arts integration and STEAM, despite initially feeling overwhelmed. Her experiences revealed that, while STEAM can be demanding, it can foster deep learning for all types of students, while giving them a platform to thrive. Aubrey's experiences in both traditional and arts-integrated settings shaped her belief in the value of creative, student-centered instruction, and the importance of support through collaboration and professional learning.

Nicole's Story

Prior Experience

Nicole knew she wanted to be a teacher after spending time in her mother's classroom. She had always loved learning, being around children, and making a difference. This led her to initially pursue a path in the education field. That path came to an unexpected halt when there was a specific education assessment that Nicole did not pass. She then changed her focus to sociology because she enjoys people. She wasn't happy with this path, and she knew deep down that her heart was in teaching. She then pursued a business degree at another university and still felt unfulfilled. She knew in her heart that teaching was where she belonged, and she was determined to make that dream a reality. Eventually, she completed her Master of Arts in Teaching (MAT) degree from a different university—a milestone that marked the beginning of the career she had always envisioned.

Nicole felt well-equipped by her teacher preparation program with the tools she needed to navigate the realities of the classroom. She explained that while her program did not directly consist of any arts classes, the professors did a great job of including arts integration within their instruction:

[The professors] didn't call it [arts integration], but a lot of the lessons were integrated with various arts. I didn't even need to take notes because of how we learned. It was definitely arts integrated; they just didn't use the terminology.

She recalled a specific arts integrated lesson that she drew upon later in her teaching career:

We were talking about life cycles, and each team had to present a life cycle to the class. My team did the life cycle of a chicken, and since I teach second grade currently, it worked out perfectly. So, we had a big felt model of the life cycle of a chicken, and we had [the] students—well, our classmates—arrange it. They had to make their own models [and] use their body to show the life cycle. I didn't really know it was arts integration—I just thought it was fun. But that's what it was.

She now uses a modified version of this activity in her own second grade class “because it was so great.”

Prior experiences in the arts played a role in Nicole's journey, beginning with her participation in middle and high school theater. She always loved drama and was even the lead role in a production. She recounted, “It was just fun experiencing the whole process of a play and expressing yourself and learning the lines. It was amazing.” Nicole felt comfortable with dramatic arts, and later, brought her love of acting into her arts-integrated classroom.

Transition to STEAM

Nicole student taught at Cedar Ridge Elementary, where she was later hired in second grade. She recalled, “I really enjoyed the school environment. I enjoyed how the teachers taught, so I knew this was a place I wanted to be. I was fortunate enough to be able to be [at Cedar Ridge].” Nicole has been teaching for a total of six years, with her first year marking the start of the COVID-19 Pandemic in 2020. She recalled the tumultuous time as she tried to remain steadfast in her teaching:

My first year, COVID happened. STEAM and arts integration were more of a “do it where you can, if you want to.” You didn’t really have to. One of the teachers—she’s now the STEAM teacher—did STEAM in her classroom, and I really liked it. So, I was trying different STEAM projects to get the kids interested [and] to also integrate things because we never have enough time. So how can we integrate? STEAM is one of the best ways that I found.

Cedar Ridge was already pursuing arts integration certification through the district when Nicole was hired, so it was always an expectation. She recalled the way she initially taught her first year when STEAM and arts integration was not a priority:

So, I [had] a PowerPoint slide or a slide presentation I would show the kids. [I had students] in class and [students] online, and then . . . most of the activities were online based. Our [district level online platform] was just making its way out there. But I did do Microsoft Forms or different types of online based assignments so that students would get the material either way.

Because Nicole’s first year was during the COVID-19 pandemic, and she was responsible for concurrent teaching—teaching both online and in-person students at the same time.

Because of this, she has always felt very comfortable with technology integration. She recalled, “I’m always learning something new about technology, but I’m very comfortable with it.”

After her first year, she was introduced to Cedar Ridge’s STEAM initiative. She recalled feeling confused because it seemed like teachers had to do additional work simply as documentation for STEAM certification. She recalled:

Honestly, [the challenge came from] trying to understand [STEAM], because I don’t want to say we made it more complicated than it already was, but it’s like things we would do anyway. It’s just the point of documentation that was always the thing, and as a whole, [we struggled with] teacher buy-in . . .

Although the teachers around her struggled to accept the STEAM certification process, Nicole “was always interested in it.” She recalled her initial feelings regarding STEAM certification:

I just wanted to know how to make it flow, how to make it work. You know, the good, the bad. And of course, those were things that you didn’t really know until you got into it. So that’s how it looked in the beginning. I wasn’t really sure, but I was excited. We definitely had various trainings, and our coaches would come in whenever we needed them to. Then, we worked together as a team, and we had a STEAM teacher, so that definitely helped a lot with the whole process.

While Nicole was initially unsure about STEAM, various supports at her school such as trainings, team collaboration, coaches, and specialists helped her develop a clearer understanding and integrate it into her teaching. Cedar Ridge was already pursuing arts integration certification when she was hired, and later they pursued county-

level STEM certification. It only made sense to combine the two and also apply for STEAM certification. Because the staff already had experience with the previous two certifications, Nicole explained that STEAM “was something we’re already doing anyway, so you might as well get the credit for it.”

Nicole was eager to learn more about STEAM, so she made it a point to attend trainings and visit nearby schools that were also STEAM-certified. She recounted a memory that had a lasting impact and was an inspiration for own classroom:

We would go view other schools [and] one of the schools that sticks with me most is Wolf Meadow Elementary . . . It was amazing to see how the students express themselves, how they could meet the learning targets through art. And it was all of the kids—it was even done in specials. So, I was like, “We can do this.” This is something that can be done, and it was great to see the students just be passionate about their learning because that’s what I want. So that was amazing, seeing that in that school’s environment. And it’s pretty close to us, so I was like, “OK, that should work for us too.”

Nicole had always loved integrating the dramatic arts into her classroom and recalled a training she went to at the Center for Puppetry Arts. She recounted how they learned how to use different drama strategies to get students talking about content. She expressed that drama helped her students “. . .express themselves and understand the topics in different creative ways. The students are very expressive, and they like to talk. Why not talk about the topic? [That’s why] drama is probably my favorite.”

Nicole brought her love of drama and technology into her classroom. She explained how a typical arts-integrated STEAM lesson looks like in her classroom today:

We do a lot of Canva for our visual arts. We also do drama. Like today, we did *Storywhoosh*. The kids really like it. So, we mainly do the drama, and then the visual [arts] is usually computer based, but I do . . . give them choices. A lot of them like to draw, so using that visual art to express their thoughts. That's always an option.

Since integrating STEAM into her daily routine, Nicole reflected on ways her teaching outlook has changed. Nicole reflected that STEAM enabled her to give her students the choice of how they wish to present their learning. Nicole expressed that allowing her students choice helps them to:

. . . express themselves because I have students who can't necessarily write to answer a question, but they may be able to draw to answer the question, or act it out . . . It's amazing to see their learning in various ways . . . [Teaching] shouldn't be segmented. Life isn't segmented, so it's definitely helped with student choice. I know that seems simple, but . . . letting them choose what they want because they know how they would like to show their learning.

Nicole and her team plan larger STEAM PBL activities at least once a quarter in addition to daily arts-integrated activities. Nicole explained how the integrated PBL activity "Market Day" captivated her students and inspired meaningful real-world learning:

The students were the consumer and the buyers. They had to create a business plan, [and] they also had to create a poster in Canva to persuade their buyers. That was an amazing process. Then they switched through classrooms to buy their products and to sell their products. Administration visited and a fifth-grade class

visited, so it was amazing to see our students so excited about that whole process from creating their products to selling their products.

Although integrated teaching has been rewarding for Nicole, it hasn't come without challenges. Nicole explained planning meaningful integrated experiences that incorporate several disciplines had been a struggle:

One of the [biggest challenges] is actually just thinking about the lessons and how to integrate everything together in a way that makes sense . . . Everything should be intentional. Making sure things fit, that's actually been one of the most challenging things so far.

In addition, gaining teacher buy-in for the integrated STEAM model has been a persistent challenge. Another barrier lies in the disconnect between integrated PBL STEAM challenges and state-mandated assessments, as students “. . . don't have choice. [The answer] is either right or wrong, so that's when it becomes a little complex.” The rigidity of district and state testing requires students to spend significant time preparing for standardized assessments, which often do not align with the flexibility and creativity of multidisciplinary teaching.

Support

Nicole is fortunate to teach at a school with many supports in place to help teachers with STEAM. Nicole had access to professional learning, school visits, model lessons, and a school arts coach. Nicole also relied heavily on collaboration with her team and the STEAM teacher. She also had the experience of going through arts integration and STEM certification, so STEAM certification did not seem as daunting. Nicole took initiative to deepen her understanding of STEAM by exploring various resources, including

www.ArtsNowLearning.org, among others. She also served on the arts committee, which allowed her to “listen to other teams, and then [have] them listen to our ideas and give input to make things even better.”

Collaboration is a critical component for successful STEAM implementation. Nicole expressed that while her team meets often—three times per week—the meetings are not always fruitful. With four new team members, collaboration has been a bit of a struggle recently. As team leader, Nicole plans to make STEAM and planning integrated experiences a priority for the following year:

Most of the time, when we get together, of course, we’re discussing what the students are learning. We somewhat discuss how we will teach it. And when it comes to our integration—that’s one thing I want to prioritize next year. We do talk about how we can get students interested, and then also when it comes to our [professional learning committees], we discuss either extension or remediation.

Most of the time, there are art strategies included in steering our [PLCs], but next year, I want to prioritize when we talk about how we will be teaching things, to teach it with integration [in mind] so people can have various options for that.

Nicole emphasized the critical role of collaboration in making STEAM successful. She expressed, “Collaboration makes everything easier. Just working together and then pulling out the standards that work together . . . If it doesn’t work, don’t make it fit.”

Recommendations

Nicole reflected on her experiences with STEAM and arts integration, which informed several practical recommendations for teachers and administrators. For teachers new to STEAM, she suggested seeking out professional development to hone their craft:

Definitely attend trainings, especially those that aren't required. If you can go to a training, go to one because as teachers, we're limited to be honest. We may not share things [with each other], not intentionally . . . so, going to those trainings definitely help working with people outside of your team.

She also further emphasized the importance of meaningful collaboration with teammates, specialists and coaches:

Work with the specialists, work with the coaches, and use that knowledge to help you build your lessons and ask questions. Ask questions and get the materials that you need because it can be done. But sometimes you need somebody else to help you do so.

She also suggested allowing students to have input and ownership in the lessons:

Get student input. That helps too, because students will think of things . . . or they may come up with options that you don't even think of. So, allow them to choose, too. Give them a list. But it's OK if they go off of that list. It doesn't have to be super structured, and it's not going to be quiet. It's going to be messy, and that's OK because they're learning.

To strengthen collaboration, Nicole suggested that administrators hire an arts coach to work alongside teachers. She further emphasized the importance of administrative support through sustained professional learning and responsiveness to teacher feedback:

For administrators, if possible, [I would suggest] having those resources for teachers. Support the teachers . . . just support them and get them what they need. Have those meetings. Have those conversations. Teach the teachers how to do it,

and it makes life a lot easier, and it will be better quality [STEAM] lessons for students and for teachers.

Nicole offered several practical recommendations to strengthen STEAM implementation, particularly around resources, materials, and dedicated spaces to support creative expression across the arts:

Having money for resources helps as well . . . When it comes to visual arts or even music or things like that, having resources—that makes a huge difference. [Of course, provide] paper and things like that. But one thing I think would be great that I saw at another school—they had puppets. So, when they did their drama, the kids could have those puppets already made. Of course, they could make them, but having them [pre-made] could also help, especially in the lower grades. And possibly even an area within the school to get this done. We do have a “Nest,” which is our technology lab, so students can do a lot of the technology or the digital art in there too. But just having another space within the school would also be quite beneficial.

Summary

Nicole’s experience highlights the importance of a growth mindset and openness to new approaches when successfully adopting arts-integrated STEAM. While initially unsure about STEAM, Nicole grew more confident in her abilities through professional learning, schoolwide support, and opportunities to visit STEAM-certified schools. Her background in theater and comfort with technology helped her embrace arts integration in creative ways. Over time, she came to value student choice, sustained professional learning, and meaningful collaboration as essential elements to successful STEAM

implementation. Despite facing challenges such as planning across disciplines and navigating standardized testing constraints, Nicole continued to prioritize integration and innovation in her teaching while being a model for other teachers around her.

Elizabeth's Story

Prior Experiences

Elizabeth is a veteran teacher with 18 years of experience, though her career did not begin in education. Interestingly, she initially pursued a path in dental hygiene before ultimately finding her calling in the classroom. After taking a difficult chemistry class in college, she began to reflect on the path she should take. Elizabeth recalled her deliberation as she contemplated a change in major:

I had a really good group of girlfriends going into teaching, and [it] kind of made me reflect back on my years of school. I took time to reflect on elementary school, middle school, and high school. There's a reason middle school is only three years. [laughs] I thought about my third-grade teacher, and I thought, *My goodness. What a fantastic year I had in third grade.* And for me to still remember, it really must have stood out. So, I said, "OK, let me give it a try." So, I started taking classes [at the university], and I loved it so much. I loved going to class. I loved learning. I loved visiting schools. I loved being with the students, [and] getting to go out in the community, and I thought, "Yes, this is great. This is great. I'm going to love this."

Elizabeth awakened a passion for teaching that had quietly been in her all along.

Throughout her time in college, she took two art education classes: one art history class, and one art education class. While Elizabeth described herself as not being artistic and

“more on the sports side of things,” she remembered some of the material from her art education class and later applied it in her classroom:

How to draw a face sticks out more to me than anything. First, the shape of the head. You’ve got to get the shape of the head right. People don’t really have circular faces, and then you know, you draw the line of symmetry down the middle of the face. Then you [make a horizontal line] more towards the middle, and that’s where your eyes go. So, it’s just step by step, talking about shapes and symmetry and color and where to highlight things on the face.

A lesson on drawing a face became a meaningful example of how concepts like symmetry, geometry, and color can be woven across content areas through arts integration. By openly embracing her own artistic vulnerability, Elizabeth created a safe space for her students to express themselves and build confidence:

I always tell my students, “Let me draw something first . . . because I promise you yours is going to be much better than mine is.” So, hopefully they feel a little better, because I’m not an artist. I actually taught kindergarten last year, and the year before, and I got a little bit more information on how to become a better artist. So, I just go by those rules, but I have no artistic background.

Elizabeth began her teaching career in Silverleaf County, first as a fifth-grade supply teacher at Pinehollow Elementary, then as an EIP teacher at Sunnydale Elementary, and later as a third-grade teacher at Riverbend Elementary. She stayed at Riverbend for eight years before having children and wanting to move closer to home. Elizabeth was inspired by the innovative STEM program of a local school, Maple Grove Elementary, and actively pursued opportunities to make herself a strong candidate for a

position there. She enrolled in a two-year professional learning program called the Math and Science Partnership, which was being offered through a district partnership with the local university. After the program, she met with the Maple Grove administrators at a job fair, interviewed, and got a job teaching in third grade. She later taught fifth grade, kindergarten, and most recently, second grade at Maple Grove.

Transition to STEAM

Maple Grove was well-known in the district for their STEM program. With a desire to grow in this area, Elizabeth recalled embracing the opportunity to learn from the expertise around her when she first arrived at Maple Grove:

When I first came [to Maple Grove], everybody was so knowledgeable in STEM because they had worked so hard to get certified. I really took a lot away from different grade levels being out in the hallways. There were a lot of different ideas that I had never seen, and I learned a lot through the people who worked there. So, it's been a really great experience.

Elizabeth then had 11 years of experience integrating the STEM disciplines in her teaching. More recently, Maple Grove administrators have concentrated their efforts on obtaining county-level STEAM certification—a distinction held by only three other schools in the county. Elizabeth recalled the first time she was told of the transition to arts-integrated STEAM:

I think I can speak for a lot of [the teachers at Maple Grove] . . . When you hear “STEAM,” and you hear “arts integration,” you think, “Oh my gosh. I can't. I don't know how to paint. I don't know how to draw. I don't. How am I going to teach my kids these artistic skills when I can't even do it myself? I haven't been

trained, so everybody . . . [pauses] kind of gets a little scared. A little shocked. We all ran to the art teacher, and we're like, "We're gonna need your help!" And she can't help everybody.

Elizabeth explained that sustained professional development in arts integration helped build her confidence, understanding, and overall implementation of STEAM:

We started taking professional learning courses, and come to find out, it's not just art, it's not just painting. It's not just drawing. It is musical instruments. It is role-playing and theater. It's movement. It's drama. It's whatever works best for your class, but all of that was considered art. We took a year and just took different courses . . . But as soon as we went through all the professional learning courses, I think we all were able to breathe a little easier. It was one of those things where we said, "Oh my goodness. We're already doing these things, but now they just have a fancy name." And I think it's a lot easier for the younger grades to integrate than the older grade levels. Intermediate grade levels had to be a little more creative, a little more opening minded. But now that we've got everybody on board, everybody seems to love [STEAM].

Elizabeth was fortunate enough to have 11 years of interdisciplinary teaching experience at a STEM-certified school before transitioning to STEAM. Before that, she described her teaching as more traditional, with content areas taught in isolation rather than through interdisciplinary connections. Looking back, Elizabeth shared how her classroom operated before STEAM became a central focus at Maple Grove and the transformation she has observed since its implementation:

The arts side of it was done in art. The music side of it was done in music, so a lot of it was just hidden in Specials. PE was PE. We didn't bring that stuff into the classroom. So then, when we got our STEAM certification here at Maple Grove Elementary, we were able to actually bring [the arts] into our classroom and see how our kids were affected by it. And you can literally see that your kiddos who are not engaged during the day suddenly become engaged because they don't have to write it down in a journal. They don't have to write about it on a worksheet. They can get up, and they can show through movement or painting or coloring or instruments. It's just made a huge difference, and I think we can see it. It gives every single student an opportunity to show they know something in different ways—lots of choice boards, things like that. Where in the past, you feel like your kiddos weren't given too much of a choice. It was—*You have to do this. This is the way you have to do it.* And it's just not like that anymore. It gives them more opportunities. It's a little more subjective.

Elizabeth has increasingly made an effort to weave the arts into her everyday instruction. She shared a particularly impactful lesson she created that resonated with students and teachers alike:

In my first year [of teaching] kindergarten, I was trying so hard to integrate the arts and just do something different because the people in kindergarten have done things how they've always done them, and now I'm new to the grade level and we're starting to integrate arts into everything that we did. And I said, "What kind of ideas can I bring to the table?" So, we have the standards day and night and then we had standards that had oviparous animals, just different animals that

hibernated—a lot of different animals. And I thought, “Oh my goodness. You know what we could do? We could create our own Eric Carle murals!” We could read the books, and the kids could make the animals and make the background. So, we, as a team, got a big, big piece of butcher paper—each teacher. And we just let the kids have at it. We let them paint on the paper. We showed them how to make colors kind of like Eric Carle did. We showed videos of Eric Carle and how he makes his own paintings and how he mixes colors and has different textures and patterns . . . And all of the kids painted pieces of paper. Different textures, different colors, and we threw all of the paper onto the middle of the carpet, and we said, “OK. Think about what you want to do. Do you want to do daytime? Do you want to do nighttime? Do you want to do nature? Do you want to do an animal?” And so, they have these ideas in their head, and we said, “OK, now come over and pick out someone else’s pattern, somebody else’s color and texture. Whatever they made and make it your own.” And when I tell you, these kiddos just went crazy and got so creative . . . Their murals were just so precious. Today I think it’s one of my favorite things that I’ve ever done.

In another example, Elizabeth described how she regularly integrated the arts across all subjects:

When we read stories, we retell through movement, and it helps them to comprehend the story better, and it helps them become more engaged and listening to those story elements . . . Whereas, it may have been a challenge in the past to just look at a book and read it and think, “Oh my goodness. What was the problem?” Well, they can actually act it out and feel and be part of [the story]. [In

another example,] we studied Vincent van Gogh, and we connected it to our stars unit in science. We made our own *Starry Night* in the hallway, and the students painted their own stars, and we talked about the temperatures of the stars, the colors of the stars, if they were warm or cool. And they were able to pick their own colors and put their own temperature to their star and add it to our second grade *Starry, Starry Night*.

While Elizabeth has a lot of experience with integrated instruction, the transition to arts-integrated STEAM was not always easy. She remembered a lesson that did not go according to plan:

We had the STEAM [certification] walk, and our kids were painting. It was different textures and different ways to use pastels to paint. And who would have known there are about 12 different ways to use your pastel colors? It was a disaster, and this was a STEAM walk for us to get certified. The county was here. But we had cups spill over. There were words that I had messed up saying. We would try and do certain textures, and it just wouldn't work with some kids, and they would get angry. So, you do things like that, and you kind of feel like you've . . . you've failed. But you just look at it, and you just reflect and see [if] you either get rid of it, or you make it better for next time.

Elizabeth's optimism, drive for self-improvement, and willingness to try new things have allowed her to navigate the challenges of STEAM with resilience—ultimately positioning her as a model within her school. Elizabeth recalled a proud moment when her administrator walked in unexpectedly and saw her arts-integrated teaching in action:

I had my unannounced observation a couple weeks ago . . . It just so happened that [my administrator] came in during our reading time, and we were reading a poem. In the poem, it had talked about different types of compound words . . . So, I was able to take my class and put them into pairs, and they had to do a movement for their compound word, and the kids had to guess which compound word was there's. I look back at my administrator, and she's just filming me [with her phone] and she's like, "This is great!" [thumbs up]. But it was cute. It was just kind of a way for the kids to pay attention to the poem and it hit compound words too.

While Elizabeth incorporates various forms of arts-integrated activities in her classroom, she shared that, due to her sporty nature, she tends to favor movement-based strategies over visual arts. She expressed, "[As a student], I would be the one that wants to move from side to side in the room. I would be the one that maybe made up a dance other than painting on a piece of paper or drew something with sidewalk chalk."

With over 18 years of classroom experience spanning from traditional, integrated, and now arts-integrated approaches, Elizabeth described how her teaching outlook has become more intentional and collaborative. Their planning became more purposeful, and they felt more confident taking risks:

I know it's more intentional when we meet as a grade level for collab planning once a quarter. It is very intentional that we integrate arts every single week, not necessarily into everything that we do because that's overwhelming, but just kind of whatever comes naturally. We look at our plans for the week [and ask ourselves], "How can we integrate the arts into it?" or "Did we already integrate arts into it?" because we just didn't know [in the beginning] . . . I think that it's

made it a lot easier because last year was the first year we had to do [arts integration]. So, this year, we get to go back and add to things and take things away. We are a little more comfortable, so we take more risks, and it's made teaching a lot more fun. A lot—not only engaging for the kids but engaging for us.

Support

Elizabeth explained that the professional learning she received and the support from her team and administrators have made the transition to STEAM much easier. She expressed that STEAM required “lots and lots of resources” and her administrative team was always willing to purchase these materials to make their integrated STEAM activities a reality. She explained that her administrator is “very passionate about the arts, and so most of the time, she'll say, ‘Yes.’ I think that you need to have a leader that's also really passionate.” Having a passionate administrator at Maple Grove empowered teachers to be creative and think outside the box.

Elizabeth also leaned on the support from county professional development specialists who would model lessons and provide additional resources:

We had people from the county come out that were so supportive. They would actually come into our classroom and work with our kids and say, “OK, this is what it looks like.” And we were able to reach out to them and say, “Hold on, what was that game you played again? Can you send us that?” [They] were very, very helpful.

She also leaned on the support from her collaborative team. Elizabeth explained that planning engaging arts-integrated experiences was much easier when she could “throw out different ideas” and learn from one another. She also expressed the importance of

collaborating with the art, PE, and music specialists since they are the experts in their respective fields.

Recommendations

Elizabeth's firsthand experience with STEAM inspired practical recommendations for classroom teachers and administrators to make the transition to STEAM more manageable. For teachers, she expressed the importance of being open-minded and being willing to step outside your comfort zone for the benefit of the students:

Begin [by] asking a lot of questions and just being open minded, and be willing to do something that you might not want to do [if] it benefits the kids . . . It doesn't matter how you feel about the arts. It doesn't matter how you feel about painting, how you feel about music or acting or singing or movie making. It really comes down to how much you care about the kids and what lengths you're willing to go to in order for them to be successful. Because arts integration is absolutely one of the best strategies that I've ever used in teaching, and it sounds like a lot, but it's not a lot. It's actually probably things that you're already doing. You just elaborate on what it is you're doing—map it out so that you can see, “Oh yeah! Well, we are actually really doing all this stuff.” [Just] make it intentional. Definitely make it intentional.

Elizabeth's recommendations for administrators emphasized the importance of access to adequate supplies and ongoing professional development for teachers. She assured administrators that while the transition to STEAM involved significant effort, the benefit far outweighs the challenges. According to Elizabeth, a well-supported STEAM

program not only enriches teaching and learning but also becomes a point of pride and engagement for the entire school community:

I would say [to administrators that STEAM] is a lot of work. It comes with challenges. There are so many more rewards that come with it than there are challenges. It benefits your teachers. It benefits your students. And it really is something that your community can look at and say, “Oh my goodness, this is so neat. Not every school does this, but our school does it.” And you could pull people into your community and use your community members, your stakeholders, and people like that to come in and support your children and support your program that you’re doing . . . It’s worth the money that you have to spend on it . . . [You will need] all the materials . . . The more creative you get, the more [materials] you have to ask for.

Summary

With nearly two decades of experience, Elizabeth’s teaching journey highlights her transformation from a traditional teacher to a confident teacher-leader in arts-integrated STEAM. Her willingness to take risks, embrace vulnerability, and learn from others positioned her as a respected role model in her school. Through collaboration, professional development, and continued support from her administrators, Elizabeth overcame her initial unfamiliarity with the arts and became a confident instructional leader in arts-integrated STEAM.

Mary's Story

Prior Experiences

Mary had a unique journey into education. She began her professional life as a geologist after earning a bachelor's degree in geology and spent the early part of her career immersed in the sciences before finding her way to education. As a geologist, she spent five years ensuring the underground containers from manufactured gas plants were not leaching toxins into the groundwater. She did this by collecting soil samples, monitoring the air and wells for toxins, and writing reports for the Environmental Protection Agency. It was here that she discovered her passion for teaching. She recalled the moment when she decided to pursue education:

I worked as a geologist for five years, and then I taught someone who was hard of hearing how to do some pretty particular type of work in the excavation field. They were vacuuming out tar from the ground because there was a pollutant in the ground . . . I really enjoyed that teaching [and] tutoring process. So, I got my master's in education, and this is my second career.

Mary then spent nine years teaching middle school where she taught seventh-grade science and English Language Arts and eighth-grade science. She took a year off from teaching during the COVID-19 Pandemic of 2020 to spend time with her family after moving states. Then, she interviewed at Maple Grove Elementary and was hired as a third-grade teacher. She is now in her fourth year at Maple Grove and teaches second grade.

While pursuing her master's degree in education, Mary participated in two arts courses. One was an arts fundamentals class that focused primarily on art history and

theory, while the other centered on arts education. Although she did not recall specific activities from either course, Mary described herself as a person who is naturally drawn towards the arts. Her creative background includes participation in band, choir, and musical theatre, and playing the piano. Beyond music, she enjoys gardening, hand lettering, drawing, and creating projects with her Cricut cutting machine. Her expansive artistic background and experience as a science teacher paved the way for her transition into using arts-integrated STEAM methods.

Transition to STEAM

Before getting hired at Maple Grove Elementary, which was known in Silverleaf county for its expansive STEM program, she was a seventh and eighth grade science teacher. She described her teaching style as inquiry based that revolved around the 5E inquiry process—engage, explore, explain, elaborate, evaluate. Mary recounted one of her favorite activities from this time in her teaching career:

I was teaching [my students] about the equation [for] speed and I had them make origami frogs. So, my engage was, “Here’s a note card. Here are the directions. You’re going to make an origami frog.” And then I have pieces of tape on their lab tables. It wasn’t the same distance on everybody’s table. One was on the very edge. One was a couple of inches off. One was four inches off—that type of thing. Then I gave them a paper. I said, “Well, now you’re going to race your frog with your lab partner.” So, they had to go under the table, and they would race it to the finish line, which was with masking tape, and they had to time it. So, I asked, “Who won?” They said [which group] had the fastest time. I said, “OK, how far did they go?” And then, they had to figure out through inquiry that you have to measure the

distance to figure out how fast it really is based on the time, then we figured out the equation. So, I mean, that's kind of how I taught at middle school. Then after that, the next day would be like a lecture, because I'm going to give them more information. Then they would take that information and do a lab with it or some kind of performance assessment.

After getting hired at Maple Grove, Mary was thrust into arts integration. She had recently moved to a new state and was returning to the classroom after taking a year off, making the transition even more complex. On top of adjusting to a new school and grade level, she was also navigating the shift from middle school to elementary teaching—all while attending professional development on how to integrate the arts. Mary recalled how she felt when she first learned of Maple Grove's STEAM initiative:

For a little context—It was my very first year as an elementary teacher. So, overwhelming, right? I mean, middle school was overwhelming too, but in a different way. I [had] 180 kids, but one [subject to teach]. So, now I have 20 kids and five [subjects to teach]. So, I mean, it's very different. So, it was just overwhelming learning elementary and keeping all that together. And then I was going through arts integration training on top of it. So, here they're telling me, "You have to do all this, and now you're going to include art." I thought the concept was cool, but it did feel like one more thing. [I wondered], "How am I going to do this?" Plus, everything else [that's required for elementary teaching], and I can't even get all this in. So, what . . . what's gonna give? Something's gotta give.

Once Mary understood what arts integration entailed, she began to feel more confident in her abilities and realized she was doing arts integration all along:

We just got [STEAM] certified this year, so when people said, “Oh, we’re going to go for art certification,” other people in the building were like, “Oh my gosh, not another certification!” I’m like, “I’m already doing all of it.” It doesn’t really matter. Like, it’s fine, you know? I mean, of course it was a bumpy transition, just because it does feel like one more thing. But when you really think about it, it’s just innately kind of woven in.

Reflecting on how her teaching evolved through arts integration, Mary described a clear shift from surface-level instruction to deeper, more connected learning experiences for her students:

Before [arts integration], [my teaching] was just like, “Well, here’s my standard. Here’s how to teach it. Here’s the information I have to deliver. OK, show me what you know. What did you get from what I taught you?” Instead of trying to connect it to different things. As a teacher, you want to connect things to make it relevant for them, so you remember and understand. But I didn’t try to connect it to like, arrays and Andy Warhol or puppet shows to actual theater. I didn’t try to connect it through any of that kind of stuff. It was just like, “OK, well, you have to know how to make a volcano explode. What happens in the earth? OK, this happens. So, what can you do to make it explode?” It was just like, “Let’s mix the chemicals together. OK, we’re done.” That was it. It didn’t really have much substance. I feel like I go deeper with arts within the concepts.

Because Mary described herself as naturally artistic and taught inquiry-based science for most of her teaching career, arts integration came to her naturally. As Mary continued to feel more confident in her ability to integrate the arts, she began to think creatively and take risks. She shared her process around designing an integrated puppet show unit, which helped her realize the powerful impact arts integration had on teaching and learning:

We learned about shadows and retelling stories, so this year I [decided] to do puppet shows. I was the only one in second grade to do it because everyone else is busy doing different things. I'm like, "I'm just gonna do it." [My team] was like, "Well, what's the thought process?" And I'm like, "I don't really have a huge thought process. I'm just going to do it and try it to see what works and what doesn't work, and I'll tweak it for next year." So, the kids had these three stories that they practiced, and they knew the beginning, middle, end, and the moral of the story. And I said, "You guys have to pick one of these. You have to write the script with beginning, middle, and end, and you have to talk like the character, and you have to make puppets and perform. You can make a backdrop if you want, but here's your puppet theaters. Write your script together and figure it out." We had to make process boards for our arts integration certification walk, and when I was making that, I didn't realize how many standards it really did cover. Reading, writing, speaking and listening, math, science. I mean, everything—that whole two weeks right there, planning it and performing it—it was amazing. Plus, the soft skills of listening to your partners to give compliments . . . All those things to make that community. That really emphasized how much bang for your buck you can get

with arts integration . . . I could have done all those standards separately, and it would have taken me twice as long. But, because I put everything together and connected it all, I taught or got evidence of more learning in those two weeks than I would have [if I did] everything separate. And the kids really understood and saw that you don't do science in isolation. You don't do reading in isolation.

Everything is all together, and it makes an impact. You understand it more because you're doing it all connected and integrated.

When asked if her teaching outlook has changed since she has integrated the arts into her regular routine, she replied:

I don't think my teaching has changed per se because I just do what's best for kids . . . because they're the reason why I'm here, and they're the reason why I'm teaching. I don't want them to leave my room without the experiences to understand what they need to understand to move on in life.

She also explained how she now feels confident to try new things and be a "pioneer" for her peers because she is "not afraid of it flopping." This led to Mary create innovative ideas that her teammates eventually try in their own classrooms.

Although Mary is very confident with arts integration, STEAM does not come without its share of challenges. She expressed frustration with the pressure of time constraints and testing demands, saying:

[I struggle with] having enough time—I taught third grade for two years, [and] there's a timetable you have to be done with everything because then testing happens. I really felt that pressure in third grade because when it was my very first year, testing was early. It was like super early, and I'm like, "Oh my gosh! I still

have like a month left of [teaching]. What am I supposed to be teaching them?”

Because even though I’m *done* teaching them, I’m not really done because I’m just making sure I taught what I needed to teach for their testing. A lot of time, the first thing to go is arts integration because I need to get this X, Y, and Z done because they need that content to be able to perform well on the test. There’s also probably the anxiousness of being a new elementary teacher and making sure I get all the things that you have to get in. Now I teach second grade, we don’t have testing like third, fourth, and fifth grade, so I feel like I can meander through [the content] a little bit better, and I don’t have that time crunch per se.

Support

Having a support system is imperative to successful STEAM implementation. Mary described a trusted colleague she turned to for guidance and reassurance when planning arts-integrated lessons:

This person is just a naturally artsy person . . . She is just naturally good at the art part of it, like her product looks amazing . . . She is just a naturally calming person that if you feel frantic about something, whatever it is, in this case, planning something arts integrated or making sure it works, she’s like, “You can do it however you want. It doesn’t matter, it’s fine.” So, always reassuring that everything’s going to be OK. It’s art. Anything can happen in art. She’s just got a wealth of information of different things to try, different materials to use, different ways to use certain media.

While Mary expressed that professional development is “always good to get a refresher, especially with some things that you might have forgotten,” she explained that

she sometimes felt like it was a “wasted day.” She explained that sometimes it is “harder to be at a professional development than just in my classroom [teaching] because I always have to reteach whatever was taught before.” While Mary explained that professional learning can be beneficial, especially if it is relevant to a teacher’s specific grade level, she felt like “there’s so much else on our plates that . . . I can’t immediately think about how I can use it. So, I’m already done with it, you know?” Mary preferred taking her own initiative and looking on TikTok or Facebook for innovative ideas that she may want to incorporate into her lessons rather than sitting through a professional development that may not be relevant for her class.

Recommendations

Mary created several recommendations for teachers and administrators based on her experiences with arts-integrated STEAM. For teachers, she explained how important it is to stay committed to the purpose behind arts integration:

It’s easy to go back to “the old way”—deliver a lesson, have them perform something, move on. Always remember you’re trying to connect to the kid and have them try to take that connection and build something with it. Doing it through art—some kind of arts—is a great way for them to remember. So, you’re really trying to have them instill that memory. Don’t lose that focus.

For administrators, she expressed the importance of having “a classroom set of all the art materials that [teachers] need . . . totally fully stocked all the time,” because STEAM can be expensive. She explained that while her school typically supplied the necessary materials, she sometimes had to purchase supplies with her own money. She

also stressed the importance of supporting teachers throughout the transition to STEAM. She urged administrators to:

. . .support your staff—really provide that support. Have somebody come in and talk to them or give them examples of what it could look like. What different things have been successful? Make sure it's streamlined through people, so have department heads or something, then delegate out or have people volunteer so that way it's not all on one person. Make sure you're sharing the load and you're just being supportive. Have a reasonable timetable to get it all done . . . Help [teachers] with ideas. Get them in contact with somebody from the district or someone else in the building who's good at it. Help them.

Summary

Mary's journey into STEAM was shaped by her background as a geologist and her natural inclination towards the arts, which helped her transition easily to arts-integrated STEAM teaching. Although she initially felt overwhelmed by the demands of elementary teaching and the addition of arts integration, she began to see arts integration as a powerful way to deepen student learning through making connections. Over time, Mary's teaching evolved from surface-level content delivery to richly connected, interdisciplinary learning experiences that built student understanding through creativity and collaboration. Now confident in her practice, she serves as a model for innovation among her peers, while navigating the continued challenges of time management and testing constraints. Her story underscores the importance of teacher support, access to resources, and staying focused on the meaningful impact arts integration can have on students' learning and growth.

Conclusion

In this chapter, I took the experiences of six classroom teachers at STEAM-certified schools and crafted unique narratives highlighting their transition from traditional methods to arts-integrated STEAM, detailing the challenges and the growth they experienced throughout their journey. While each teacher initially described the transition to STEAM as overwhelming, intimidating, or even shocking, they began to recognize the benefits of arts-integrated instruction after witnessing its positive impact on both students and themselves. Based on their experiences, each teacher expressed the benefit of having support from colleagues and administration, access to materials, and quality professional development to aid in STEAM implementation. In the next chapter, I will discuss the themes that emerged in greater detail, which will offer a deeper insight into the meanings the six participants constructed as a result of their individual journeys.

Chapter V

Themes

In this chapter, I will discuss three themes that emerged through cross-narrative analysis of the six participants' experiences. The themes are as follows:

1. Inclusive, Purposeful, and Interconnected Learning
2. Fear to Empowerment
3. Prior Experiences

I reached these three themes through five different coding methods: descriptive, In Vivo, narrative, values, and pattern coding (Saldaña, 2021). I began with descriptive coding to develop a general understanding of each participant's data and to group portions of the data for later reference. I then isolated key quotes using In Vivo coding, which later helped me deduce overarching themes. After descriptive and In Vivo coding, I used narrative coding to identify narrative elements, sociality, time and place to *re-story* each participant's experience into a cohesive story. Then, I combed the data using values coding, noting things the participants valued, their attitudes, and beliefs, paying close attention to if and how their values changed over the course of the participant's story. Finally, I looked across the codes and the participant narratives to identify common patterns, which were then used to create the overarching themes. I developed the themes by writing detailed memos after coding. In addition, the themes directly relate back to the research questions used to guide this study:

RQ1: How do elementary classroom teachers describe their experiences with traditional teaching methods as compared to their experiences with arts integration at schools pursuing STEAM certification? (*Theme 1*)

RQ2: How did the participants navigate the transition to arts-integrated STEAM? (*Themes 2 & 3*)

RQ3: What are the participants' recommendations for transitioning from traditional teaching methods to arts-integrated STEAM? (*Theme 2*)

I will highlight how each theme emerged from the participants' narratives in the following sections.

Theme 1: Inclusive, Purposeful, and Interconnected Learning

Arts-integrated STEAM instruction fostered more inclusive, purposeful, and interconnected learning for students than traditional methods. All six teachers had a similar definition for traditional teaching methods. They each described it as teacher-led and worksheet-based, with subjects taught in isolation, followed by some form of assessment. Aubrey shared that her students found traditional methods boring, often protesting with, “*another* worksheet.” She painted a scene with herself at the front of the classroom, students at their desks. She was the giver of information; they were the receivers. She did most of the talking. Students were expected to listen compliantly. Lessons typically ended with a worksheet-based activity or assessment. The five other participants echoed this description.

Increased Student Engagement

After transitioning to arts-integrated STEAM, all six participants expressed a drastic change in their students' engagement and behavior, shifting from complaints over

“*another* worksheet” to believing school can be relevant and fun. Sally illustrated this powerful shift as she explained how STEAM positively impacted her students:

If you came in my room, you would think the kids are out of hand because they’re talking so loudly and they’re up—they’re out of their chairs and they’re creating, but they’re really working. So, with STEAM, my classroom has gone from traditional—sit and do your work—to collaborating and working together and building as a team. Those kids that normally would get in trouble because they can’t sit still—they’re thriving in this environment because of STEAM.

This stark contrast to the traditional picture Aubrey described was also echoed by Elizabeth as she described her students’ response to STEAM:

When we got our STEAM certification . . . and [saw] how our kids were affected by it, you can literally see that your kiddos who [were] not engaged during the day suddenly became engaged because they don’t have to write it down in a journal. They don’t have to write about it on a worksheet. They can get up and they can show through movement or painting or coloring or instruments. It’s just made a huge difference, and I think we can see it.

All six teachers describe a similar change in their students—moving beyond traditional, worksheet-based methods that was stifling for some learners to an engaging and hands-on learning environment that encouraged all students, especially those who were initially reluctant to participate, to create, engage, and succeed.

Purposeful and Interconnected Learning

All six teachers also expressed how transitioning their teaching methods to arts-integrated STEAM prompted them to establish a purpose for learning and connect it

across multiple content areas. This allowed students to make deeper connections and apply new concepts across disciplines. Nicole explained, “[Learning] shouldn’t be segmented. Life isn’t segmented.” Sally echoed this sentiment when she expressed, “[STEAM] truly help[s] the kids see beyond the walls of the school. It helps them see how their community is in play.”

All six teachers illustrated the interconnectedness of STEAM by detailing specific lessons that allowed students to make deep connections across content areas: Daisy had students create a new way to feed goats; Sally developed public service announcements to teach about germs; Nicole taught economics through a market day; Aubrey explored hornworm lifecycles in their school garden; Elizabeth explored animal traits by creating Eric Carle–style murals; and Mary used puppet shows to teach fairy tales and shadows. This level of integration required intentional collaborative planning, which all six teachers described as being central to successful STEAM implementation.

Inclusivity Through Student Choice

The addition of arts-integrated STEAM provided students with more autonomy in how they learned and how they demonstrated what they learned. Nicole, Elizabeth, Daisy, Sally, and Aubrey expressed how they gained a deeper insight into their students’ understanding when students were given a choice on how they expressed their learning. Aubrey and Elizabeth described a proud moment when students who typically could not express their learning in a traditional way, such as writing it out, did so using a different mode of expression. Aubrey recalled:

I [taught] cotaught, so I had several [students] who were still on a kindergarten reading level [in second grade]. But in those arts integration projects, they were

really able to show what they knew and participate because it wasn't [about] having to sit down and read something or write out answers. Just watching some of those lower kids really come out of their shell and be excited to participate and show that they were learning—they just couldn't express it on paper the same way.

Elizabeth echoed this sentiment when she said:

[STEAM] gives every single student an opportunity to show that they know something in different ways . . . [I]n the past, you feel like your kiddos weren't given too much of a choice. It was, "You have to do this. This is the way you have to do it," and it's not like that anymore. [STEAM] gives them more opportunities.

Student choice became central to Nicole's teaching style once she started utilizing arts-integrated STEAM on a regular basis. She explained that using student input allowed her to tailor her instruction to better suit her students' learning styles, while exploring creative alternatives that she would not have developed herself. The inclusive nature of STEAM allowed her students space to demonstrate their understanding through choice and different modes of expression as opposed to traditional written assessments.

Common Challenges

While most of the teachers expressed how interdisciplinary STEAM projects were engaging and inclusive for all students, five of the six teachers expressed the initial challenge of planning new integrated PBLs. Nicole, Aubrey, Daisy, Sally, Elizabeth each expressed how they all initially felt overwhelmed when trying to find standards that naturally integrated across disciplines in meaningful ways. Sally expressed that as she planned one of her first PBLs, she felt defeated and "like I wasn't a good teacher" because she was trying to force too many standards into a single unit, rather than focusing

on meaningful integration. Once she learned that the units did not have to encompass every standard, she felt like it was “a breath of fresh air,” a sentiment also echoed by Daisy, Nicole, Aubrey and Elizabeth. Once these teachers embraced the idea of natural integration, their attitudes shifted from being initially overwhelmed to feeling more confident and willing to take risks.

Several teachers pointed out the constant struggle of trying to fit STEAM into the traditional framework defined by mandatory standardized testing and district-imposed time constraints. For example, Nicole and Mary explained the dissonance between the open-endedness of STEAM and the rigidity of standardized assessments. Nicole expressed that on standardized assessments, “You don’t have choice . . . it’s either right or wrong. That’s when [STEAM] becomes a little complex—just meshing and matching everything together.” Mary explained that due to time constraints, “the first thing to go is arts integration because I need to get this XY and Z [taught] because they need that content to be able to perform well on a test.” Sally, on the other hand, found that she could use innovative test preparation strategies that utilized arts integration. She illustrated this by detailing a lesson where she cut up test questions, placed them in plastic eggs, and hid them around her classroom. Not only were students up moving their bodies—an arts-integrated strategy—but they were answering questions to prepare for a traditional assessment. Sally, Daisy, and Nicole reiterated how they had to balance traditional district requirements and arts-integrated STEAM.

Summary

All six teachers emphasized how their teaching was different now that they utilized arts-integrated STEAM. They explained how teaching and learning became more

engaging, meaningful, and inclusive for all learners as opposed to the rigidity of traditional teaching methods. While Aubrey and Mary explained that traditional teaching could be viewed as being the easier of the two methods, all six teachers described how the student-led nature of STEAM was more purposeful, while helping students make connections that they may otherwise overlook. The more experience teachers had with arts-integration and STEAM, the more they expressed that integration was a more meaningful and holistic teaching method as compared to teaching in isolation. Mary described arts-integration as having, “the biggest bang for your buck” because a two-week puppet show unit hit multiple skills that would have taken twice as long to teach in isolation. Although the transition to this approach presented initial challenges, especially around planning and balancing expectations within a traditional, test-driven system, teachers continued to make arts-integration a priority for the benefit of their students.

Theme 2: Fear to Empowerment

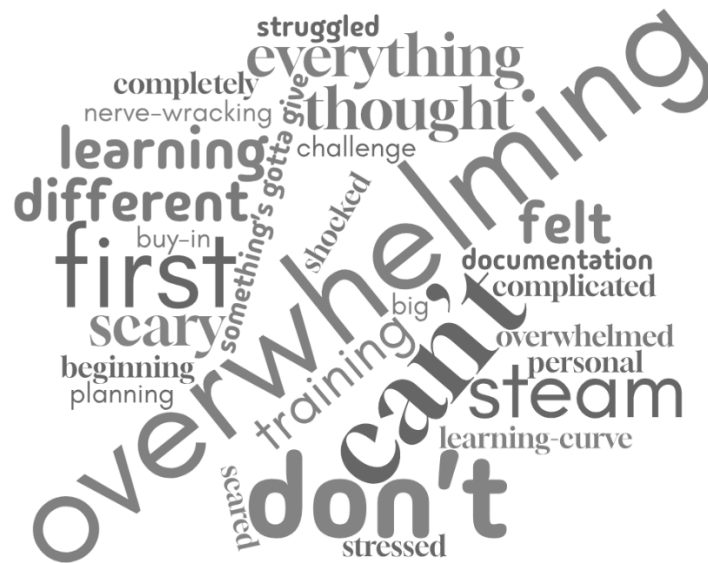
Arts-integrated STEAM required all six teachers to shift their teaching methods from a rigid traditional style to a more purposeful, relevant, hands-on, and student-centered way of teaching. Because of this drastic shift, the initial transition to STEAM was not an easy one for all six participants. Collaboration, professional development, and empathetic support transformed initial fear into a sense of empowerment for all six teachers.

When asked about the initial shift, all six participants described the start of their journey as being emotionally taxing and challenging, collectively using the words “overwhelming” 12 times, “scary” 10 times, along with other stress-related terms such as “nerve-wracking,” “shocked,” “big learning curve,” “huge transition,” “complicated”,

and “confused.” Because all six participants used similar words to describe the stress of the initial transition, I created a word cloud of the responses below (see Figure 2).

Figure 2

In Vivo Word Cloud



By the end of their journey, all six participants spoke positively about STEAM and expressed the benefits for both teachers and students. This positive outcome was made possible because each participant obtained support through collaboration, professional development, and administrative support, which left them feeling prepared and ultimately empowered.

Initial Sense of Fear

All six participants began their journey to STEAM with an initial sense of fear. This fear ranged from feelings of inadequacy, the burden of additional responsibilities, or confusion over what STEAM encompassed. Elizabeth, Sally, and Daisy had little to no arts experience, so their initial fear stemmed from the belief that they were ill-equipped to teach art. Elizabeth illustrated this sentiment when she admitted, “How am I gonna teach

my kids these artistic skills when I can't even do it myself?" Sally echoed Elizabeth's fear when she explained, "[It was] scary because . . . I wasn't an art teacher. I thought you had to be an art teacher in order to include the arts." Daisy was worried about learning a new style of teaching and reflected, "[W]e had to completely change how we're doing everything . . . It was very scary." Adding to their fears, Daisy and Sally also taught at the only school in their district pursuing STEAM certification, which left them feeling a sense of isolation due to the lack of peer and mentor support needed during the transition.

Mary, Nicole, and Aubrey had the initial sentiment that STEAM was just another responsibility added to their already full plates. Mary and Aubrey were both navigating significant life transitions when they began attending STEAM trainings—Mary was moving from middle school to elementary school, and Aubrey was moving from pre-K to elementary. In addition to adjusting to new grade-level expectations, both teachers were simultaneously learning how to implement arts integration and STEAM in their instruction. Mary recalled how she initially felt about STEAM as she recalled, "So, here they're telling me you have to do all this [to teach elementary school], and now you're going to include art? I thought the concept was cool, but it did feel like one more thing." Aubrey echoed this sentiment when she said, "It was a lot of neat stuff, but it was very overwhelming . . . It felt like a lot of extra stuff we were going to have to do on top of all the stuff we already have to do." Collectively, all six teachers were concerned that STEAM would require them to adopt a new way of teaching, while adding the arts to an already demanding workload.

Support

Eventually, all six teachers were able to overcome their initial sense of fear through a variety of support systems throughout the process. Collaboration, professional learning, and empathetic support from administrators were three areas all six teachers mentioned as being imperative to their personal growth. The following sections describe how each of these forms of support contributed to their successful transition.

Collaboration. Collaboration was a key component to the successful transition of all six teachers. Specific collaboration will be discussed, including collaboration with colleagues, specialists, and designated STEAM committees.

Colleagues. All six teachers referenced the importance of intentional collaboration with the colleagues on their grade level teams. In doing so, teachers were able to feel supported by planning, sharing individual skillsets, or just having an empathetic ear in times of struggle. Team collaboration brought out the strengths of some team members which benefited the whole group. Mary emphasized this as she described a close colleague that had “a wealth of information of different things to try, different materials to use, [and] different ways to use certain media.” Aubrey echoed this as she described the collaborative dynamics of her second-grade team. She explained, “For a while, the head art person at our school was on the second-grade team, which helped because she had wonderful ideas.” Elizabeth echoed drawing from others’ expertise as she said, “You lean a lot on your team—just throwing out different ideas. We’ve all been working in the school system from two to twenty-five years, and we all have our own ideas of things.”

Collaborative planning also helped ease the burden of additional planning that some teachers initially feared. For example, Nicole explained, “Collaboration makes everything easier—just working together and pulling out the standards that work together.” Sally emphasized the collaborative nature of STEAM, saying, “You can’t do STEAM solo. It’s hard to try and do it all by yourself.” The teachers also found comfort in having trusted colleagues go through the process with them. Mary expressed how a specific colleague would help her whenever she was feeling “frantic” about STEAM:

She is just a naturally calming person, that if you feel frantic about something . . . in this case planning something arts integrated, she’s . . . reassuring that everything’s going to be OK. It’s art. Anything can happen in art.

Even though Sally and Daisy felt isolated for being the only STEAM school in the district, they knew their colleagues were going through the same situation and found comfort in that. Sally said:

[We] really just leaned on each other. Like I said in the beginning, a lot of teachers were wary going to STEAM . . . Really just leaning on each other and trying to see the positives of what STEAM did—and now that we see the positives, just keeping that image of what STEAM does for our class, and being able to teach it to the new teachers that come in.

While collaboration helped all six participants balance the demands of STEAM, it needed to be intentional to be beneficial. Nicole had four new team members, which changed the dynamic and shifted the team focus away from STEAM. She expressed that she wanted to make STEAM more of a priority in the coming year. Elizabeth echoed this sentiment when she said, “[Our planning] is very intentional that we integrate the arts

every week . . . Definitely make it intentional.” The teachers agreed that without deliberate and purposeful collaboration, sustaining a strong focus on arts-integrated STEAM would be difficult.

Specialists. Five of the six teachers referenced the wealth of knowledge the art, music, and physical education (PE) specialist teachers brought to intentional collaboration. Elizabeth recalled that everyone ran to the art teacher for support after her school found out they were pursuing STEAM certification. Likewise, Sally described the enrichment the specialist teachers brought to her lessons:

Our specials teachers are phenomenal—just the ideas they have—and how I can say, “I want to do this,” and they’ll just be like, “Oh, but we can add this part of STEAM into it and turn it into this.” So, I start in my classroom, and they finish it in specials. It’s just wonderful collaboration.

Daisy also expressed how the media arts teacher modeled how to make the arts intentional and meaningful. Similarly, Nicole emphasized the value of collaboration with specialists and instructional coaches as she suggested:

Work with the specialists. Work with the coaches and use that knowledge to help build your lessons. Ask questions and get the materials that you need because it can be done. But, sometimes, you need somebody else to help you do so.

Committees. Daisy, Sally, Aubrey, and Nicole each had schoolwide committees dedicated to arts integration and STEAM, which they attributed to a great source of collaboration and ongoing support. Sally, especially, benefited from her local “STEAM Team.” Sally had one of the most significant transitions into STEAM as she initially described herself as “a Negative Nancy” and a “control freak” upon learning of her

school's STEAM initiative. She felt isolated during this transition and placed tremendous pressure on herself to succeed, which left her feeling "very heartbroken, very defeated. I felt like I wasn't a good teacher. I honestly contemplated if I was supposed to be a teacher anymore because it was [pauses] it was very hard." To combat this feeling of isolation and being unprepared, she took charge of her situation and joined her school's STEAM Team to attend additional trainings, school visits, and be a part of a supportive community that would ultimately help her get through the transition. Collaboration with colleagues and specialists helped Sally and the other five participants better navigate the transition to STEAM.

Professional learning. Another step all six teachers took to overcome their initial uncertainty of STEAM was to participate in various forms of ongoing professional development. This included professional development courses, school visits, observing mentor teachers, and self-directed professional learning. Professional development gave all six teachers greater clarity on what STEAM encompassed, tools to implement in their classrooms, and the understanding needed for successful implementation.

Ongoing professional development courses. Sally, Daisy, Elizabeth, and Nicole each referenced professional learning courses as a crucial part of their successful transition to STEAM. Among the six teachers, Elizabeth, Sally, and Daisy had the most limited artistic background, which attributed to their initial concern over their ability to teach the arts. To overcome feelings of inadequacy, Elizabeth attributed ongoing professional development to helping her understand more of what the arts encompassed, giving her a greater confidence in her ability. She said:

We started taking professional learning courses, and come to find out, [arts integration] is not just art, it's not just painting . . . It's musical instruments, it's role-playing and theater. It's movement. It's drama . . . But as soon as we went through all the professional learning courses, I think we all were able to breathe a little easier. It was one of those things where we said, "Oh my goodness, we're already doing these things."

This was also true for Sally, Daisy, and Nicole who each had a similar experience with professional development, which helped them develop a greater understanding of the arts and how to integrate it into their classroom in meaningful ways.

Ongoing professional development required a lot of time since it was offered after school or during the school day. Sally initially struggled with the time commitment because she felt as if "[administrators] didn't care for our time and our personal lives after school." After completing the professional development, she began to see the value, saying, "I guess after a full year of it and seeing what it did bring to us and where it got me, it was all worth it in the end." Daisy mentioned that because teachers were required to completely transition their teaching from traditional methods to STEAM, she felt as if the professional development "wasn't as intense as it probably should have been," even though it was offered twice a month. This further illustrated the value she placed on quality professional development and the positive impact it had on her practice.

A life-long learner, Nicole highly valued attending professional development courses and believed they allowed her to not only gain new skills but collaborate with other teachers across the district. Her main piece of advice for new teachers transitioning to STEAM was to "definitely attend trainings, especially those that aren't required."

Through these trainings, Nicole was able to deepen her understanding of arts integration and STEAM and build a toolbox of new strategies to apply in her classroom.

School visits. Another type of professional development that helped teachers transition to STEAM was the opportunity to visit other STEAM schools to see arts integration in action. Sally and Nicole had specific experiences that positively impacted them and gave them confidence in their own transition.

Sally initially felt a sense of loneliness early in her transition as Willowbrook was the only school in the district pursuing STEAM certification. The teachers were all learning together, and the task of planning year-long PBLs felt overwhelming because they believed they had to pack as many standards as possible into a single unit. This left Sally feeling defeated and questioning whether she should remain in the teaching profession. Finally, she was able to observe other STEAM schools and see how they planned and implemented year-long PBLs, and she realized the importance of natural integration. After seeking advice from other experienced teachers and seeing implementation in action, Sally regained the confidence she lost and felt empowered to implement STEAM at her own school.

Nicole had a similar experience with a school visit towards the beginning of her transition to STEAM. Nicole was initially confused about STEAM and the requirements for certification, but after seeing STEAM implemented with fidelity at a neighboring school, she felt confident about her own implementation of STEAM. Regarding this school visit, she explained:

It was amazing to see how the students expressed themselves, [and] how they could meet the learning targets through arts. And it was all of the kids . . . So, I was like,

“We can do this. This is something that can be done.” . . . That was amazing seeing that in that school environment, and it’s pretty close to us, so, I was like, “OK, that should work for us too.”

Seeing a school in a similar location and demographic be successful with STEAM gave Nicole clarity and confidence as she brought STEAM practices back to her own school.

Mentorship. Another form of professional development that was helpful for four of the six teachers was model lessons presented by mentor teachers. Elizabeth, Nicole, and Aubrey work in Silverleaf County, which has a specific professional development program for schools pursuing STEAM certification. During this program, a STEAM professional learning specialist would come to their school several times throughout the semester and model STEAM lessons with their students while the teachers observed. All three teachers found this experience to be highly beneficial. Nicole expressed, “Seeing lessons in real life [was] very helpful.” Aubrey explained, “[The professional learning specialists] were always super available to come in and help model a lesson or help you write a lesson or observe . . . They were super supportive.” Elizabeth explained, “[The professional learning specialists] would actually come into our classroom and work with our kids and say, ‘OK, this is what it looks like,’ and we were able to reach out to them and say, ‘Hold on, what was that game you played again? Can you send us that?’” All three teachers benefitted from seeing STEAM in action with actual students, in addition to the collaborative and supportive nature of the professional learning specialists. They were available for feedback, collaboration, and overall support, which aided all three teachers as they brought the new techniques back into their classroom.

Aubrey and Nicole also had an arts integration specialist at their school who regularly met with teachers to help with planning, integration, and feedback. While Daisy did not have direct access to model lessons like Elizabeth, Nicole, and Aubrey, she mentioned that she believed having access to a mentor teacher would have helped her in her transition. She described wanting a professional mentor who modeled lessons, gave regular feedback, and helped to create lesson plans. She described this type of mentorship as “the number one thing” that would help someone successfully transition to STEAM.

Self-directed. Mary did not attribute the same value to professional development courses and mentorship as the other teachers. Instead, Mary found self-directed professional development to be more meaningful than what was offered by her district. Self-directed professional development is informal professional development using teacher blogs or social media platforms. While Mary worked at the same school as Elizabeth and had access to the same professional development, she explained that she rarely applied the techniques after the training. In addition, she explained that the material was either irrelevant or was delivered past an opportune time to use it again with her students. Rather than depending on formal support, Mary sought out arts integration strategies on platforms like TikTok and Facebook, using her scientific inquiry background to explore, evaluate, and ultimately find the guidance she needed.

Administrative support. Another support system that all six teachers highlighted as a key factor in their success was administrative support, specifically empathetic listening and providing materials. Pursuing STEAM certification was primarily an administrative decision, so consistent administrative support was crucial to build teacher buy-in and confidence with STEAM implementation.

Empathetic Listening. All six teachers expressed feeling supported by a leader who listened and made adjustments based on teacher feedback. Daisy's administrator allowed the teachers to adjust the district provided scope and sequence to allow for natural integration. Other schools are not allowed to do this, and it meant a lot to Daisy because she believed the principal was listening to what teachers needed and made adjustments to help them succeed with STEAM. Sally and Aubrey felt supported when their administrators empathized with the teachers and did not place unrealistic expectations on them. Sally expressed, "Admin truly [understood STEAM was] a change in our normalcy and that we're under pressure and the stress. So, they really did try to help alleviate any of those worries that we had." Aubrey echoed Sally's sentiment as she explained how an empathetic administration can help alleviate teacher stress:

Be supportive. The certification process is a lot with people coming out and doing walks . . . I think having supportive admin [that] will sit down in meetings and help come up with ideas [and] listen to the teachers when they say something might be too much or not manageable.

Nicole and Mary highlighted administrative support in the form of responsive listening and professional development that was adjusted to reflect the needs of teachers. Nicole explained:

As an administrator . . . just support the teachers and get them what they need. Have those meetings. Have those conversations. Teach the teachers how to do it, and it makes life a lot easier. It will be better quality lessons for students and for teachers.

Mary had a similar suggestion when she explained, “Support your staff. Really provide that support. Have somebody come in and talk to [the teachers] or give them examples of what it could look like . . . Have a reasonable timetable to get it all done.”

All six teachers felt supported when their administrators took the time to listen and offer support where teachers needed it. The transition to STEAM was challenging but having an empathetic and responsive administrator helped ease the process and build teacher confidence. Sally summed this up when she said:

I recommend that [administrators] . . . [are] understanding with their teachers, to know that the teachers are going to resist at first, but if they just keep a positive outlook and help their teachers out when these problems arise, that the teachers will get on board.

Materials. Another way all six teachers felt supported was when their administration provided the necessary arts materials to implement STEAM. Arts integration in STEAM requires many consumable supplies, that require additional funding. Daisy explained this when she said, “I feel like if you’re a STEAM school, you should also have additional funds because we are using and doing and making so much more than another [non-STEAM] school.” As Elizabeth put it, “The more creative you get, the more you have to ask for.” Every teacher expressed a need for additional supplies to support STEAM implementation, often having to purchase the materials themselves or request donations from parents. Sally explained, “I think about all of the projects that we do. And we have great parents at the school that always send in those supplies, but it does get expensive depending on the projects that you pick.” When asked about how administration could further support teachers transitioning to STEAM, they all expressed

a need for a class set of additional basic arts supplies, such as construction paper, acrylic paints, watercolors, pastels, and the like. Elizabeth's administrator made a point to support her staff in this way. Elizabeth said, "I don't know which fund it comes from, but . . . [our administrator] is very passionate about the arts, so most of the time, she'll say yes. I think that you need to have a leader that's also really passionate." Mary and Aubrey expressed a need for funds to purchase additional technology for digital arts integration. Aubrey explained, "I think [we need] more technology like iPads, access to those 3D printing pens, and access to more technology to make [STEAM] easier." Overall, all six teachers emphasized a desire for consistent administrative support in funding and providing arts resources as an essential component for sustaining meaningful STEAM integration and taking the financial burden off teachers.

Summary

All six teachers began their transition to STEAM feeling overwhelmed and underprepared. After being continuously supported through purposeful collaboration, sustained professional development, and ongoing administrative support, all six teachers ended their transition with a sense of empowerment. Sally explained this process as she reflected:

I guess if I had to simplify [my experience], I was scared, overwhelmed, [and] felt pressured into doing it. And after really doing my research and working with admin, working with our team, I realized that it wasn't that scary. It's very simple, and it's really fun. I really do love STEAM. It's a big transition, but it's worth it.

Daisy expressed that she could not imagine going back to the traditional way of teaching. Nicole emphasized making STEAM a priority and mentoring new teachers. Elizabeth and

Mary expressed the positive impact STEAM had on students. Aubrey, who moved from a STEAM school to a traditional school, reflected on how she believed STEAM was a more efficient and relevant form of teaching. Collectively, their experiences reflected a shared sense of empowerment, having overcome the initial challenges through ongoing support.

Theme 3: Prior experiences

While each teacher initially felt overwhelmed with STEAM, those who had prior experience with the arts and/or prior experience with a similar transition were faster to accept STEAM and buy-in to implementation. Specific examples and the impact on teacher adaptation will be discussed.

Experience with the Arts

Of the six teachers interviewed, three teachers described themselves as being artistic. Aubrey dabbled in crafting, Nicole participated in middle and high school theater, and Mary had many artistic interests. Each teacher described their initial feelings towards STEAM in a more succinct and less emotional way as compared to the teachers without artistic experience. For example, Nicole explained her initial reaction as being “confused.” Aubrey and Mary both described their transition as “overwhelming,” but they were also switching grade levels, which may have also contributed to their feelings of being overwhelmed. Although all three teachers described feeling overwhelmed at first, each followed up with something positive: “I was also excited” (Aubrey), “I thought the concept was cool” (Mary), and “I was always interested in it” (Nicole). On the contrary, Daisy and Elizabeth had no artistic experience, and while Sally took chorus in middle school, she also described herself as having no prior artistic experience. The three

teachers without an artistic background spent a longer time detailing their negative feelings in the beginning of their journey to STEAM, illustrating how the initial transition was more challenging for them compared to the teachers with experience in the arts.

While Daisy and Elizabeth did not have the same artistic experience as the other teachers, they did have a background in sports. When integrating the arts in their classroom, both Daisy and Elizabeth said they were more likely to integrate movement as an artform as opposed to visual arts or music. Sally had experience with chorus, and she described how she leaned towards integrating music as her preferred artform. Similarly, Nicole loved theater, and she continually expressed the importance of drama and self-expression. Lastly, generalists, such as Aubrey and Mary, were more willing to take risks and try new modes of art compared to the other participants. This further demonstrates that an individual's prior experiences strongly shape their approach, preferences, and adaptability when navigating change.

Experience with a Similar Transition

Elizabeth, Aubrey, and Nicole had prior experience with STEM and arts integration certification, which eased their transition into STEAM certification. Conversely, Mary, Sally, and Daisy did not have experience with a similar transition and had mixed feelings about the process.

Elizabeth knew of Maple Grove Elementary's reputation of being a prestigious STEM school within her district when she initially interviewed. She took the opportunity to learn from her peers and become an expert on integrated and interdisciplinary instruction, which was a requirement for STEM certification. Even though she initially felt overwhelmed and underprepared when learning about her school's STEAM initiative,

she quickly overcame her initial misgivings and became a leader on her team and in her school. Elizabeth realized that she had already been doing arts integration in her classroom all along, which renewed her confidence and self-efficacy with STEAM implementation. She already had the knowledge and experience for interdisciplinary teaching, so adding an additional component did not seem as daunting after getting professional development and support from administration.

Similarly, Aubrey and Nicole had previous experience with arts integration certification and later STEM certification. STEAM certification seemed only natural, since in Nicole's words, "It [was] something we're already doing anyway, so you might as well get the credit for it." Aubrey and Nicole's school, Cedar Ridge, initially pursued arts integration certification, so they had prior experience integrating the arts throughout multiple content areas. Later, they obtained STEM certification, where they gained experience with planning and implementing PBLs and interdisciplinary instruction. Because they were already utilizing arts integration and planning interdisciplinary PBLs, STEAM became a natural byproduct. Both Aubrey and Nicole had an easy transition to STEAM, aided by their prior experience with two similar certifications.

Sally and Daisy did not have a similar transition with which to compare STEAM certification, so they both described feeling alone in their journey. Sally, in particular, had a difficult time initially adjusting to the change. She initially described herself as a "Negative Nancy" and quipped, "If it isn't broke, don't fix it" regarding traditional teaching. After getting the necessary support and seeing the positive impact on her students, she became an advocate for STEAM and had one of the most meaningful transitions among the participants.

While Mary did not have experience with a similar transition, she had the most arts and scientific inquiry experience, so she had a relatively easy transition to STEAM. After being trained on the basics of STEAM and arts integration, Mary realized that she had been doing arts integrated strategies all along. When asked if her teaching outlook had changed, she replied, “I don’t think my teaching has changed per se because I just do what’s best for kids . . . because they’re the reason I’m here.” Rather than drawing on prior experience with a similar transition, Mary utilized her prior experiences with the arts and science to have a successful transition to STEAM.

Hands-on Experiences Strengthened Teacher Buy-In

Although all six teachers began their journey into STEAM with trepidation, they all ended their journey feeling empowered and seeing value in STEAM as a teaching method. As the teachers devoted more time to refining their practice and STEAM implementation, they were able to witness tangible results that ultimately reinforced their positive perceptions of STEAM. They each described how STEAM increased student engagement, reduced behavior issues, and made learning more enjoyable for both teachers and students. Specifically, the word “fun” was collectively used 20 times to describe STEAM. To illustrate this, Sally explained, “I really do love STEAM. It is very fun . . . It’s a big transition, but it’s worth it . . . My negative mindset went to a positive. Almost like a breath of fresh air.” As teachers were able to build positive experiences, their confidence with implementation began to grow. When asked what helped Daisy the most with STEAM implementation, she replied, “I would say actually getting in the classroom and doing it and going through the design thinking process.” Once the teachers

had more experience with implementation, they began to realize that integration came naturally, giving them confidence. Elizabeth described this when she said:

As soon as we went through all the professional learning courses, I think we were able to breathe a little bit easier and it was one of those things where we said, “Oh my goodness. We’re already doing these things, but now they just have a fancy name . . . Now that we’ve got everybody on board, everybody seems to love it.”

STEAM transformed teaching and learning into an experience that was relevant, engaging, collaborative, and innovative for both teachers and students. Elizabeth, an 18-year veteran teacher, summarized this notion as she expressed, “Arts integration is absolutely one of the best strategies that I’ve ever used in teaching.”

Summary

The experiences of these six teachers revealed the transition from traditional teaching methods to arts-integrated STEAM was complex, challenging, rewarding, and shaped by prior experiences, resources, and support. While each journey offered a unique viewpoint into their experience, each teacher ultimately overcame their initial fear and gained confidence through meaningful collaboration and support. The themes I discussed in this chapter highlight the transformative potential of arts-integrated STEAM, addressing RQ1, and ways to ease the transition for future teachers, addressing RQ2 and RQ3. In the following chapter, I will synthesize these findings, discuss their implications for practice, and offer recommendations for educators and school leaders who are seeking to navigate a similar transition to STEAM.

Chapter VI

Discussion and Conclusion

In this section, I will examine the themes in greater depth, using the study's guiding theoretical frameworks and insights from the reviewed literature to frame the discussion. Connecting the findings of this study to existing research helps contextualize the themes within the wider body of knowledge on arts-integrated STEAM. Practical implications for teachers, administrators, and policy makers will also be discussed. The practical recommendations taken from teacher experiences may provide teachers and administrators with strategies to help ease the transition to arts-integrated STEAM practices. Implications for future research and limitations will also be discussed.

The purpose of this study was to explore the experiences of classroom teachers at STEAM-certified schools by sharing their personal journeys as they transitioned their teaching practices to include regular arts integration and the meanings those experiences had for them. The results of this study can be used to advocate for the necessary resources and support systems to make the STEAM certification process more manageable and sustainable for educators. In this chapter, I will discuss the existing literature and how it relates to the thematic findings of this study. I will discuss the themes and literature related to inclusive, purposeful, and interconnected learning, moving from fear to empowerment, and how the teachers' prior experiences shaped their current realities.

Inclusive, Purposeful, and Interconnected Learning

The teachers' reflections revealed a sharp contrast between the rigidity of traditional instruction and the inclusive, purposeful, and interconnected learning they experienced through STEAM. The description of traditional teaching was similar for each teacher—a teacher-centered, worksheet-based teaching approach that was rigid, isolated, and “boring” for students, although efficient for test preparation. The teachers' shared definition was supported by existing research, as a study conducted by Schmidt (2011) explained that traditional teaching could cause students to become disengaged and develop a negative connotation towards specific subject areas. While Asilevi et al. (2024) argued that a teacher-centered approach may be beneficial for test preparation, Tularam and Machisella (2018) explained that interdisciplinary learning, rather than traditional teaching, helped foster problem-solving and creativity, which were important skills for the evolving workforce.

These findings were echoed in the individual teacher narratives. For example, Sally explained that the interdisciplinary nature of STEAM helped increase her students' engagement, collaboration, and creativity, while drastically reducing the behavioral problems that she saw in the traditional model. This was supported by Teschers et al. (2024) who acknowledged the benefit of interdisciplinary learning, as it fostered a variety of interpersonal skills, such as diligence, openness, and flexibility. Similarly, Županec et al. (2023) noted that integrated teaching enabled students to recognize the interconnectedness of real-world phenomena, which was echoed by Nicole as she said, “[Teaching] shouldn't be segmented. Life isn't segmented.” Sally echoed this sentiment as she said, “[STEAM] truly help[s] the kids see beyond the walls of the school. It helps

them see how their community is in play.” The inter- and transdisciplinary nature of STEAM gave students an opportunity to use skills across and through multiple disciplines, as they solved relevant problems, and worked collaboratively and creatively—a stark contrast to the rigidity and disconnectedness of traditional teaching.

In addition to interconnected and purposeful learning, arts-integrated STEAM presented inclusive opportunities for all students to show their learning through different modes of representation. Inclusivity through STEAM is referenced in several studies (Braund & Reiss, 2019; Lage-Gómez & Ros, 2021; Okwara & Pretorius, 2023). Nicole, Aubrey, and Elizabeth explained that STEAM enabled struggling learners to experience success and demonstrate understanding through avenues beyond reading and writing. This was consistent with the findings of Okwara and Pretorius (2023), who explained that STEAM was more engaging than traditional instruction because it empowered students to express their understanding in unconventional ways, thus improving motivation and self-efficacy for students. Additionally, Braund and Reiss (2019) suggested the inclusion of arts integration in STEAM stimulated interest, specifically for students who found a specific subject area to be boring. The existing literature and the thematic findings of this study support the notion that STEAM not only increases student engagement but fosters an inclusive environment where all learners can succeed.

While STEAM has shown itself to be beneficial in increasing student engagement, inclusivity, and content relevancy, thematic analysis revealed several challenges with implementation. While professional development was important, Daisy and Sally felt like their personal time was not respected after school due to the intense professional learning demands required for STEAM certification. Chapman and Yates

(2023), Herro et al. (2019), and Liu and Wu (2023) also found that teachers felt there was an overall lack of time to collaboratively plan STEAM experiences and attend professional development for STEAM. The rigidity of the district-provided scope and sequence also made planning integrated experiences difficult for teachers. While Daisy was given the opportunity to adjust standards for natural integration, most teachers were not afforded the same flexibility. Nicole, Aubrey, Sally, and Elizabeth expressed how they initially felt overwhelmed when trying to find standards that naturally integrated across when planning PBLs. This is consistent with the findings of existing literature, as several studies have found that the rigidity of district-provided scope and sequence made integration difficult for teachers (Chapman & Yates, 2023; Herro & Quigley, 2017; Herro et al., 2019; Liu & Wu, 2023). In a study by Herro et al. (2019), the participating teachers had to forcibly integrate standards that did not appropriately align due to the inflexibility of the scope and sequence and the volume of standards that must be covered. As Mary and Nicole pointed out, the rigidity of standardized testing and the open-endedness of STEAM did not align. As Mary said, “The first thing to go is arts integration because I need to get this X, Y, and Z done because they need that content to be able to perform well on the test.” As Daneshpour and Kwegyir-Afful (2022) found, the traditional model currently utilized in most schools did not support interdisciplinary learning or STEAM.

Answering RQ1, the findings of this study highlighted how arts-integrated STEAM offered a purposeful, engaging, and inclusive alternative to traditional instruction. Unlike teacher-centered instruction, which may be considered rigid and boring to some students (Schmidt, 2011), arts-integrated STEAM created opportunities for students to collaborate, engage in authentic problem-solving, and express themselves

across disciplines. This method of teaching increased student engagement and decreased behavior problems. Nevertheless, systematic barriers continue to persist, such as limited planning time, inflexible district-wide scope and sequences, and the pressures of standardized testing. While the interdisciplinary nature of STEAM has proven to be beneficial for students, the current systems of teaching and learning remain largely rooted in traditional methods, therefore requiring a significant shift in policy and practice to meaningfully support arts-integrated STEAM.

Fear to Empowerment

Despite their unique backgrounds, all six teachers shared a similar journey, moving from an initial sense of fear to a growing sense of empowerment as they accessed various support systems, addressing RQ2. The initial fear stemmed from feelings of being overwhelmed, scared, underprepared, and confused. Several teachers felt as if STEAM was yet another requirement added to their already full plates. As Sally recalled, “I wasn’t an art teacher. I thought you had to be an art teacher in order to include the arts.” While three of the six teachers took an arts education class in college, only Nicole felt as if it helped prepare her to teach arts-integration. This aligned with existing research as the results of one study found that pre-service teachers were not adequately taught how to create or deliver interdisciplinary units (Boche et al., 2021). Another study revealed that a lack of understanding and self-efficacy among teachers was a barrier to arts-integrated STEAM implementation (Caton, 2021). Like the teachers in the current study, two studies revealed that while teachers valued STEAM, there was an overall lack of understanding and an expressed need for additional professional development (Alghamdi,

2023; S. Kim & Lee, 2018). Specific supports were needed to help the teachers in the current study overcome their initial fear, which will be discussed further.

Transition Theory

Through multiple modes of support, all six teachers were able to reach a place of empowerment. To analyze the types of support that facilitated this transition, I employed Schlossberg's (1981) *4 S* System of transition theory—situation, self, support, and strategies, which I will describe in more detail below.

Situation. *Situation* can be described as the duration of the transition, one's sense of control, and concurrent stress (Anderson et al., 2022). The six teachers in this study encountered these aspects of situation in distinct ways, which shaped how they perceived and navigated their transition to arts-integrated STEAM.

The duration of the change was an important factor for the teachers. Being that STEAM certification was an administrative priority, the six teachers realized that STEAM would not be a temporary initiative but an enduring expectation, thus impacting their perception of the duration. STEAM was not a fleeting educational fad; rather, it was an instructional practice they had to embrace.

Next, the amount of the teachers' sense of control had an impact on their situation. According to Anderson et al. (2022), individuals who gained a sense of control tended to feel more empowered in their transition. All six teachers gained a sense of control by joining committees, attending additional professional development courses, and collaborating with others, which will be discussed in more detail in a later section. By taking charge of their situation, the teachers were able to feel more in control of their outcome, which began to positively impact their outlook of the transition.

Concurrent stress was another factor that impacted the teachers' transitions to STEAM. For example, Aubrey and Mary were both moving to a new grade level and school during their transition. Aubrey and Mary described arts integration as an added burden on top of their existing responsibilities, likely because their immediate priority was learning the new curriculum and establishing a sense of normalcy, which took precedence over integration. Similarly, Daisy, Sally, and Nicole experienced the COVID-19 Pandemic during pivotal moments of their transition. This concurrent stress added another layer to the already stressful transition for these teachers. The teachers' perception of the duration, their sense of control, and the concurrent stress shaped the situation which influenced how they navigated the transition to STEAM. In addition to situation, an individual's sense of self also played a critical role in how the individual adapted to change.

Self. Schlossberg (1981) explained that an individual's characteristics such as psychosocial competence and life-stage can influence their adaptation to change. An individual's psychosocial competence is their attitudes towards themselves and the world. Individuals with positive attitudes are more likely to have an easier time adapting to change and have a higher self-efficacy when tackling challenges (Anderson et al., 2022). For example, Sally initially had a negative psychosocial competence, describing herself as a "Negative Nancy" and "control freak." Conversely, Mary had a positive psychosocial competence as she described herself as being comfortable taking risks and trying new things. The two teachers engaged in very different transitions. While initially resistant to change, Sally was deeply affected by the positive outcomes STEAM brought to her classroom, which made a lasting impact on her personal beliefs regarding STEAM.

Sally continuously reiterated her positive beliefs about arts-integration after having seen the benefits, and her emotion could be felt throughout the stories she told. Mary, on the other hand, always believed she was doing arts-integration, even while teaching in a traditional classroom. The shift to arts-integration did not yield the same change in Mary as it did for Sally. In contrast to Sally, Mary did not notice a change in her attitude as it remained fairly consistent, so the transition was not as impactful as Sally's. That was not to say that Sally's transition was easy; she, perhaps, had one of the most difficult, yet meaningful, transitions to STEAM. Elizabeth, Nicole, and Aubrey, on the other hand, had a positive psychosocial competence, as they described themselves as being "openminded" (Elizabeth), "always trying something new" (Nicole), and "excited" (Aubrey). This positive attitude helped them persist through challenges, which in turn, built their self-efficacy. The teachers with positive attitudes had a much easier transition than the teachers with a negative attitude.

In addition to one's psychosocial competence, Schlossberg also mentioned a person's life-stage, or peer groups with similar ages and characteristics, can impact their ability to adapt to change. For this study, the teachers' years of experience were used as their life-stage group. Based on the data, the life-stage did not make a noticeable difference in how the teachers perceived their transition to STEAM. For example, Nicole had only six years of experience compared to Elizabeth who had 18. Both teachers had a relatively easy time transitioning to STEAM. Conversely, Sally had 11 years of experience, and she had the most difficult journey. Ultimately, it was the teachers' psychosocial competence rather than their life-stage that had a greater impact on the meaning they made throughout their journey to STEAM.

Support. Another key component of Schlossberg's (1981) 4 S System is support, which refers to the interpersonal and institutional resources that help individuals navigate transitions (Anderson et al., 2022). Support systems include interpersonal support such as collaboration with peers and specialists, and institutional support, which includes professional development and administrative support. Each support system will be discussed below.

Collaboration. Each of the six teachers referenced the vital role collaboration played in their transition to STEAM. They each described how collaboration not only improved the quality of their lessons but also fostered a sense of shared responsibility, reduced feelings of isolation, and increased their self-efficacy in implementing STEAM practices. This notion of collaborative planning is supported by a study conducted by Liu et al. (2023) who found that collaborative teams planned "significantly higher quality" (p. 389) STEAM experiences as compared to experiences planned by individuals. Collaborative planning brings out the diverse skillsets each team member brings to the group. In addition, all six teachers reiterated the importance of collaborating with specialists and skilled teammates to create innovative cross-curricular projects. In their scoping review of transdisciplinary STEAM practices, Daneshpour and Kwegyir-Afful (2022) found many studies recommended collaborative cross-disciplinary planning in STEAM. The teachers in the current study were able to learn from content specialists and apply new techniques in their classrooms, or in Sally, Elizabeth's, and Aubrey's case, start a lesson in the classroom and finish it with the specialists. Sally explained this reciprocal relationship when she described:

Our specials teachers are phenomenal. Just the ideas they have. And how I can say I want to do *this*, and they'll just be like, 'Oh but can we add this part of STEAM into it and turn it into *this* . . . I start it in my classroom, and then they finish it in specials. It's just a wonderful collaboration.

Although cross-disciplinary planning is recommended, one study found that it was rarely executed due to a lack of planning time and support from administration (Caton, 2021). To address this issue, Herro et al. (2022) suggested discussing the importance of common planning time with administration as a team. Because the schools of the six participating teachers were all STEAM-certified, collaborative planning was an administrative expectation. Elizabeth explained how collaborative planning must be intentional, and arts integration must have a clear focus to develop meaningful experiences for students. Conversely, Nicole explained that due to having four new teammates, arts integration took a backseat during collaborative planning at her school. For the coming year, she explained that she wanted to make it a priority to keep arts integration at the forefront of their planning conversations.

Another mode of support was an arts-integrated mentoring program. Silverleaf County hired a professional learning specialist that would hold professional learning sessions and model lessons with the teachers' actual students. This was available to Aubrey, Nicole, Elizabeth, and Mary. While Daisy and Sally did not have access to this level of mentorship, Daisy expressed that she believed mentorship would have been the number one thing that would have helped her on her journey to STEAM. During mentor sessions, teachers were able to see model lessons and receive specific feedback and materials that they could immediately use in their classrooms. Aubrey, Nicole, and

Elizabeth found this to be extremely beneficial, while Mary saw it as an inconvenience. Teacher mentorships have been studied in STEAM-related literature. A study conducted by Chapman and Yates (2023) found that mentorship increased the participating teacher's self-efficacy and willingness to continue using arts integration, which was also true for the teachers in the current study. Similarly, in her dissertation research, Espinoza (2024) found that teachers experienced a stronger sense of self-efficacy after learning from peers who had successfully implemented specific techniques or arts-based ideas. Overall, mentorship played a critical role in shaping the teachers' confidence with STEAM implementation, highlighting it as a powerful support system for teachers transitioning to STEAM.

Professional development. In addition to collaboration, professional development played an essential role in increasing the teachers' self-efficacy, understanding, and overall implementation of STEAM. Professional development is considered an institutional support, which includes professional development courses, school visits, observing mentor teachers, and self-directed professional learning. All six teachers expressed the importance of sustained professional development, as it increased their understanding, skill, and confidence implementing STEAM. Due to the complex nature of arts integration in STEAM, studies have shown that sustained professional development is needed to educate teachers on how to effectively plan and implement STEAM experiences (Caton, 2021; Daneshpour & Kwegyir-Afful, 2022; Herro & Quigley, 2017; S. Kim & Lee, 2018; Liu et al., 2023; Spyropoulou & Kameas, 2024). Additionally, another study found that increased STEAM professional development resulted in increased teacher confidence with STEAM implementation (Herro & Quigley,

2017; Romero-Ariza et al., 2021), which was supported by the results of the current study. While professional learning is essential to effective STEAM implementation, the teachers in the current study voiced several concerns. Daisy, Mary, and Sally expressed frustrations about the lack of time to attend trainings. Daisy and Sally explained that they had to spend time away from their children, which became burdensome. This was supported by several studies where findings indicated that teachers felt there was an overall lack of time to attend professional development for STEAM (Chapman & Yates, 2023; Herro et al., 2019; Liu & Wu, 2023). Another concern was the quality of professional development. Mary explained that while she thought professional development was beneficial, she rarely used the strategies in her classroom. In a similar way, Daisy explained the professional development she had was not “as intense as it should have been” for the drastic change in teaching she was expected to undertake. In support of this, a study conducted by Kim and Lee (2018) found that many teachers were dissatisfied with the STEAM training they received, which influenced their lack of implementation in schools. The findings of the current study, coupled with existing literature, suggest that while professional development is critical to building teacher self-efficacy and understanding, teachers were concerned about the amount of time required to attend trainings and the quality of the trainings provided.

Administrative Support. Another institutional support was the empathetic leadership from administrators. All six teachers expressed feeling supported by a leader who listened, made adjustments based on teacher feedback, and did not place unrealistic expectations on them. Empathetic leadership helped all six teachers feel respected and supported, thus easing the transition to STEAM. This notion is supported by a study

conducted by Boice et al. (2021) that found that administrative support was a crucial element to the successful implementation of arts-integration and STEAM. Another way teachers felt supported was through the provision of necessary materials. As Elizabeth reiterated, the more creative the teachers become, the more supplies they need. The teachers in the current study felt supported when their administration provided the necessary tools and materials to allow for creative, cross-curricular projects. This notion was supported in existing literature (Boice et al., 2021; Razi & Zhou, 2022), as the teachers' self-efficacy increased with financial and material support, which further fueled STEAM implementation. The findings of Razi and Zhou (2022) showed teachers relied on administrative support, particularly through the provision of supplies and the flexibility to adjust scope and sequence to foster interdisciplinary connections. Daisy specifically mentioned feeling grateful that her administrator allowed the teachers at her school to adjust the scope and sequence—a luxury that her friends at other schools did not have. While the current study and existing literature highlight the importance of administrative support in easing the challenges of STEAM, the findings further emphasize the importance of additional supports to ensure that teachers can be successful and sustained throughout their transition to STEAM.

Prior Experiences

This study was developed using a constructivist paradigm, meaning the belief that an individual's current reality is shaped by their cumulative experiences. Schlossberg (1981) emphasized the importance of an individual's prior experience in her *4 S System* used for counseling adults in transition. Schlossberg posited that individuals who had positive experiences overcoming a similar transition will be more likely to successfully

adapt to a new change. In the current study, a previous experience with a similar certification had a major impact on the teachers' transition, which also addressed RQ2. Three of the six teachers had previous experience with either arts-integration certification and/or STEM certification, which helped them attribute previous successes to the current transition. Attributing previous success to a similar situation helped the teachers gain a sense of control, which then positively impacted their self-efficacy and resiliency. For example, Elizabeth, Aubrey, and Nicole had experience with STEM and/or arts-integration certification. Because of this, they had already somewhat transitioned their teaching away from traditional methods and began to integrate a new style of teaching. When it came time to fully transition to STEAM, Elizabeth, Aubrey, and Nicole had previous experience to draw upon, which helped ease the transition to STEAM. Comparatively, Elizabeth, Aubrey, and Nicole each had an easier transition than Daisy and Sally, who had no previous certification experience.

Drawing on prior experiences aligns with Dewey's (1934) theory that prior experiences with the arts cultivates knowledge that can be applied to future experiences. Dewey suggested that as an individual builds an intuition and familiarity with the arts, they were more likely to return to the arts later in life. In the current study, three of the six teachers had prior artistic experiences, which had a positive impact on their transition to STEAM. Their familiarity with the arts made incorporating artistic elements easier than it was for those without arts experience. The three teachers without arts experience had a more difficult time initially adding the arts into their daily routine, but with the necessary supports, they were able to do so eventually. Prior experience played a critical role in shaping the teachers' self-efficacy and comfort level with integrating the arts into

their classrooms. Daisy and Elizabeth described themselves as “sporty” with little experience with the arts. When asked which art form they used most often, both described movement as their preferred means of integration. Nicole, who had a background in dramatic arts, prioritized creative self-expression and theater in her classroom. Sally, drawing from her experience in middle school chorus, encouraged her students to compose and perform songs. In contrast, Mary and Aubrey considered themselves artistic generalists with experience across multiple art forms. They expressed feeling confident incorporating a wide range of arts into their teaching. Teachers who had positive experiences with the arts or with a similar instructional transition were able to draw on their background knowledge and intuition, making the shift to STEAM smoother than it would have been without that prior experience.

Summary

The purpose of this study was to explore the experiences of six classroom teachers as they transitioned from traditional teaching methods to arts-integrated STEAM practices at STEAM-certified schools. The findings, supported by existing literature, revealed that the transition to STEAM made learning more purposeful, integrated, and inclusive for students opposed to the rigidity of traditional teaching methods, addressing RQ1. While the teachers initially struggled with feeling overwhelmed or underprepared, necessary supports such as professional learning, collaboration, and administrative support helped ease the transition and eventually made the teachers feel empowered when developing STEAM lessons, addressing RQ3. I used Schlossberg’s (1981) 4 S System and constructivism as frameworks to further analyze the data, which revealed that an individual’s psychosocial competence, personal outlook, and concurrent stress had an

impact on how the individual experienced the transition. Both interpersonal support (collaboration with peers, specialists, and mentorship programs) and institutional support (professional development and empathetic leadership) were critical in facilitating the transition, addressing RQ2. Teachers who received consistent guidance and materials were better able to sustain and innovate in STEAM practices. In addition, teachers with previous experience with the arts and/or with similar certification were able to navigate the transition more easily than those without, further addressing RQ2. These findings suggest implications for practice, which will be discussed in the following section.

Implications for Practice

The findings from my narrative inquiry study suggest that while STEAM is a transformative pedagogical method compared to the traditional way of teaching, the transition for teachers can initially be overwhelming. Coupled with an individual's personal outlook and prior experiences, specific support systems can help ease the transition to STEAM, helping teachers move from fear to empowerment. The implications discussed below serve as practical recommendations, addressing RQ3.

For educators, the results from this study should validate any initial feelings of fear and confusion, while emphasizing the significance of one's mindset in overcoming them. Going into the transition with a positive outlook and being open to new things will ultimately aid in the transition to STEAM. Another key finding was the importance of collaboration with peers and specialists. Regular collaboration encouraged teachers to share their expertise, reduced isolation, balanced planning duties, and ultimately reduced burnout. Collaboration with specialists gave teachers insight into unique lesson ideas that they may not have developed on their own. Teachers also benefited from ongoing

professional development to strengthen their knowledge of arts-integration and interdisciplinary planning. Workshops led by content specialists that modeled lessons with the teachers' own students proved far more valuable than one-time sessions, which often felt disconnected from their immediate instructional needs. Teachers also benefited from visiting other STEAM-certified schools to see arts-integration in action and learning from mentor teachers. Finally, teachers should reflect on their own artistic background, however small, and draw upon their strengths as they begin to integrate the arts into their regular routine. While the transition from traditional methods may initially seem overwhelming, the benefits far outweigh the challenges. Arts integration fosters greater student engagement, makes the content more relevant and interconnected, and creates an inclusive environment where every learner can demonstrate their understanding using their individual strengths.

Critical implications for administrators were also revealed through data analysis. Teachers expressed feeling most supported by administrators that empathetically listen, provide materials, and make adjustments based on teacher feedback. Because collaboration is a key component for teacher support, administrators should prioritize common planning times for teaching teams with flexibility to include instructional coaches and specialists to allow for cross-disciplinary planning. Administrators should also allow flexibility in the scope and sequence to allow for meaningful integration experiences. Teachers indicated that passionate administrators who were part of the STEAM certification process helped them feel supported and valued. This included being an active part of collaboration, providing funds to purchase necessary materials, and reducing unrealistic expectations. Teachers indicated that when they felt supported and

had access to the necessary materials, they were more confident, creative, and innovative. Additionally, administrators should provide sustained professional learning opportunities including teacher mentorships and school visits, in addition to traditional professional learning courses, especially when these opportunities helped strengthen the teachers' understanding and self-efficacy with STEAM implementation.

While administrators play a critical role in supporting local teachers during STEAM-certification, broader systemic support is also necessary. The current educational framework does not support the interdisciplinary and exploratory nature of STEAM (Herro et al., 2019; Liu & Wu, 2023). The overemphasis on standardized tests, traditional grading systems, and rigid pacing guides do not offer flexibility, student-choice, or creativity. Educational reform is needed to place a greater emphasis on interdisciplinary studies, problem-based learning, and arts integration, which have all shown to yield better results than the traditional model which the current educational system is built upon. The traditional educational system is outdated and does not provide students with the knowledge and skills needed to be successful in a fast-paced, innovative, and multifaceted world. Additional funding and grants should also be awarded to schools pursuing STEAM certification, as arts integration requires additional supplies and professional development. Finally, pre-service teacher education programs should better prepare candidates for interdisciplinary and arts-integrated approaches, which better align with the growing demands of the 21st century. Educational leaders must reconsider current policies to better support interdisciplinary integration, allowing STEAM to move from a supplemental initiative to a foundational pedagogical framework.

Implications for Future Research

Implications from the current study suggest specific support systems, such as collaboration, mentorship, empathetic leadership, and professional learning, can ease the transition for elementary teachers adapting their teaching practices to include arts-integrated STEAM. While the focus of this study was the personal experiences of classroom teachers at STEAM-certified schools, several implications for future research suggest deeper investigation may be warranted. For example, the student perspective of transitioning from traditional teaching to interdisciplinary STEAM could offer firsthand insight into the engaging, inclusive, and purposeful nature of STEAM referenced in the current study. In addition, the inclusivity of STEAM could be explored by investigating the impact on diverse learners, including students with disabilities and multilingual learners. This study focused on the teachers' transition to STEAM, but longitudinal studies could also explore how teacher self-efficacy, mindset, and support evolve over time. Finally, because support was a key component of a successful transition to STEAM, a comparative study could be conducted to examine the differences between schools with strong support systems versus those with limited supports.

Limitations

Several limitations were present within the current study. Notably, the narrative inquiry method I chose involved the deep analysis of a few participants' experiences. An open-ended survey administered to more participants may garner a broader range of experiences, possibly yielding different results. I also relied solely on participant interview data, which was subject to self-reporting, so the responses might not accurately reflect the complexities of their nuanced experiences. Additionally, given that participant

reflection was essential to addressing the research questions, the use of a single semi-structured interview could have constrained the depth of reflective responses, while increasing participant fatigue. Conducting multiple interviews could offer participants time to reflect on their past and current experiences with deeper personal insight. Also, researcher observation or triangulation with other data such as lesson plans or work samples could help validate and expand on the participant's responses in future studies. Another limitation lies in the focus on STEAM-certified schools in Georgia, which may not reflect the experiences at non-certified schools or schools in other states. Finally, as the sole researcher, my interpretations and subjectivity inevitably influenced the analysis, despite efforts to remain reflexive and grounded in the participants' narratives.

Conclusion

The purpose of this narrative inquiry study was to explore the experiences of elementary educators who transitioned their teaching methods from traditional methods to arts-integrated STEAM at STEAM-certified schools in Georgia. Findings revealed that STEAM created a purposeful, interconnected, and inclusive learning environment that increased student engagement and decreased behavioral issues, answering RQ1. Additionally, while the teachers felt overwhelmed and underprepared at the start of their journey, with the necessary supports, they all gained confidence, expertise, and eventually became empowered with STEAM implementation, answering RQ2. Furthermore, the teachers' prior experiences, personal outlook, and concurrent stressors also impacted how they navigated the transition. Finally, the implications for practice emphasized the need for empathetic administrators that provide flexibility, resources, and intentional collaborative planning, addressing RQ3. Broader systemic changes are needed

to align the outdated traditional educational policy with modern interdisciplinary learning, which will better prepare students for the demands of the 21st century. This study fills a gap in literature by providing insight into the teacher experience with arts-integrated STEAM and underscores the importance of the necessary supports for successful implementation.

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Appendix A

Email Containing Details of Study

Are you a K-5 classroom teacher at a school pursuing STEAM certification? Do you have at least three years of prior teaching experience at a school that was not STEAM-certified? If so, I would love to hear your story!

You are being asked to participate in an interview as part of a research study entitled “*A Narrative Inquiry into Elementary Teacher Experiences Transitioning from Traditional Teaching Methods to Arts Integration in STEAM*” which is being conducted by Abby Sandlin, a doctoral candidate at Valdosta State University.

The purpose of the study is to gain insight from the experiences of teachers who transitioned their teaching methods to include art-integrated STEAM at schools pursuing STEAM certification. You will receive no direct benefits from participating in this research study other than a carefully crafted narrative of your experience. Your responses may provide valuable insights into what it is like to teach at a school pursuing STEAM certification, your experience transitioning to arts-integrated STEAM, and suggestions for future practice. There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. Participation will include two virtual one-hour interviews via Microsoft Teams. The interviews will occur virtually and will be recorded to accurately capture your concerns, opinions, and ideas. Once the recordings have been transcribed, the tapes will be destroyed. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to participate, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your participation in the interview will serve as your voluntary

agreement to participate in this research project and your certification that you are 18 years of age or older.

Questions regarding the purpose or procedures of the research should be directed to Abby Sandlin at *asandlin@valdosta.edu*. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

Appendix B

Semi-Structured Interview Questions

Semi-Structured Interview Questions

Thank you for taking the time to interview with me today. The purpose of this interview is to gain insight into your unique experiences as you made the transition from traditional teaching methods in the beginning of your teaching career to arts integration in STEAM more recently. Throughout our interview, I hope to hear stories about your experiences, including your educational history, prior trainings, the challenges and successes you've encountered, and the personal and professional growth you've undergone as a result of this journey.

This interview is totally confidential and any identifying information will be removed or changed into a pseudonym. Your participation is voluntary. You may choose not to participate, to stop responding at any time, or to skip any questions that you do not want to answer. Feel free to stop or ask questions at any time. Do you have any questions? Are you ready to begin?

- Describe yourself as an artist. Walk me through the prior life experiences you have with art. This could be visual arts, dramatic arts, music, literary arts, horticulture...
- Let's dive deeper into your personal connection with art. Walk me through your favorite memory connected to art.
- Now, let's explore your journey into education. Walk me through your journey to become an educator. What was your college preparation like?
- Building on your educational background, I'm curious about your college experiences with art. Describe any arts courses you took in college. What were they like?
- Was there anything about the arts courses that you drew upon later in your career?
- Let's talk about your professional path. What led you to your current position? Walk me through your prior teaching experience.
- Reflecting on your teaching experiences, can you share a special memory from a specific class?
- Tell me the story of your first introduction to STEAM? What were your first impressions? Why?
- Tell me about the moment when you learned about the transition to arts-integrated STEAM at your school. What was that like for you?
- Tell me about a prior experience with arts integration and/or STEAM that had a lasting impact on you. This could be in the form of training, learning from others, a school initiative, etc.
- How would you describe arts integration in STEAM to a new teacher?
- Let's get into some specifics about the requirements for STEAM certification. Walk me through some of the arts integration requirements you needed for state-level STEAM certification. What was the expectation at your school?
- What was that like for you? How did you respond to the change from the way you were teaching previously?

- Tell me a story from this time in your transition to arts-integrated STEAM.
- Reflecting on your classroom experience, help me understand what it was like in your ___ grade class.
- Paint a picture of what it is like in your current classroom in which you utilize arts-integrated STEAM.
- How is the way you previously taught different from the arts-integrated STEAM you teach now that your school is STEAM certified?
- Describe the impact the transition to arts-integrated STEAM had on your daily teaching routine.
- Walk me through how your teaching outlook changed, if at all now that you utilize arts-integrated STEAM. (Things you prioritize, what you deem as important, your beliefs about students)
- STEAM is not easy. Describe a memory where you felt challenged in your STEAM journey.
- On the flip side, share a moment of pride or accomplishment with arts integration.
- Pretend like I'm a good friend of yours, how would you describe your current thoughts or opinions regarding arts-integrated STEAM?
- Describe any new skills or techniques you have learned throughout your transition to arts-integrated STEAM, if any?
- What resources or tools that have been particularly helpful during your transition, if any?
- Paint a picture of the person you turn to for support.
- Pretend your administrator or STEAM coordinator said you could have any resources you need to design a program to make the transition to arts-integrated STEAM more manageable for teachers. What would that encompass?
- What recommendations do you have for administrators and program developers to make the transition to arts-integrated STEAM more manageable for teachers?

Appendix C

Interview Question Rationale Table

Interview Question Rationale Table			
Original Research Questions	Interview Reflections	Providing Clarity (Semi-Structured Interview Questions)	Answer to Original Research Questions
RQ1: How do elementary classroom teachers describe their experiences with traditional teaching methods as compared to their experiences with arts integration at STEAM-certified schools?	To answer RQ1, I asked participants to reflect on their prior experiences and construct personal stories to illustrate their life before transitioning to arts-integrated STEAM. Specifically, I asked participants to start with their earliest memories with art and work through their life story, including their pre-service college preparation, prior teaching experiences in a traditional classroom, and their professional journey that led them to teach arts-integrated STEAM at their current school. This laid the foundation for the context of each participant's unique narrative.	<ul style="list-style-type: none"> • Describe yourself as an artist. Walk me through the prior life experiences you have with art. This could be visual arts, dramatic arts, music, literary arts, horticulture... • Let's dive deeper into your personal connection with art. Walk me through your favorite memory connected to art. • Now, let's explore your journey into education. Walk me through your journey to become an educator. What was your college preparation like? • Building on your educational background, I'm curious about your college experiences with art. Describe any arts courses you took in college. What were they like? • Was there anything about the arts courses that you drew upon later in your career? • Let's talk about your professional path. What led you 	The participants revealed that STEAM better prepares students for the interdisciplinary demands of the 21st century, in contrast to the rigidity of traditional, single-discipline teaching methods. Teachers consistently described arts integration as a way to make learning more relevant, creative, and engaging for students while increasing their collaboration, communication, on-task behavior, and engagement.

		<p>to your current position? Walk me through your prior teaching experience.</p> <ul style="list-style-type: none"> • Reflecting on your teaching experiences, can you share a special memory from a specific class? • Reflecting on your classroom experience, help me understand what it was like in your ___ grade class. • Paint a picture of what it is like in your current classroom in which you utilize arts-integrated STEAM. • How is the way you previously taught different from the arts-integrated STEAM you teach now that your school is STEAM certified? • Describe the impact the transition to arts-integrated STEAM had on your daily teaching routine. 	
<p>RQ2: How did the participants navigate the transition to arts-integrated STEAM?</p>	<p>To answer RQ2, I asked participants to reflect on important stories and events from their prior experience and describe how those events impacted their current attitudes, beliefs, and</p>	<ul style="list-style-type: none"> • Tell me the story of your first introduction to STEAM? What were your first impressions? Why? • Tell me about the moment when you learned about the 	<p>Although the transition to arts-integrated STEAM may initially feel overwhelming for teachers, the participants revealed that teachers can thrive when provided with the right supports. Collaboration, mentorship, sustained</p>

	<p>values towards arts-integrated STEAM.</p>	<p>transition to arts-integrated STEAM at your school. What was that like for you?</p> <ul style="list-style-type: none"> • Tell me about a prior experience with arts integration and/or STEAM that had a lasting impact on you. This could be in the form of training, learning from others, a school initiative, etc. • How would you describe arts integration in STEAM to a new teacher? • Let's get into some specifics about the requirements for STEAM certification. Walk me through some of the arts integration requirements you needed for state-level STEAM certification. What was the expectation at your school? • What was that like for you? How did you respond to the change from the way you were teaching previously? • Tell me a story from this time in your transition to arts-integrated STEAM. 	<p>professional development, and empathetic leadership were all essential in helping teachers feel empowered through their transition to STEAM.</p>
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		<ul style="list-style-type: none"> • Walk me through how your teaching outlook changed, if at all now that you utilize arts-integrated STEAM. (Things you prioritize, what you deem as important, your beliefs about students) • STEAM is not easy. Describe a memory where you felt challenged in your STEAM journey. • On the flip side, share a moment of pride or accomplishment with arts integration. • Pretend like I'm a good friend of yours, how would you describe your current thoughts or opinions regarding arts-integrated STEAM? • Describe any new skills or techniques you have learned throughout your transition to arts-integrated STEAM, if any? 	
<p>RQ3: What are the participants' recommendations for transitioning from traditional teaching methods to arts-integrated STEAM?</p>	<p>To answer RQ3, I asked participants to reflect on their personal experiences and offer suggestions for administrators, program developers, and fellow teachers</p>	<ul style="list-style-type: none"> • What resources or tools that have been particularly helpful during your transition, if any? • Paint a picture of the person you turn to for support. 	<p>Teachers benefitted from collaboration, having a positive mindset, professional development, and empathetic leadership.</p> <p>Administrators play a critical role in sustaining</p>

	<p>who are transitioning to arts-integrated STEAM.</p>	<ul style="list-style-type: none"> • Pretend your administrator or STEAM coordinator said you could have any resources you need to design a program to make the transition to arts-integrated STEAM more manageable for teachers. What would that encompass? • What recommendations do you have for administrators and program developers to make the transition to arts-integrated STEAM more manageable for teachers? 	<p>STEAM. They must protect collaborative planning time, ensure access to materials and professional development, actively listen to teacher feedback, and demonstrate empathy toward the challenges teachers face. When these supports are in place, teachers are better positioned to fully embrace and sustain arts-integrated STEAM.</p> <p>For program developers, educational reform is needed to place a greater emphasis on interdisciplinary studies, problem-based learning, and arts integration, which have all shown to yield better results than the traditional model which the current educational system is built upon</p>
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Appendix D

Institutional Review Board (IRB) Approval Letter



**Institutional Review Board (IRB)
for the Protection of Human Research Participants**

PROTOCOL EXEMPTION REPORT

Protocol Number: 04596-2025

Responsible Researcher(s): Abby Sandlin

Supervising Faculty: Dr. Jenny Evans

Dissertation Research Member: Dr. Jamie Workman

Project Title: *A Narrative Inquiry into Elementary Teacher Experiences Transitioning from Traditional Teaching Methods to Arts-Integrated STEAM.*

Institutional Review Board Determination:

This research protocol is **exempt** from Institutional Review Board (IRB) oversight under 45 CFR 46.101(b) of the federal regulations, **category 2**. If the nature of the research changes such that exemption criteria no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research study.

Comments:

- *Your research study may begin at the following location: Colquitt County – R.B. Wright Elementary School (03.28.25). Additional locations will be considered upon receipt of a letter of cooperation.*
- *Per exempt protocol guidelines, it is permissible to record interviews for the specific purpose of creating an accurate transcript to be utilized for documentation or analysis. Once the transcript has been constructed, all recorded interview sessions must immediately be deleted from all devices, including electronic files used to store recordings. This measure is in place to uphold confidentiality and ensure that information contained in the recordings is adequately protected.*
- *To comply with consent guidelines, audio/video recordings must capture the researcher reading the consent statement aloud, ensuring the participant's understanding and willingness to participate. Each transcript must document the researcher's reading of the consent statement and the participants' consent. A copy of the consent statement must be provided to participants. |*
- *To ensure confidentiality, pseudonym lists must be kept in a separate secure file from corresponding names, email addresses, etc.*
- *Upon completion of the research study all data (e.g. data, pseudonym/email lists, transcripts, etc.) must be securely maintained (e.g. locked file cabinet, password protected computer, etc.) and accessible only by the researcher for a minimum of 3 years. At the end of the required time, collected data must be permanently destroyed.*

Proposed modifications must be submitted to the IRB Administrator at tmwright@valdosta.edu for review and approval before implementation is permitted.

Elizabeth W. Olphie

03.28.2025

Elizabeth W. Olphie, IRB Administrator

Date

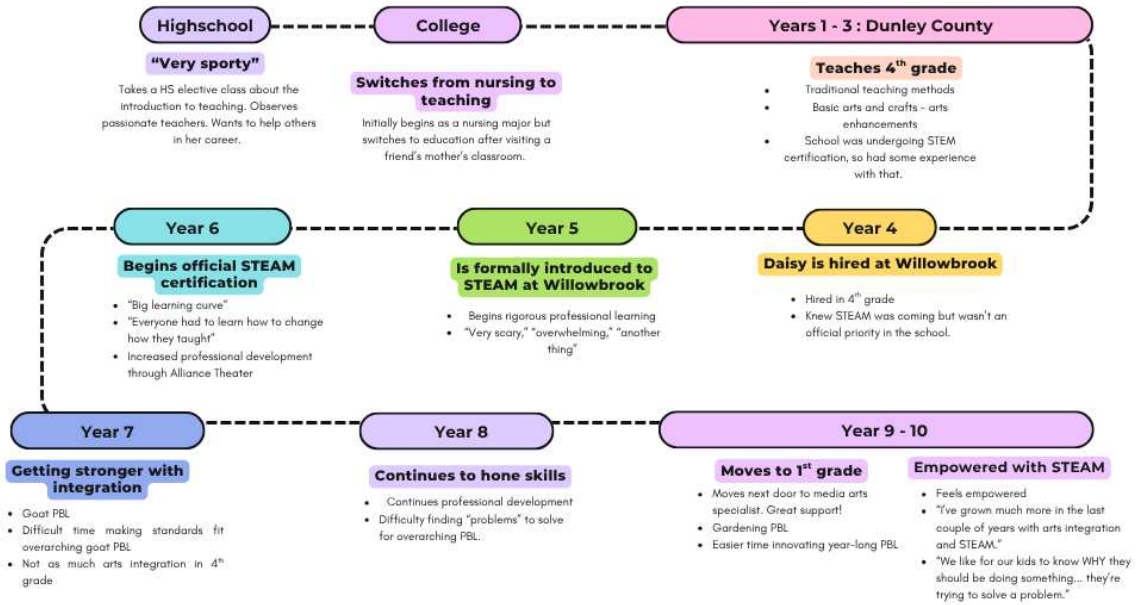
Thank you for submitting an IRB application.

Please direct questions to irb@valdosta.edu or 229-259-5045.

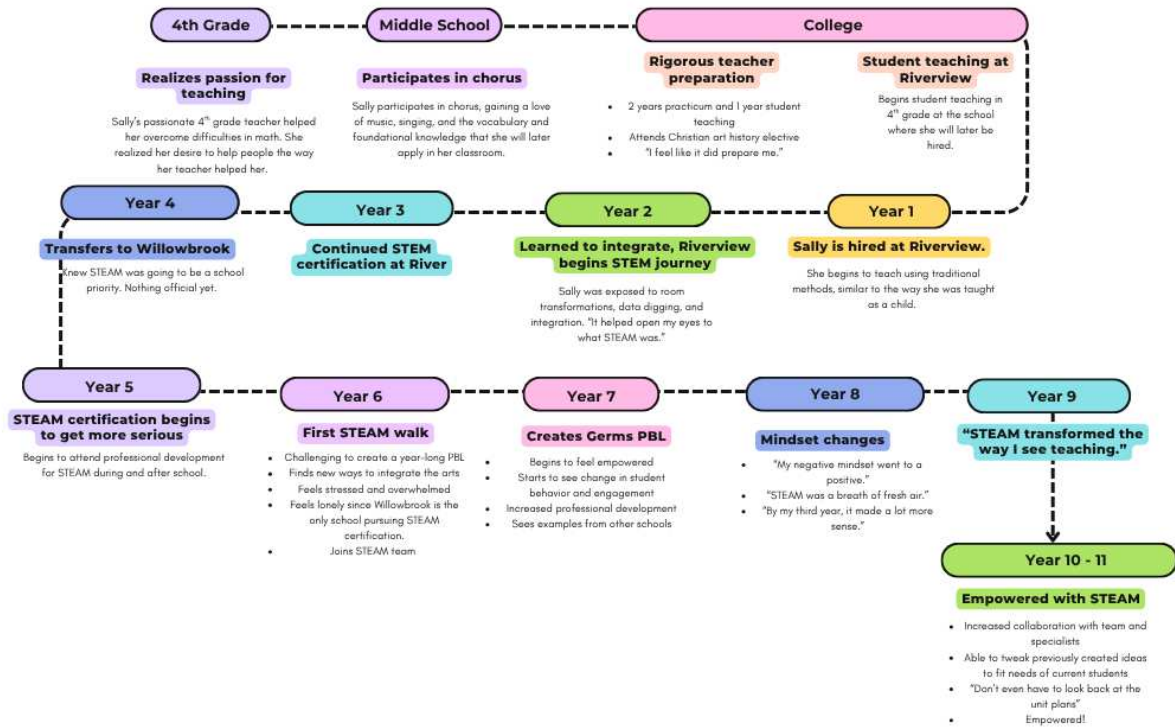
Revised: 06.02.10

Appendix E
Participant Timelines

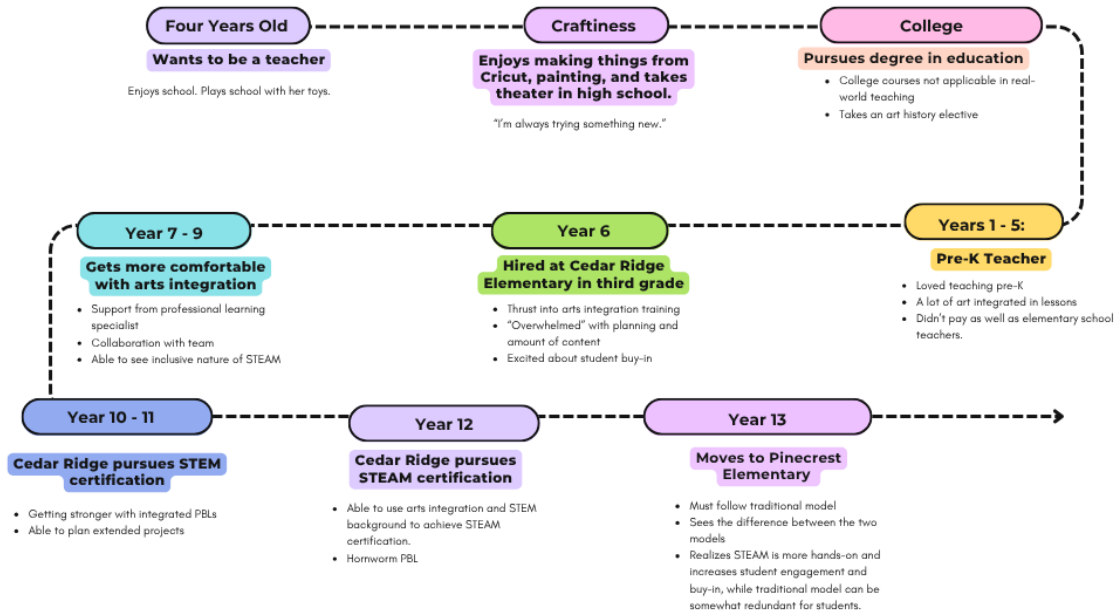
Daisy's Timeline



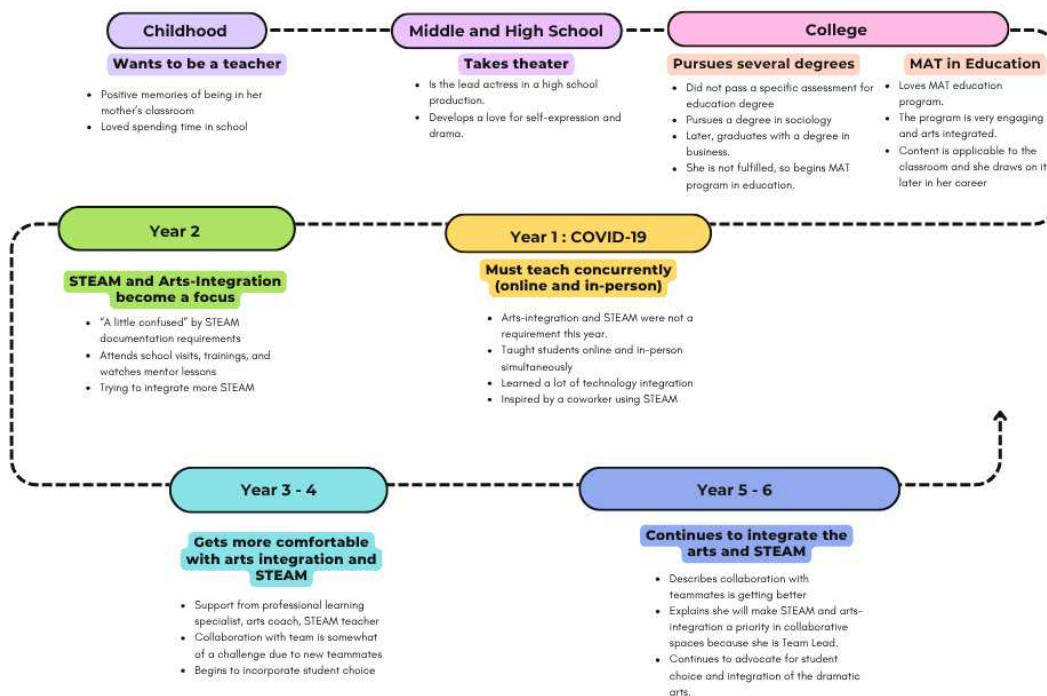
Sally's Timeline



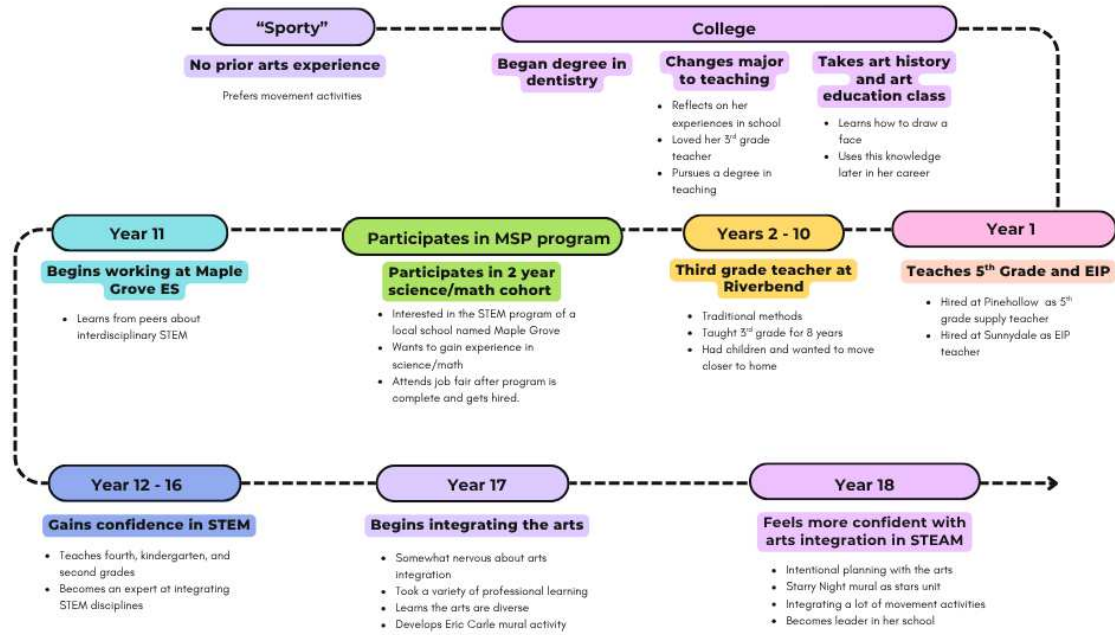
Aubrey's Timeline



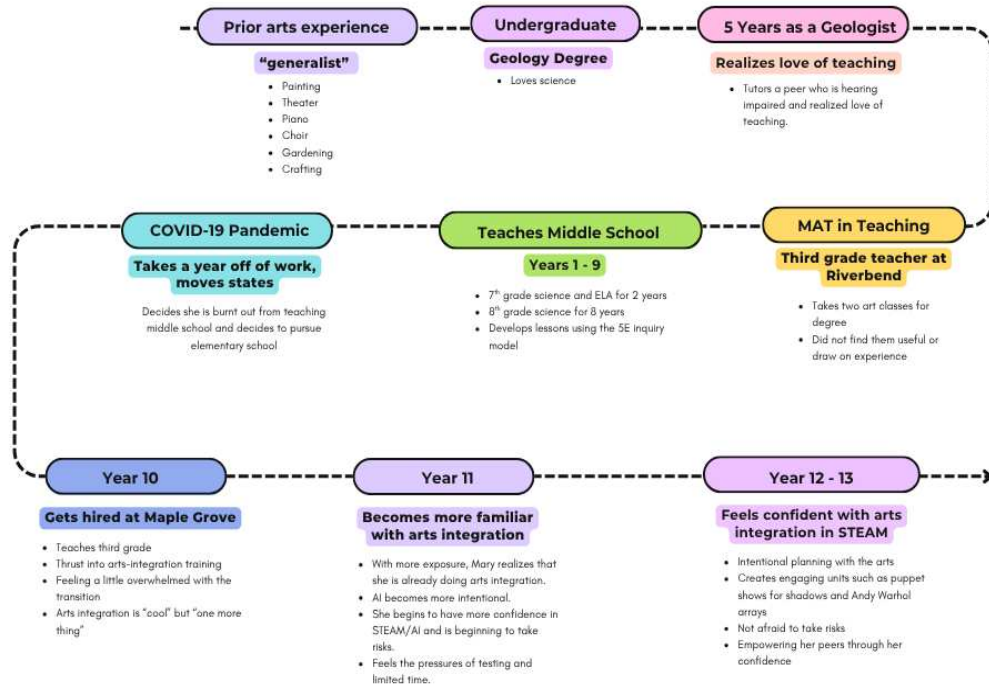
Nicole's Timeline



Elizabeth's Timeline



Mary's Timeline



Appendix F
CITI Training Certificates



Completion Date 28-Aug-2024
Expiration Date 28-Aug-2027
Record ID 64620833

This is to certify that:

Abby Sandlin

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Responsible Conduct of Research
(Curriculum Group)
IRB Basic (RCR)
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Valdosta State University



101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Generated on 28-Aug-2024. Verify at www.citiprogram.org/verify/?wc447196b-1c02-47a6-985a-6e322940269d-64620833



Completion Date 28-Aug-2024
Expiration Date 28-Aug-2027
Record ID 64689745

This is to certify that:

Abby Sandlin

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Human Research
(Curriculum Group)
IRB Basic
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Valdosta State University



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Fort Lauderdale, FL 33301 US
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Completion Date 28-Aug-2024
Expiration Date 28-Aug-2027
Record ID 64620834

This is to certify that:

Abby Sandlin

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Human Research
(Curriculum Group)
IRB Basic
(Course Learner Group)
2 - Refresher course
(Stage)

Under requirements set by:

Valdosta State University



Collaborative Institutional Training Initiative

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Fort Lauderdale, FL 33301 US
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