Fall 11-25-2019

The Pedagogical Impact of Secondary Science Teacher Efficacy on Blended Learning Implementation: A Phenomenological Study

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College of Education

Dissertation submitted to the Faculty of the College of Education

in partial fulfillment of the requirements for the degree of

Doctor of Education in

Professional Inquiry, Leadership, and Transformation

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Concordia University–Portland

2019

Abstract

As new pedagogical approaches, such as blended learning, are implemented in classrooms, it is important to properly prepare the teachers to ensure fidelity of implementation. The descriptive phenomenological study examined the influence of secondary science teacher efficacy on overcoming obstacles and sustaining the Blended Learning pedagogical approach at a high school in the southern United States. Using purposeful sampling based on specific criteria nine teachers were selected to participate in the study. Through two interviews and a focus group, the researcher collected data based on the participants' shared experience of implementing the flipped classroom instructional model. The data was themed according to the four sources of teacher efficacy: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. The results suggest that teacher efficacy does influence the implementation of the Blended Learning pedagogical approach. Key findings from this study include teachers need time to plan for the transition, teachers need time to implement the pedagogical approach with support, teachers need support and coaching from school leaders, and teachers need time to collaborate to build collective teacher efficacy. The results of this study are significant to as it supports the importance of providing teachers with time to plan and implement the pedagogical approach to fidelity and understanding the role of teacher efficacy. As Blended Learning becomes more commonplace in the secondary science classroom, stakeholders need to understand how to support teachers throughout implementation.

Keywords: blended learning, flipped classroom, high school, science, secondary, teacher efficacy

Dedication

I dedicate my dissertation to my children, Alexander and Adeline. Alex, you made me a mother and in your time on this earth made such an impact on my life, I continue to be strengthened by you. Addie, even though you are too young to remember the journey of Dr. Mommy, my hope for you is to realize the power of a determined woman to accomplish her goals no matter the obstacles. I started this journey while I was pregnant with you and was able to accomplish this because of you, my best surprise.

Acknowledgements

I must first thank my Heavenly Father—without Him none of this would have been possible and I am grateful for the talents for which I have been given. “Let your light so shine before men, that they may see your good works, and glorify your Father which is in heaven” (Matthew 5:16 KJV).

I would like to thank my husband, Trason, for entertaining the idea of both of us in school, working full-time, while raising a toddler and a teenager then starting your doctorate right after earning your masters. I am so proud of everything you accomplished in your military career and everything you are working toward now. From day one you believed in me and knew this was possible. I love you and am grateful to be with you for all time and eternity.

A huge thank you to my dissertation chair, Dr. Belle Booker-Zorigan. I knew from our first meeting I had selected the right chair. Your support and thorough feedback pushed me to be the best and I feel I accomplished this daunting task because of you.

Thank you to Dr. Michael Hixon for thoroughly reading my work and helping me to produce the best material of which I am capable. Dr. Ralph Spraker’s support and feedback throughout this process was also encouraging, I thank you for that.

I am so grateful for my best friend and little sister, Danielle. You, along with my children, are my reasons for existing. You are so incredibly talented, and I am honored to be your sister.

My parents always believed I could get to this point. My mom, daddy, and Cath’s support throughout my entire educational career has helped me get here. My stepdad Doug has also supported my nerdiness. They are the foundation of my lifelong love of learning which I hope to pass the same love on to my children.

My Aunt Ag, who has spent a lifetime dealing with my face in a book as a child and writing papers during visits over the last couple of years, has been nothing but supportive through my journey. My gratitude to you has no words.

A huge thank you to my sister-in-law Brindy Buchanan. I am so grateful for your friendship and lucky we get to call each other sisters. Your friendship and support are things I can never repay. It's good to know we'll have each other as the three musketeers grow up.

A special thank you to the science teachers past and present at Seguin High School. I must also thank Vicki Rosenwald for being passionate about Blended Learning, helping teachers perform at their best, and being the best work wife. I learned so much from you and use the lessons daily. Without you this study would not have been possible.

A huge thank you to the women who prove time and time again that it is not the quantity of friends, but the quality. I am grateful for Heidi Bennett, Nikki Elaine Bittings, Lisa Burns, Brandy Mai, Terrie Nowlin, Jennifer Salisbury, Patricia Stager, and Teresa Willemin. Finding one friend with their qualities is rare, but to find such strong women who I admire has been incredible and each have been my rock as I navigate life. These women have shown me what it means to be a friend and a sister; through their examples I am a better person, wife, and mother.

A special thank you to the wonderful Willemin family I was lucky to join. I have gained two bonus daughters, Veronika and Julianna, amazing sisters and brothers-in-law, and quite possibly the most incredible mother-in-law that has ever existed. I appreciate all your support.

Another person I must thank is Samantha Miles. Miles was always willing to talk through ideas and provide wonderful constructive criticism that helped me through many difficult problems of this venture. Your talent as an educator will influence generations. I am grateful to be part of your journey.

Finally, thank you to Dr. Hector Esquivel for introducing me to Concordia University's doctoral program and to Dr. James Diaz for listening and assisting me throughout the process.

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Chapter 1: Introduction

Introduction to the Problem

In a typical public high school, students sit at their desks listening to a teacher lecture during class. Teachers disseminate information while students passively take notes; unfortunately, according to Moore (2016), this model is failing to prepare them for the real-world workplace. Moore affirmed employers such as Google prefer to hire applicants who possess skills such as communication, self-regulation, and problem-solving real-world situations not often seen in the public school setting. To combat students entering the workplace deficient of skills, new pedagogical approaches can be implemented that will allow the students to take an active role in their learning.

Implementing a new pedagogical approach in the secondary science classroom can be difficult for students. Some students struggle to shift from passive to active learners. Students in an active learning environment learn to collaborate, as Abdi (2014) claimed, like scientists. Transitioning from a traditional teacher-directed classroom to a blended learning classroom has been difficult for some teachers as well. Some teachers find it difficult to transition from being the disseminator of knowledge to the facilitator of learning (Napier, Dekhane, & Smith, 2011). The traditional teacher-directed lesson is an efficient way for the teacher to give information to the students that they can recall but does little to help the students think critically about a topic (Smith & Cardaciotto, 2011).

Some teachers find the traditional teacher-directed classroom more comfortable due to the pressure they feel from high-stakes state assessments (Wong & Day, 2009). But by doing so, some researchers argue teachers fail to address the needs of the students in a science classroom (Abdi, 2014). Altemueller and Linquist (2017) contend it is easier for teachers to personalize

learning for students in a blended learning classroom as it increases the interactions between the students and the teacher. According to Abdi (2014), teachers who use inquiry-based methods as an instructional model found students performed better in class. The teacher no longer just shares curriculum students can easily recall, rather they become part of the learning experience with the students (Bidarra & Rusman, 2016).

With the implementation of any pedagogical approach, teacher efficacy plays a significant role. High teacher efficacy has been linked to greater student achievement (McNeill, Pimentel, & Strauss, 2013; Pedota, 2015). When a teacher has high teacher efficacy, he or she is more likely to plan more effective lessons and set higher goals for his or her students (Michalsky, 2012). Multiple factors influence teacher efficacy, including content knowledge, administrative support, and collaborating with other teachers (Olmez & Ozbas, 2017; Velthuis, 2015). Kleinsasser (2014) asserted that teacher efficacy needs to be examined at different points of teachers' careers and at all levels of education as it can change depending on the circumstances. Although teacher efficacy is a personal characteristic, it is influenced by other employees at the school (Donohoo, 2017; Hughes, 2012).

Some research exists that examines teachers' efficacy for implementation of blended learning, more research is needed. Kleinsasser (2014) stressed the importance of continuing to examine teacher efficacy in the K–12 setting. While much of the peer-reviewed research focused on blended learning at the post-secondary level, teacher efficacy research primarily focused on preservice teachers (Hao & Lee, 2016; McNeill et al., 2013; Menon & Sadler, 2017; Napier et al., 2011; Palmer, Dixon & Archer, 2015; Stockwell, Stockwell, Cennamo, & Jiang, 2015; Wanner & Palmer, 2015). Very little research exists that addresses teacher efficacy and its influence on the blended learning pedagogical approach (Gerard, Varma, Corliss, & Linn, 2011;

Ho, Nakamori, Ho, & Lim, 2014; Kelly & Denson, 2017; Velthuis, 2015). The gap in the literature exposed a need to examine the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach.

A phenomenology was the research methodology for this study. Phenomenological research focuses on the experience of the participants to find meaning of the phenomena (Moustakas, 1994). The study focused on the experiences of science teachers at a high school in the southern United States to begin to understand the influence teacher efficacy has on how the teachers overcome obstacles and sustain the blended learning pedagogical approach. The phenomenological study aligned with Giorgi's (2009) descriptive phenomenology, a modified Husserlian approach, which focused on deriving meaning from the lived experience of the participants. The participants for this phenomenological study were secondary science teachers who work at the same high school in the southern United States and have at least four years of experience using the blended learning pedagogical approach in their classroom.

Background, Context, History, and Conceptual Framework for the Problem

Background. Public education in the United States pre-dates the formation of the country itself. In the 1600s, the Massachusetts, Connecticut, and New Hampshire colonies had basic forms of public education (Thattai, 2017). Due to the technological advances that occurred during the Industrial Revolution, interest in science education increased (Bybee, 2010). The Department of Education was created in the 1800s, with many of Thomas Jefferson's ideas used as inspiration for the education system. But even after the creation of the Department of Education, school was only readily available to the wealthy. By the end of the 19th century free public education was made available to all children in the United States, primarily due to the efforts of Horace Mann and Henry Barnard. In the late 1800's, a report by the Committee of Ten

on Secondary School Studies formed by the National Education Association established goals for secondary education, which included requiring science courses (Vázquez, 2006).

As politicians and educators worked to organize and design the public school system of the United States, science education became a class where information was memorized, not one based in inquiry (Bybee, 2010). John Dewey questioned this style of teaching and noted that students were not given a chance to explore and experience productive struggle in education. From this, the Department of Education developed the scientific method to standardize the inquiry process that is still used in many classrooms today (Bybee, 2010). As public education evolved, so did the science curriculum. In the 1950s, physics was taught to all secondary students, but the textbooks did not include lab experiments or graphs to help the students understand the concepts (Haber-Schaim, 2006). Educators began to question this curriculum, leading to the creation of a course based in inquiry and experiments.

In the 1960s and 1970s, science curriculum evolved to reflect learning through exploration, invention, and discovery (Karplus, 1969). Science classes became more engaging so the students could begin to take an active role in their learning (Bybee, 2010). By the 1980s, with inspiration from Robert Karplus, Malcolm Wells and David Hestenes worked to incorporate more hands-on learning and modeling into science classes (Wells, Hestenes, & Swackhamer, 1995). Since this time, science teachers have worked to find ways to actively address the curriculum in an engaging manner that will reach all learners eventually evolving into the current use of the blended learning pedagogical approach in some science classes.

Context. Erikson High School, the pseudonym for a high school in the southern United States, is the only high school in the school district. The enrollment of the high school is almost 2,000 students (Overview, 2019). The high school met standard in student achievement, school

progress, and closing the gaps according to the state's 2017–2018 report card (TEA Report Card, 2019). The racial demographics of Erikson High School are 67% Hispanic, 27% Caucasian, and 5% African American, 0.7% Two or More Races, 0.1% Asian, 0.1% American Indian, and 0.1% Pacific Islander (TEA Report Card, 2019). Of the student population at Erikson High School 51.8% are economically disadvantaged, 5.5% are English Learners (ELs), and 10.8% receive special education services. Of the approximately 450 graduates from the class of 2017, 42.9% were considered college, career, and/or military ready, which is 11.3% lower than the state average (TEA Report Card, 2019). The attendance rate for Erikson High School, 90.7%, is lower than the state's attendance rate, 95.7% (TEA Report Card, 2019).

State report cards for the school from 2013–2018 revealed Erikson High School has improved performance on the Biology state standardized test as part of the State of Texas Assessments of Academic Readiness (STAAR) since the flipped classroom instructional model has been implemented, but overall scores are still below the state average (TEA Report Card, 2015; TEA Report Card, 2016; TEA Report Card, 2017; TEA Report Card, 2018; TEA Report Card, 2019). The STAAR test is a valid and reliable measures of the students' mastery of the Texas Essential Knowledge and Skills (TEKS; DeVries, 2018). During the same time period, the percentage of students who scored in the advanced category has tripled (TEA Report Card, 2015; TEA Report Card, 2019).

History. Before the flipped classroom instructional model and other forms of blended learning became part of American public schools, teachers still used technology to help them teach the curriculum (Bersin, 2004; Horn & Staker, 2015). In the 1840s, students were able to take courses through the mail allowing people, regardless of where they lived, to obtain an education (Kentnor, 2015). This trend continued well into the 1900s, which changed the way

nontraditional students learned. Another trend in education that emerged in the 1900s was using radio and television to support instruction (Kentnor, 2015). By the end of the 1900s, personal computers became more commonplace in homes and the invention of the internet changed the way the world communicates. Although teachers did not embrace computers and the internet right away, by the late 1990s both tools were being used in the classroom (Kentnor, 2015).

The internet took the idea of distance learning from the 1800s and modernized it, but it was not without its problems in the beginning (Kentnor, 2015; Siemens, Gašević, & Dawson, 2015). To solve some of the problems, some classes began to meet in person and complete work online creating a blend of instructional models. Although blended learning is a newer pedagogical approach, using the available technology to enhance learning is not new.

Grouping students by age began over a century ago to standardize the learning experience for all students (Horn & Staker, 2015). This pedagogical approach echoed the factory model in an attempt to get more students to graduate and because of this more students attended high school and graduated. But this model does not adequately address the needs of the 21st century learning in a personalized manner (Horn & Staker, 2015). Instead of students adapting to the schools, Beetham and Sharpe (2013) stressed that K–12 schools need to adapt to the students.

Conceptual framework. Blended learning (Horn & Staker, 2015) was the primary framework that guided this phenomenological study. Additionally, a secondary lens of teacher efficacy theory was used for this phenomenological study (Bandura, 1977). Using two theories in conjunction to guide this phenomenological study will help stakeholders begin to understand how and why teachers overcome obstacles and sustain different pedagogical approaches in their classrooms.

Blended learning. Horn and Staker (2015) defined blended learning as a pedagogical approach where students learn partially through online learning and partially through in person teaching where the students have some choice over "time, place, path, and/or pace" of the material (p. 35). Majority of the blended learning models fall within one of four categories: flex, a la carte, enhanced virtual, and rotation. For the purposes of this study the rotation model was used, specifically the flipped classroom instructional model. All other categories are discussed in depth in Chapter 2. The rotation model is made up of station rotation, lab rotation, flipped classroom, and individual rotation. The students rotate in the rotation model between online and face-to-face instruction at the teacher's discretion (Horn & Staker, 2015).

For this phenomenological study, the rotation model was examined, specifically the flipped classroom instructional model as it is the model used by participants. The flipped classroom instructional model delivers the traditional whole group instruction through videos allowing class time to focus on working in small groups and/or individually (Bergmann & Sams, 2012). The students are the focus of this instructional model with teachers designing curriculum to ensure strategic and extended thinking beyond the classroom (Bergmann & Sams, 2012). The teacher focuses on creating a classroom that meets the needs of individual students instead of trying to estimate the needs of the whole group. Blended learning, as a conceptual framework, combines the benefits of the traditional teacher-directed classrooms and online learning blending the two pedagogical approaches to create a student-centered environment. Students are given choice in a blended learning classroom about how they learn instead of relying on teacher direction (Staker, 2015).

Teacher efficacy. Teacher efficacy is defined as a teacher's confidence in his or her teaching ability and how the ability is sustained through obstacles (Bandura, 1977). Teacher

efficacy is discussed as the ability for a person to believe a goal can be met. When the experiences are dependable, the more likely teacher efficacy will be positively changed (Bandura, 1977). Those who believe they can succeed are more likely to succeed. For example, teacher efficacy can influence how a pedagogical approach is implemented in the classroom and how a teacher reacts to obstacles. Teacher efficacy can be developed through mastery learning, vicarious experiences, verbal persuasion, and emotional arousal. Klassen, Tze, Betts, and Gordon (2010) found, through a meta-analysis of research from 1998–2009, that the four sources of teacher efficacy, mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal, support each other and led to teachers trying new challenges.

Mastery experiences occur when someone succeeds during a difficult experience. According to Bandura (1994), mastery experiences are the most effective way to build a strong sense of teacher efficacy. Klassen et al. (2010) found that after teachers had mastery experiences with the flipped model, they reported higher efficacy. Those who have never experienced failure lack a foundation to build upon their teacher efficacy. Vicarious experiences occur when a person learns through social models. Witnessing the success of others through effort, leads a person to believe they are capable of the same success (Bandura, 1994). Novice teachers benefit from vicarious experiences through diversified modeling. Observing a variety of social models can lead a person to believe she or he can be successful because different people were successful (Bandura, 1977).

The third source of teacher efficacy development is verbal persuasion, which is the use of positive language helping a teacher believe they can succeed. It is difficult to create a foundation for a strong teacher efficacy based on verbal persuasion alone (Bandura, 1994). The emotional state of a person can affect their teacher efficacy, known as emotional arousal (Bandura, 1977).

A person's mood affects their teacher efficacy, when a person is in a positive mood their teacher efficacy is enhanced and in the same respect when someone is in a negative mood their teacher efficacy is diminished (Bandura, 1994).

Using blended learning and teacher efficacy lenses to investigate the phenomenological study will provide a new view to the body of literature. The four sources of teacher efficacy could potentially influence how blended learning is implemented in the K–12 setting. Examining teacher efficacy while using blended learning began to answer why teachers overcome obstacles to sustain pedagogical approaches in their classes while others abandon them in favor of what is familiar.

Statement of the Problem

Bergmann (2018) asserted the original intent of blended learning was to meet the needs of individual students, but this has not been embraced by all stakeholders. As teachers, schools, and districts quickly adopt the newest pedagogical approaches, such as blended learning, it is important for them to become experts in the delivery or else it may not be implemented with fidelity (Courcier, 2007). If a teacher does not believe the pedagogical approach will make a difference, the amount of empirical research available does not matter. Tucker and Umphrey (2013) postulated that teachers need to take ownership over the process to make the best transition to a class that is student-centered. The length of time a teacher has been in the classroom, attitude towards educational innovation, and the emotional state of the teacher all affect the implementation of pedagogical approaches (Morozova & Malysheva, 2016).

Research that focuses on teacher efficacy has increased since the 1980s, but it is still an under researched subject (Kleinsasser, 2014). Specifically, research on the role teacher efficacy plays in overcoming obstacles and sustaining the blended learning pedagogical approach in the

secondary science classroom was not found, exposing a gap in the literature. Research on this topic has involved more around post-secondary institutions with little focus on the secondary classroom, specifically the secondary science classroom.

Studies at the undergraduate level concluded science classes would benefit from using the blended learning pedagogical approach as it is an effective way to deliver instruction (Cheung, Wang, Au, & Xie, 2018; Nair & Bindu, 2016). Few studies have examined secondary classrooms and those that do have found that blended learning has a positive effect on students, namely their self-efficacy and performance (Cheung et al., 2018; Kazu & Demirkolb, 2014; Yapici & Akbayin, 2012). However, few studies exist that focus on teacher efficacy and its influence on the implementation of the blended learning pedagogical approach. Tomory and Watson (2015) suggested further research is needed to examine the influence of teacher efficacy in blended learning secondary science classrooms to determine how to best support teachers.

Purpose of the Study

According to Reynolds (2018), teacher efficacy directly affects student achievement, and therefore is important to understand. Blended learning is a newer pedagogical approach, and as such unforeseen obstacles emerge, which may lead teachers with low efficacy to abandon it altogether (Palmer, Dixon, & Archer, 2015). Beginning to understand the influence of teacher efficacy on when and why a pedagogical approach is abandoned can help stakeholders support new pedagogical approaches and know how to overcome obstacles. Thus, the purpose of this phenomenological study was to begin to understand the role secondary science teacher efficacy plays in overcoming obstacles in blended learning implementation and how the pedagogical approach is sustained over time. Specifically, the goal of this research was to discover common

themes and patterns regarding the influence secondary science teacher efficacy has on the ability to overcome obstacles and sustain the blended learning pedagogical approach.

Conducting this phenomenological study provided insight as how other stakeholders can support and equip teachers with the tools to successfully implement the blended learning pedagogical approach in the secondary science classroom. Teachers, according to King and Nomikou (2017), are aware of the need to improve instruction for students but do not always have the support and resources to make it happen. Velthuis (2015) asserted the successful implementation of a pedagogical approach is dependent on the efficacy of the teacher. Uncovering the role science teacher efficacy plays in overcoming obstacles and sustaining blended learning may help stakeholders begin to understand how to support the effort.

Research Questions

1. To what extent does the self-efficacy of secondary science teachers influence the implementation of blended learning?
2. How do secondary science teachers' experiences overcoming obstacles in blended learning implementation reflect those of mastery experiences, vicarious experiences, verbal persuasion, and emotional state?

Rationale, Relevance, and Significance of the Study

As the blended learning pedagogical approach becomes more commonplace in the K–12 setting, it is important to research all facets of it to ensure it is a best research-based practice and not just an education fad. But, the bulk of the research on blended learning has been conducted at the undergraduate level with little attention to the K–12 setting (Gough, Dejong, Grundmeyer, & Baron, 2017). Research conducted in the K–12 setting focuses on the student with little focus on

the role of the teacher and sustainability of the pedagogical approach (Halverson, Graham, Spring, Drysdale, & Henrie, 2014).

When research has focused on teachers it is about preservice teachers and the teachers who are in the initial stages of implementation (Kleinsasser, 2014; Palmer et al., 2015). As teachers move beyond the initial stages of implementation of blended learning in the classroom, they encounter issues that would not surface for preservice teachers and those who are in the initial stage of implementation. The role teacher efficacy plays in how the teacher perseveres through the issues is an area of concern as the problems could lead to the abandonment of the pedagogical approach. Teacher efficacy has a direct effect on student performance (Reynolds, 2018). The teachers in this position need support, but it is an area of little research. This research addressed the gap in the literature caused by inattention to the teacher's role in adoption of and fidelity to blended learning.

The results of this phenomenological study are of interest to secondary teachers, administrators, and curriculum developers to improve their adoption and implementation of pedagogical approaches. Beginning to understand the influence teacher efficacy has in the implementation of the blended learning pedagogical approach could help create coaching and other professional learning opportunities to best meet the needs of the learners. Additionally, the results of this study will allow secondary teachers, administrators, and curriculum developers adjust how teachers are supported using the blended learning pedagogical approach in the secondary science classroom.

Definition of Terms

Blended learning. A pedagogical approach where students learn partially through online learning and partially through in person teaching with some choice over "time, place, path, and/or pace" of the material (Horn & Staker, 2015, p. 35).

Emotional arousal. The emotional state of a person and how it can affect his or her confidence. Stress can be a motivating factor for a person, but once it turns into anxiety it can be damaging to one's self-efficacy as it is read as a deficiency (Bandura, 1977; Bandura, 1989). A person's mood affects their self-efficacy, when someone is in a better mood their self-efficacy is enhanced and in the same respect when someone is more depressed their self-efficacy is diminished (Bandura, 1994).

Flipped Classroom. A submodel of the rotation model in the blended learning pedagogical approach. In this modality, the students watch videos to receive the traditional classroom lectures minimizing whole class instruction. Classroom time is used for small group instruction and work traditionally completed at home (Bergmann & Sams, 2012; Horn & Staker, 2015).

Mastery experiences. When a person finds success during a difficult experience. Bandura (1994) found this to be the most effective way to cultivate a strong sense of self-efficacy.

Teacher efficacy. A person's belief in their ability to complete a task (Bandura, 1977).

Verbal persuasion. When someone is led through the words of another to believe they can succeed (Bandura, 1994).

Vicarious experiences. When a person learns through social models. Witnessing the success of others through effort, leads a person to believe they are capable of success (Bandura, 1994).

Assumptions, Delimitations, and Limitations

Assumptions. Three assumptions about this phenomenological study are that teacher efficacy influences the implementation of the blended learning pedagogical approach; the blended learning pedagogical approach will continue to be used in secondary science classrooms; and the secondary science teachers working at a high school in the southern United States would be the best teachers to share their experience. The researcher also hoped the two interviews and the focus group would collect enough data about the shared lived experience to begin to determine the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach. The phenomenological method was the best approach for this study.

Delimitations. The study was restricted to a qualitative methodology, specifically the phenomenological approach. To collect information for this phenomenological study, purposeful sampling was used to select participants according to specific requirements. The participants were limited to those who teach secondary science at the same high school in the southern United States with at least four years' experience using the blended learning pedagogical approach. A limited number of participants took part in this phenomenological study. A group of nine secondary science teachers were interviewed and provided data analyzed by the researcher. The sample population consisted of two males and seven females. Four teachers taught physical science courses and five teachers taught both physical and life science courses.

Limitations. The data of the study was collected through interviews, creating a potential limitation as the researcher had to rely solely on the participants' responses. The participants provided as much detail as possible clearly articulating their responses. The goal of phenomenological research is to describe and understand the lived experience of the participants (Moustakas, 1994).

The sample size of nine secondary science teachers presents another potential limitation for the phenomenological study. The participants who took part in the phenomenological study voluntarily diminished the available sample limiting the information collected (Vähäsantanen, 2015). The researcher needed to collect enough information from the sample to completely describe the shared experience of the secondary science teachers in the phenomenological study (Moustakas, 1994).

Summary

The phenomenological study focused on the influence of secondary science teacher efficacy in overcoming obstacles and sustaining the blended learning pedagogical approach. The research questions focused on the influence of teacher efficacy on a group of secondary science teachers at a high school in the southern United States. The data of the phenomenological study was collected through two interviews and a focus group to examine the influence of individual teacher efficacy and collective teacher efficacy. In Chapter 2, the literature of teacher efficacy and blended learning will be examined. A brief history of student-centered instructional approaches was also included to understand the evolution of the blended learning pedagogical approach. In Chapter 3, the phenomenology method, research design, and data collection tools are clearly defined and elaborated upon. In Chapter 4, the results of the study are provided. Finally, Chapter 5 will discuss the results, their meaning, and further suggestions for research.

Chapter 2: Literature Review

Introduction

As students are educated in the K–12 setting, the teacher traditionally uses instruction time to lecture while the students take notes. Some of the teachers' lectures could be as long as 50 minutes in length (Khan, 2012). Many high school graduates can easily recall a teacher who spent the entire class lecturing, expecting students to comprehend material based on the lecture alone. Using this pedagogical approach for long periods of time without teacher/student interaction demonstrates the amount of knowledge the teacher has, leaving the students to passively participate in their learning. Bergmann and Sams (2012) referred to long lectures as the teacher acting like a *sage on the stage*, meaning the teacher is the focal point of the class disseminating information. Students in traditional classrooms where lecture is the focal point lack the ability to interact with the material in a meaningful way and after 15 minutes show a loss in retention of the material (Inaki, Anton, & Prada, 2015; Sousa, 2011; Sprenger, 2010).

According to Bergmann and Sams (2012), the teacher can better serve the needs of the students by acting as the *guide on the side* allowing students to collaborate to learn the material. When the teacher is not the focal point of the class, students can take an active role in their learning and become the center of the classroom (Fisher, Ross, Laferriere, & Maritz, 2017). One way researchers suggested this can be accomplished is by using blended learning (Sousa, 2012). Blended learning, according to Horn and Staker (2015), is a student-centered pedagogical approach where students learn partially through online learning and partially through in person teaching with some choice over "time, place, path, and/or pace" of the material (p. 35). Most models of blended learning fall within one of four categories—rotation, flex, a la carte, and enhanced virtual—with the teachers selecting the model that best works for their subject area and

grade. Horn and Staker asserted that blended learning is an effective and innovative pedagogical approach which enables the teacher to meet the increasing demands of the classroom. But it is not easy to implement, as Bergmann and Sams (2012) contended many teachers abandon this pedagogical approach in favor of the traditional classroom because of the pre-planning work.

At the core of any classroom is the teacher and the success or failure of any pedagogical approach is dependent on him or her (Pedota, 2015). But success is not only based on teachers' content knowledge and education; their teacher efficacy plays a role as well (Bandura, 1977). The efficacy of teachers using the blended learning pedagogical approach beyond the initial time of implementation is an under examined research-based construct because blended learning is considered a newer pedagogical approach (Kleinsasser, 2014). To improve classroom instruction, it is important to understand how teachers overcome barriers such as the lack of professional development, stakeholder support, and adequate resources (Baucum-Manross, 2016; Cullen & Greene, 2011; Drysdale, Graham, Spring, & Halverson, 2013; Kleinsasser, 2014; Moskal, Dziuban, & Hartman, 2013; Reilly et al., 2014; Zhang 2014;). This literature review explores the concepts that guide this qualitative study on understanding how teacher efficacy can influence the implementation and sustainability of blended learning in secondary science classrooms.

The blended learning pedagogical approach, as Hainline et al. (2010) asserted, is in response to the idea that one size does not fit all like in the traditional teacher-directed classroom. When the instructional model is executed successfully with online delivery of materials, Ross (2012) suggested students learn anytime and anywhere, actively participating in learning outside of the school day. Students can receive immediate personal feedback from the teachers within the blended learning classroom (Podota, 2015).

The traditional education model is unable to support individual students as much of the teaching time is dedicated to the whole class. This is a change to the standard education model and is transforming the idea of how students learn. Because of this shift in learning and the teacher's role, it is important to examine the influence teacher efficacy has on the implementation and sustainability of this pedagogical approach. According to Kleinsasser (2014), the study of teacher efficacy in the United States has increased over the last few decades. Yeh, Huang, and Yeh (2011) found that the blended learning affected the teacher efficacy of preservice teachers in Taiwan. Velthius (2015) discovered that teachers with high teacher efficacy are more likely to implement new strategies in their classes to improve student achievement, but the lack of professional development available deters many teachers from attempting new pedagogical approaches. However, additional research is needed to determine the motivation for teacher to use and sustain the blended learning pedagogical approach as well as the training and support required to continue its use. Much of the research conducted has been outside of the United States and at the post-secondary level focusing on preservice teachers with little consideration given to the influence of teacher efficacy at the secondary level.

As education evolves from the teacher-directed classroom to a student-centered classroom, it is important to study this shift and the role teacher efficacy plays in this change. Kleinsasser (2014) contended teacher efficacy affects both the student and the teacher in the classroom. According to Velthuis (2015), teacher efficacy develops differently for each teacher based on experiences and content knowledge, so it is important to understand its effect in the classroom. Understanding the teacher's role in the success of blended learning can provide insight as to how teacher efficacy can affect pedagogy.

Blended learning, as Ross (2012) discovered in Malaysia, reshapes learners' thoughts about school and affects subsequent classes. While some students need more time to complete assignments, other students rush through assignments with no problems. Because of the flexibility for students through their choices in this instructional arrangement, Markoff (2014) and Kuo, Belland, Schroder, and Walker, (2014) asserted that teachers use blended learning to best meet the needs of the students as there is no one correct way to design a classroom using this pedagogical approach.

However, this model is not without criticism. Some researchers contend students learn better in a traditional teacher-directed classroom as they are used to listening to the teacher lecture and prefer it to self-learning (Chang, 2003). In addition, Helle, Laakkonen, Tuijula, & Vermunt (2013) argued that as students are left to self-manage their learning, learning may suffer as it requires collaboration between the student and the teacher. This is new territory for many students in England (Vermunt, 2013). Collaboration is a soft skill many professions expect applicants to have but is not always taught in the classroom (Merz, 2014). These soft skills or self-regulatory skills, according to Weimer (2010), are the personal learning skills students need to monitor their own behaviors and skills which are necessary in a classroom that uses blended learning. Blended learning requires students to collaborate and self-regulate, so those who have low self-regulatory skills will struggle in a class that uses this pedagogical approach (Van Laer & Elen, 2016). The efficacy of the teacher plays a role as to how the classroom functions as well as collaboration. Teachers with high teacher efficacy believe they can teach any student, whereas teachers with low teacher efficacy do not believe they can reach all students (Bandura, 1997; Palmer et al., 2015).

The results of this phenomenological study may interest secondary teachers, administrators, and curriculum developers to improve their adoption and implementation of blended learning. Acknowledging the role teacher efficacy plays in the implementation of the blended learning pedagogical approach could help create coaching and other professional learning opportunities to best meet the needs of students. Additionally, the results of this phenomenological study may allow secondary teachers, administrators, and curriculum developers to make changes to how teachers are supported when using blended learning pedagogical approach in the secondary science classroom. Specifically studying a group of secondary science teachers in the southern United States to learn how they overcame obstacles and sustained the blended learning pedagogical approach over time will add to the growing research on teacher efficacy and blended learning.

Many researchers, such as Bergmann (2018) and Horn and Staker (2015), contended using phrases such as flipped classroom s or virtual learning to describe blended learning neglects the original intent of the instructional model, which is to meet the needs of the individual students. Some teachers jump on the bandwagon of different ideas yet do not become skilled in its delivery and their understanding of the pedagogical approach affects their lessons (Courcier, 2007). Understanding the pedagogical approach is not the only way a lesson can be affected. The emotional state, attitude toward innovation, and years of service can affect how an educator uses different pedagogical approaches (Morozova & Malysheva, 2016). As with any pedagogical approach, the teacher needs to believe the approach will positively affect students or it will not be implemented with fidelity (Bandura, 1997).

Many teachers, regardless of training or support, continue to use the blended learning pedagogical approach (Stockwell et al., 2015). Much like students taking control of their

learning, it is important teachers understand and support a pedagogical approach as it is essential to its success and development of the teacher. The efficacy of teachers improves as their curriculum knowledge grows and they develop resiliency (Kleinsasser, 2014). If teachers do not buy into the process, empirical research will not matter. In other words, as education evolves, it is important for the teacher to take ownership over the delivery of the material transitioning to a class that is effectively student centered (Tucker & Umphrey, 2013). With the implementation of any innovative learning strategy, ongoing professional development focusing on curriculum first and then the strategies to address the needs of the students (Horn & Staker, 2015). Ongoing professional development is fundamental to raising teacher efficacy in blended learning (Moskal; Dziuban, & Hartman, 2013; Napier et al., 2011; Palmer et al., 2015; Velthuis, 2015; and Watson, 2008)

Much of the research on blended learning involves post-secondary institutions with little focus on the secondary classroom, specifically the secondary science classroom. Many studies at the undergraduate level concluded that science classes would benefit from using the blended learning pedagogical approach as it is one of the most promising pedagogical approaches using student collaboration and choice to complete the work (Cheung et al., 2018; Nair & Bindu, 2016). Few studies have examined secondary classrooms and those that do have found that blended learning has a positive effect on students, namely their self-efficacy and performance (Cheung et al., 2018; Kazu & Demirkolb, 2014; Yapici & Akbayin, 2012). However, few studies have been found investigating teachers' motivation for using and sustaining blended learning and the effect its implementation has on teacher practices. Siemens et al. (2015) concluded that the influence of the teacher on the effectiveness of blended learning in the classroom has not been researched. Tomory and Watson (2015) suggest the need to examine teachers' motivation for

using blended learning in secondary science classrooms to determine how to best support teachers. The phenomenological study on the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach will add to the literature.

When research has focused on teachers, it is about preservice teachers and the teachers who are in the initial stages of implementation of blended learning; overlooking the importance of researching in-service teachers (Kleinsasser, 2014; Palmer et al., 2015; Parra, 2010). As teachers move beyond the initial stages of implementation of blended learning in the classroom, they encounter issues that would not surface for preservice teachers and those who are in the initial stage of implementation. The role teacher efficacy plays in whether a teacher sustains or abandons a pedagogical approach is worth investigating in this phenomenological study. Reynolds (2018) concluded that teacher efficacy is a multi-faceted idea and can impact student performance, but studies need to address both preservice and in-service teachers. This phenomenological study addressed the gap in the literature on the teacher's role in adoption of and fidelity to blended learning.

The rest of this chapter is organized as a comprehensive literature review detailing research conducted on blended learning and teacher efficacy in the secondary science classroom. The conceptual framework of blended learning and teacher efficacy that guided the research is described first. The next section reviews the research literature and methodological literature to provide a better understanding of the blended learning and teacher efficacy. Following this section, the review methodological issues and the synthesis of research findings is reviewed. Finally, this chapter critiques previous research and summarizes the information.

Conceptual Framework

Blended learning (Horn & Staker, 2015) will be the primary framework used to guide this phenomenological study. In addition, teacher efficacy theory will be used as a secondary lens through which this phenomenological study will be viewed (Bandura, 1977). The combination of these two frameworks will help stakeholders understand how and why teachers adopt different pedagogical approaches in their classes. In this section, definitions and descriptions of each framework is presented and a discussion of how both frameworks interact to guide this phenomenological study is discussed.

Blended learning. As defined by Horn and Staker (2015), blended learning is a pedagogical approach where students learn partially through online learning and partially through in person teaching where the students have some choice over "time, place, path, and/or pace" of the material (p. 35). Staker (2019) maintained blended learning is meant to improve how the teacher facilitates lessons and computers should not be used to replace the teacher. Most models of blended learning fall within one of four categories—flex, a la carte, enhanced virtual, and rotation—and the teachers select the model that works best for their subject area and grade.

The first category of blended learning is the flex model (Horn & Staker, 2015). In the flex model, the backbone is the online component as this is where the students spend majority of their time (Horn & Staker, 2015). The students complete work according to a customized schedule in a brick and mortar setting with a teacher of record available for support. In this model, the students have greater control over the pace of their learning, and in which order the work is completed.

The second category of blended learning models is the a la carte model (Horn & Staker, 2015). The a la carte model allows the students to take a course online while the other classes in

the students' school day are in the traditional setting. This model is used in smaller schools where it is not possible to provide certain classes due to staffing. A major difference between the flex and a la carte models is when learning through the flex model the teacher of record is in person and in the a la carte model the teacher is online.

The third category of Blended Learning models is the enhanced virtual model (Horn & Staker, 2015). The enhanced virtual model takes place in the brick and mortar setting with a face-to-face teacher for instruction. Any work that needs to be completed after the direct instruction can be worked on in a remote location. The class meets at scheduled times with majority of the work completed in remote locations.

The fourth category of blended learning models, known as the rotation model, encompasses station rotation, lab rotation, flipped classroom, and individual rotation. The students rotate in the rotation model between online and face-to-face instruction at the teacher's discretion (Horn & Staker, 2015). Using a station rotation model, the students rotate in groups to different stations within a classroom as shown in Figure 1. The rotation model is most commonly used in the elementary setting. In a lab rotation, shown in Figure 2, the students complete online learning in a computer lab while still receiving traditional instruction in the classroom. The flipped classroom flips the traditional idea of instruction, shown in Figure 3. The students watch a recorded lecture as homework and then complete work that is traditionally reserved for homework in the classroom where the teacher facilitated the work (Bergmann & Sams, 2012). Individual rotation allows for the students to complete work according to a personalized list of tasks determined by the teacher or an algorithm with not all students completing the same tasks, as shown in Figure 4 (Horn & Staker, 2015). For the purposes of this phenomenological study,

the rotation model will be examined, specifically the flipped classroom instructional model as it is the model used by participants.

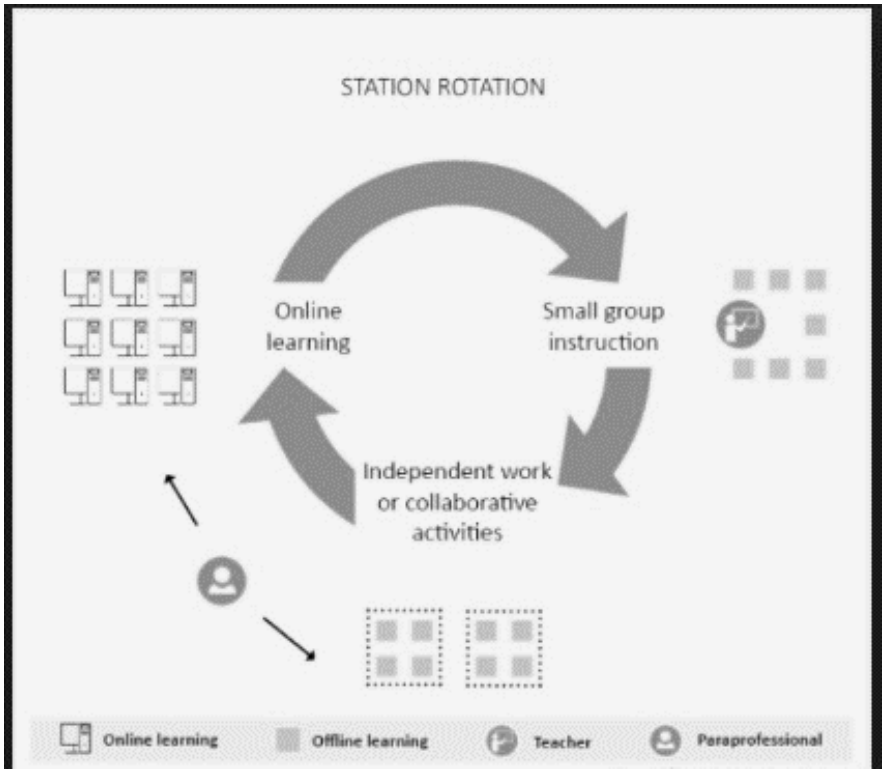

Figure 1. Station rotation model (From "What is blended learning?" by M. B. Horn and H. Staker, in *Blended: Using Disruptive Innovation to Improve Schools*, 2015, San Francisco: Jossey-Bass. Reprinted with permission.)

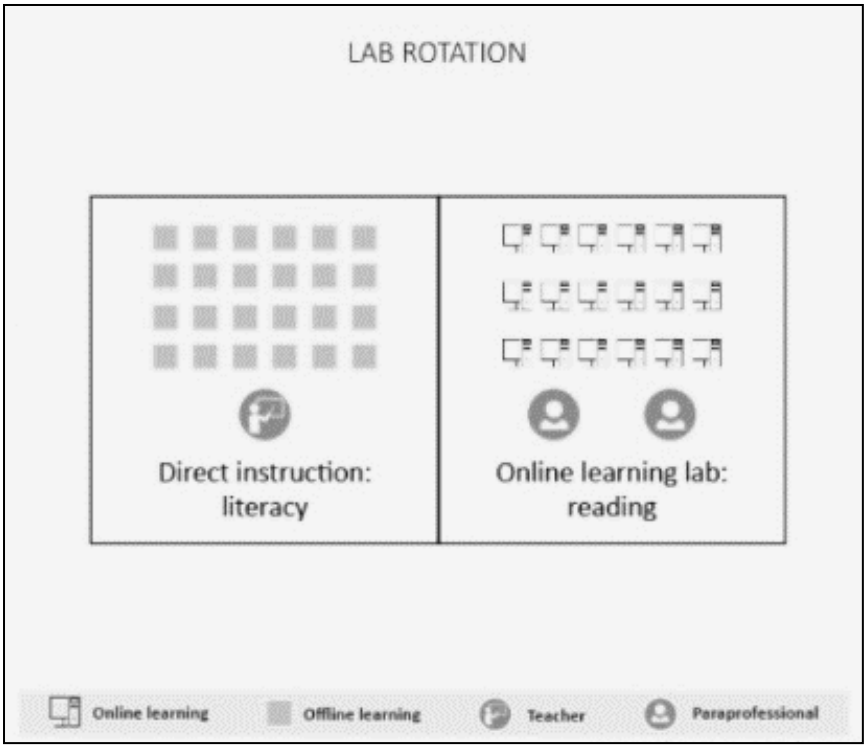

Figure 2. Lab rotation model (From "What is blended learning?" by M. B. Horn and H. Staker, in *Blended: Using Disruptive Innovation to Improve Schools*, 2015, San Francisco: Jossey-Bass. Reprinted with permission.)

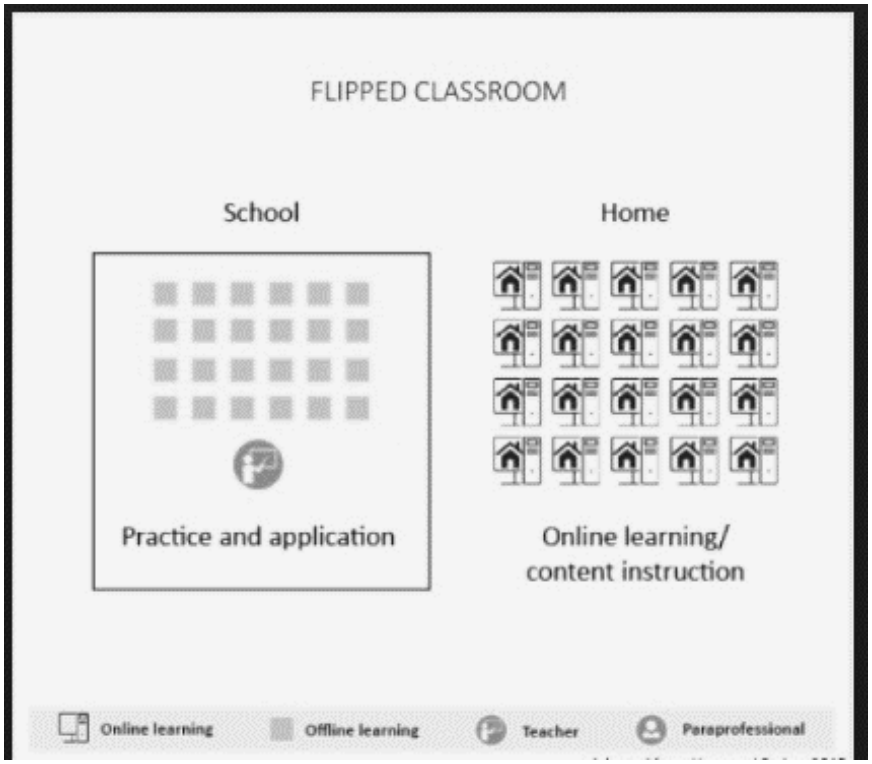

Figure 3. Flipped classroom model (From "What is blended learning?" by M. B. Horn and H. Staker, in *Blended: Using Disruptive Innovation to Improve Schools*, 2015, San Francisco: Jossey-Bass. Reprinted with permission.)

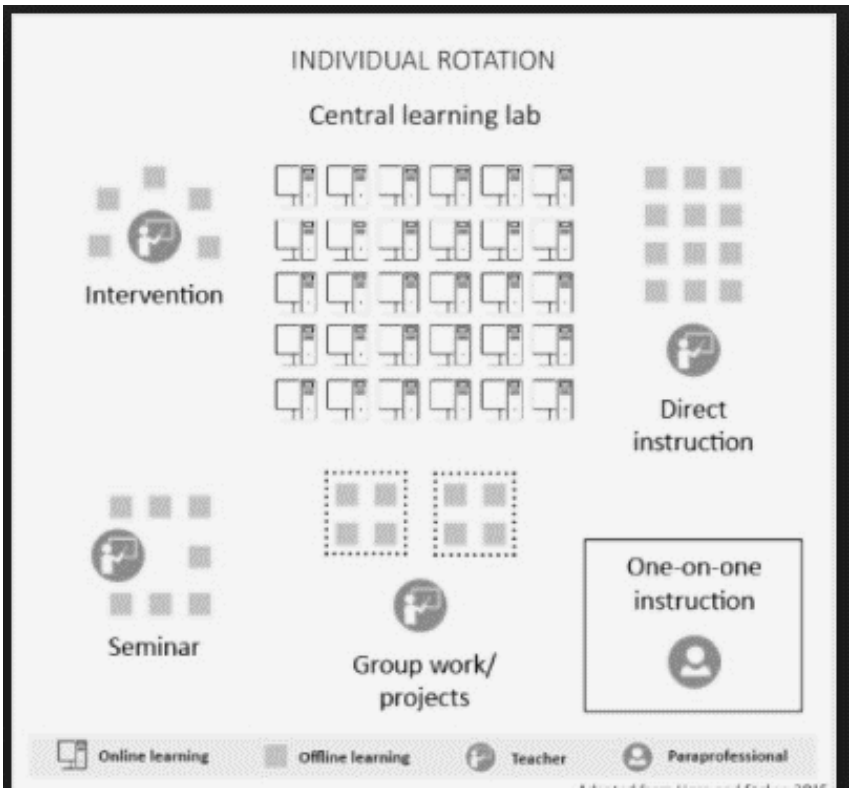

Figure 4. Individual rotation model (From "What is blended learning?" by M. B. Horn and H. Staker, in *Blended: Using Disruptive Innovation to Improve Schools*, 2015, San Francisco: Jossey-Bass. Reprinted with permission.)

As a conceptual framework, blended learning takes the beneficial aspects of traditional teacher-directed classrooms and online learning and blends the two pedagogical approaches creating a student-centered environment. In a classroom that uses the blended learning pedagogical approach, the students are given choice over how they learn instead of learning by teacher direction alone (Staker, 2015). Posting assignments online for students to access anywhere is not blended learning, rather it is using technology as part of a traditional classroom model. Blended learning extends beyond using technology as a tool in the classroom and instead uses online learning and face-to-face lessons together to drive the instruction (Horn & Staker,

2015). As with any pedagogical approach adoption, teachers must find motivation and understanding for it to be implemented with fidelity.

Much of the research on blended learning has focused on technology use, not on the teachers in the K–12 setting (Bergmann & Sams, 2012; Drysdale et al., 2013). Technology is an important component in the implementation of blended learning, but it is also necessary to understand the role of the teacher in this process and how the teacher affects the classroom. Holistic research, specifically addressing the teachers' role in the success of blended learning, is needed to better understand their influence (Delialioğlu, 2012; Halverson et al., 2014). Because blended learning is a newer pedagogical approach, there is a need for additional research in the K–12 setting (BakarNordin & Alias, 2013; Osgerby, 2013; Van Laer & Elon, 2016). Examining why teachers adopt the pedagogical approach, how they overcame barriers, and why they persevere through obstacles will add to the body of research on blended learning in order to understand the effectiveness of this pedagogical approach toward the improvement of instruction.

Teacher efficacy. Teacher efficacy, as defined by Bandura (1977) "determines whether coping behavior will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and aversive experiences" (p. 191). This idea is situated within social cognitive theory expanded and researched by Albert Bandura. In his theory, Bandura (1989) contends development occurs throughout a person's life, and how and when something is learned affects the reaction to the situation and retention of the situation. The development is best illustrated using a triadic reciprocal determinism model highlighting personal, environmental, and behavioral determinants.

In his model, Bandura (1989) explained our actions are influenced by personal choices, our environment, and behavior. Bandura defined personal determinants as the skills, qualities, and interests a person holds and how these items interact with others—how a person behaves is influenced by personal traits and the world around them. For example, a student who does not like school may negatively act out in class causing the teacher to change the classroom environment based on the student's actions. The environment influences the frequency and intensity of the behavior and the teacher's reaction can reinforce the student's hopeless idea of school (Cherry, 2018). The other students in the class are affected by the actions of the student and this may cause a tense classroom environment. These three concepts influence each other, but at times one may be stronger than the others (Bandura, 1989).

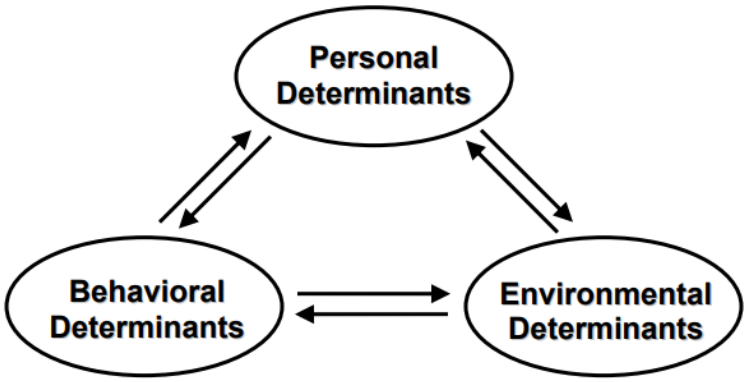

Figure 5. Bandura's triadic reciprocal determination (Bandura, 2007).

Bandura (1989) asserts the triad of personal, environmental, and behavioral determinants shape how a self-regulated learner processes material. The way a person behaves is heavily influenced by his or her teacher efficacy.

Teacher efficacy is the ability for a person to believe a goal can be met. A person's teacher efficacy affects every part of his or her life. When the experiences are consistent, the more likely teacher efficacy will be positively changed (Bandura, 1977). Those who believe they

can succeed are more likely to succeed. For example, teacher efficacy can influence how a pedagogical approach is implemented in the classroom and how a teacher reacts to obstacles. Through examining 188 preservice teachers in Israel, Michalsky (2012) found that the better preservice science teachers are prepared while enrolled a teacher preparation program, the higher their teacher efficacy is in high school science content. Teacher efficacy can be developed through mastery learning, vicarious experiences, verbal persuasion, and emotional arousal. Klassen et al. (2010) found, through a meta-analysis of research from 1998–2009, that the four sources of teacher efficacy support each other and led to teachers trying new challenges.

Mastery experiences. According to Bandura (1994) mastery experiences, defined as finding success during a difficult experience, is the most effective way to cultivate a strong sense of teacher efficacy. A person's perception of his or her effort regarding success determines his or her teacher efficacy. When someone perseveres and experiences success, their teacher efficacy strengthens; when he or she experience failure before his or her teacher efficacy has a strong foundation, then their teacher efficacy weakens (Bandura, 1977). This does not mean that one failure destroys a person; experiencing failure is a necessary part of life. The timing of the failure and the person's life experience determines the effect on teacher efficacy. Failure is an important component of teaching someone how to overcome obstacles. If someone believes he or she have the skills to succeed, he or she can develop strength because of the adversity (Bandura, 1994). Unruh, Peters, and Willis, (2016) found that after teachers had mastery experiences with the flipped model, they reported higher efficacy. By comparison, those who have never experienced failure lack a foundation to build upon his or her teacher efficacy.

Vicarious experiences. Mastery experience is not the sole way a person develops teacher efficacy (Bandura, 1977). The second way is through vicarious experiences. Vicarious

experiences are defined as those in when a person learns through social models. Witnessing the success of others through effort leads a person to believe they are capable of the same success (Bandura, 1994). This is dependent on how similar the observer views the social model. The greater the similarity, the more likely the success will be the same. Although if the observer views someone as too different, then he or she is not influenced by the social model. Keller and Kusko (2015) found teacher efficacy rose when they had time to collaborate with each other which in turn improved student performance. Diversified modeling for novice teachers is important viewing a variety of social models can lead a person to believe she or he can be successful because different types of people were successful (Bandura, 1977).

Verbal persuasion. The third source of teacher efficacy development is when someone is led through the words of another to believe they can succeed (Bandura, 1994). It is difficult to create a foundation for a strong teacher efficacy based on verbal persuasion alone (Bandura, 1994). Using positive language when addressing others can determine how an obstacle is faced. Providing feedback using constructive means, allows for a person to overcome the situation (Bandura, 1977). Just as someone can find confidence in positive language, negative language can convince someone that they lack the ability to complete the task causing them to give up when faced with adversity (Bandura, 1994).

Emotional arousal. The emotional state of a person can affect his or her teacher efficacy (Bandura, 1977). Stress can be a motivating factor for a person, but once it turns into anxiety it can be damaging to one's teacher efficacy as it can be viewed as a deficiency (Bandura, 1977; Bandura, 1989). A person's mood affects his or her teacher efficacy, when someone is in a better mood his or her teacher efficacy is enhanced and in the same respect when someone is depressed his or her teacher efficacy is diminished (Bandura, 1994). Cognitive motivation plays a major

role in how a person handles adversity. Wanner and Palmer (2015) reported teachers had higher teacher efficacy when they were supported by administrators. Teacher efficacy can impact the ability of a teacher, especially when using a new pedagogical approach. The success of the implementation is dependent on the perseverance of the teacher.

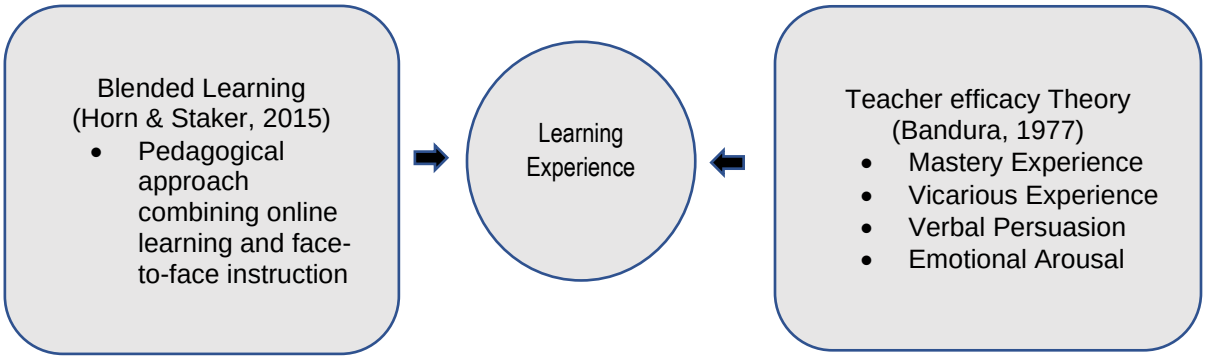

Figure 6. Connecting the frameworks.

Using the blended learning and teacher efficacy lenses to investigate the phenomenological study will hopefully provide a new perspective to the body of literature on this pedagogical approach. The four sources of teacher efficacy can influence how new pedagogical approaches are implemented in the classroom, specifically blended learning. Examining teacher efficacy while using blended learning began to answer why teachers implement new pedagogical approaches in their classes and sustain them while others abandon them. Additionally, this research can help discover what motivates some teachers to persevere through difficult times. As how one reacts to change is at the core of teacher efficacy, this research shows how teaching practices of individuals have changed over time with the implementation of blended learning. With a newer pedagogical approach such as blended learning, it is important to examine how one can overcome the fear of change to be successfully implement a pedagogical approach that could positively influence student achievement, as shown

in Figure 6. Teacher efficacy has been linked to student achievement and is therefore is an important aspect of education to examine (Reynolds, 2018).

Review of Research Literature and Methodological Literature

Before the term blended learning emerged, students experienced a blend of instruction in the classroom due to CD-ROMs and programs like Read 180 (Bersin, 2004; Horn & Staker, 2015). But the idea of learning beyond the four walls of a classroom emerged during the 1840s with Sir Isaac Pitman offering the first distance learning course on shorthand. Pitman would mail students postcards with shorthand, and they would mail the assignment back (Kentnor, 2015). This allowed people across England to learn skills and trades normally unavailable due to their location. Thirty years later in the United States, the Society to Encourage Studies at Home was founded, and other distance learning schools soon followed. This trend continued to grow throughout the rest of the 1800s and into the 1900s allowing nontraditional students to expand their knowledge base while receiving a quality education outside a brick and mortar institution.

Emergence of blended learning. With the invention of radio and then television, the landscape of education changed again but more so in the K–12 classroom. Teachers began using television in the classroom to visually teach concepts, and channels like the Public Broadcasting Service brought educational programming into the home (Kentnor, 2015). The invention of the personal computer, as well as the internet, changed both school and home life for students. Teachers did not embrace these tools right away. But by the late 1990s, more schools, both K–12 and post-secondary institutions, were using computers and the internet to help with instructional delivery. As the internet became widespread and more common in people's homes, online learning emerged as a form of distance learning, but many programs failed due to ineffective curriculum, poor understanding of the online learner, and lack of administrative support

(Kentnor, 2015; Siemens et al., 2015). To solve these problems, some classes began to combine different approaches by meeting in person but completing work remotely. While some research supports using the blended learning pedagogical approach in the K–12 setting, it is not always successful (Baucum-Manross, 2016; Moskal et al., 2013; Ocak, 2011). Many teachers abandon the blended learning pedagogical approach and return to the traditional teacher-directed lecture class as they do not feel supported by administrators, have appropriate resources, and/or have proper training (Kotter, 1996; Rajkoomar & Raju, 2016; Velthius, 2015; Yuen, 2011) Implementing the blended learning pedagogical approach requires a lot of preparation from the teacher, leading teachers without training or understanding of the preparatory work to abandon the approach (Barber, 2011).

Although blended learning is a newer pedagogical approach, the use of technology in the classroom to engage learners is not a new concept. Schools have used technology as an educational tool dating back to the 1970s with the introduction of CD-ROMs and other computer-based games (Bergmann & Sams, 2012; Horn & Staker, 2015). In fact, The Oregon Trail program, a game played in many schools, was invented by three preservice teachers in 1971. The teachers were trying to make a lesson on westward movement more interesting for middle school students (Wong, 2017). Because of programs like this, the teachers began to discuss how to meet the needs of individual learners, not just the entire class.

Researchers have studied teachers, both preservice and in-service, as they transition to a classroom that uses the blended learning pedagogical approach. Hao and Lee (2016) studied preservice teachers concerns in a flipped classroom. In the K–12 setting, Brunsell and Horejsi (2013) examined the effectiveness of the blended learning pedagogical approach in the secondary science classroom. Ho, Nakamori, Ho, and Lim (2014) analyzed how blended learning

helps science teachers transform their classes. Yuen (2011) examined the post-secondary teachers' experience in classrooms that used the blended learning pedagogical approach in China. Barber (2011) explored post-secondary teachers' transition from the traditional teacher-directed class to one that uses the blended learning pedagogical approach. Teacher efficacy in science classrooms has also been explored. Abello (2018) examined how professional learning influences teacher efficacy in a blended learning class. Blended learning is an effective pedagogical approach, but many factors can influence its effectiveness. Teacher efficacy is affected more by content knowledge than the pedagogical approach used in class. Kelly and Denson (2017) explored science teacher efficacy in blended learning classrooms. Velthuis (2015) analyzed how teacher efficacy develops according to their curriculum knowledge and their experiences. In Cyprus, Olmez and Ozbas (2017) explored the efficacy of 200 high school science teachers and found the years of experience did not influence the efficacy as much their preservice preparation. Olmez and Ozbas recommended that researchers continue to examine teacher efficacy and compare it to teachers in other countries.

The current classroom model dominating K–12 schools is based on an idea from over a century ago meant to standardize learning by grouping students according to age (Horn & Staker, 2015). This pedagogical approach mimicked the manufacturing factory model in an attempt to get more students to graduate. This approach helped more students attend high school and graduate in the early 1900s. However, according to Horn and Staker, this model does not meet the needs of 21st century learners as it does not allow for a personalized educational experience.

Foundations of blended learning. Blended learning creates a "blend" of face-to-face and online learning. Face to face and online learning both offer advantages and disadvantages that together create an effective learning environment based on the needs of the learners

(Stockwell et al., 2015). Blended learning, as defined by Horn and Staker (2015), is a pedagogical approach where students learn partially through online learning and partially through face-to-face teaching where students have some choice over "time, place, path, and/or pace" of the material (p. 35). Some researchers contend that because of the domination of technology, student brains have been rewired creating an environment where teachers need to use innovative techniques to engage the learners or face losing their attention (Sousa, 2017).

To meet the needs of students, teachers must be aware of student attention cycles and plan lessons accordingly. In the United States, Bunce, Flens, and Neiles (2010) discovered that during a lecture, students' attention spans wane over the course of a lecture. When the class engages in non-lecture activities, common in a blended learning classroom, students' attention spans are greater. In a blended learning classroom, as Boelens, Voet, & De Wever, (2018) contended, the teacher can adapt the structure of the classroom to meet the needs of the students based on the curriculum. Nair and Bindu (2016) theorize blended learning creates an environment where students and teachers can collaborate and use technology while working toward a learning objective.

The central focus of the classroom becomes the curriculum as opposed to the teacher (Smith, 2014). As the curriculum shifts to the central focus of the classroom, the teacher can notice needs of the students and adapt lessons accordingly. According to Beetham and Sharp (2013), K–12 schools need to keep up with the needs of the 21st century learners. Most students currently learn in an environment designed for the factory/industrial era, as Parra (2010) stressed, not the technological age preparing for business and economic models that no longer exist.

The traditional classroom lecture delivery approach, which proved to work in the 20th century needs to be reviewed for the current learners. Tomory and Watson (2015) argued current

curricula and teacher-directed classrooms fail to address how 21st century learners learn. Teachers are expected to cover too much curriculum in too little time (Tomory & Watson, 2015). One solution to this problem for learners is using technology during instruction. Tomory and Watson discovered students in advanced science courses perform better in a blended learning class. Valentine (2002) stated that technology is changing education and items common to today's students were unthinkable in the classroom 50 years ago. As the use of technology has increased in daily life, the students do not attend school with the same mindset as the students from 50 years ago.

Technology in the classroom. Students in today's classrooms are digital natives, those who have been raised around digital technology. They are taught by teachers who, for the most part as Bennett, Matton, and Kervin (2008) asserted, passively learned through lecture in school. Parra (2010) contended students no longer live in a media-rich environment but a media-saturated environment. From the moment many students wake up until they go to bed, they are surrounded with technology from personal cell phones to navigational systems. It is a normal part of their life to encounter technology. Bennett et al. asserted digital natives do not learn the same as digital immigrants. Digital natives need to be challenged in an environment where innovation by the teacher addresses the present and the future instead of the past. In the Netherlands, as well as other parts of the world, the educational system has not changed to adapt to the technological advances. Bidarra and Rusman (2016) claimed this should not be ignored. They further elaborate that teacher-directed classes meet the needs of learners from the past, not the learners of today who encounter technology daily.

Koutropoulos (2011) discovered those labeled as digital natives do not have uniform skills, rather their skills are dependent on their experiences. These experiences are not dependent

on socio-economic status. Most everyone has access to technology, according to Parra (2010), even students who are economically disadvantaged. Although school may be the only access economically disadvantaged students have to different devices, it is even more important to use technology in the classroom to decrease the digital divide and close the opportunity gap (Hohlfeld, Ritzhaupt, Barron, & Kemker, 2008). Hohlfeld et al. further supported the need for teachers to understand the importance of using technology in the classroom and adapt to the needs of students, even though that was not how they were taught.

Blended learning theory. According to Christensen, Horn, and Staker (2013), it is important for those involved in determining whether to transition to blended learning and decide if the change is a sustaining or disruptive innovation. Sustaining innovation refers to station rotation, lab rotation, and flipped classroom as they represent the old and new teaching methods combined in a format of which teachers are comfortable facilitating. These modalities take the traditional classroom and interject new technology requiring teachers, as Horn and Staker (2015) proclaimed, to not only be experts in traditional teaching methods but also acquire new pedagogical expertise.

Disruptive innovation refers to individual rotation, flex, a la carte, and enhanced virtual as they represent a complete transformation of the learning environment. Horn and Staker (2015) stressed that online learning is central to disruptive innovation with the teacher transitioning from the disseminator of information to facilitator of learning "if students are learning in a blended setting, and you can't figure out where the front of the classroom is, then it is probably disruptive" (p. 76). The adult acts as a facilitator, but still plays a crucial role in the students' success. Disruptive innovation takes the variable of seat time out of the equation, focusing on the personalization of the curriculum for the individual student.

Of the two models of blended learning, sustaining innovation is commonly the first model teachers and schools attempt because it is a blend of traditional and new methods. Sustaining innovation generally is used to improve the traditional classroom within the existing school model (Horn & Staker, 2015). Majority of early disruptive innovation models focus on students at risk of dropping out or those who need credit recovery. Determining whether to use sustaining or disruptive innovation is dependent on the goal of using the blended learning pedagogical approach.

Implementation of blended learning. According to Moskal et al. (2013), the implementation of blended learning can be difficult as stakeholders need to adopt a new mindset because the students learn to think independently, manage their time, and become comfortable with technology. Classrooms that use the blended learning pedagogical approach are different than what most people are used to in a traditional classroom with the teacher lecturing while the students take notes (Kuo et al., 2014). Cilesiz (2011) postulated that administrators need to understand the challenges and successes of implementing blended learning to help teachers. Teachers and administrators, as Drysdale et al. (2013) found, need to work together to ensure blended learning is properly implemented. Without this understanding, administrators may be quick to force teachers to abandon the use of the blended learning pedagogical approach as it requires a change of thinking (Dufour & Marzano, 2011; Hipp et al., 2008; Valentine, 2012). Moskal et al. (2013) revealed stakeholders need to be part of the plan and implementation or teachers will struggle with fixing the details of it.

One way administration can support teachers is through ongoing professional development. Blended learning, as Holland and Piper (2016) described, is not one-way learning rather it is a two-way street with students and teachers sharing the experience. Students need to

take an active role in their learning, learning how to reflect and self-regulate (Van Laer & Elen, 2016). Providing teachers with initial training will allow for them to design the transition but will provide little support once they are using the pedagogical approach in class.

Research on blended learning. Research about the theory of blended learning has been limited in regard to teachers' use of it as well as implementation in the K–12 setting. Many studies have focused on the effectiveness of using technology in the classroom, failing to address holistic issues and the influence of the teacher (Bergmann & Sams, 2012; Delialioğlu, 2012; Gerbic, 2011). The limited studies that focus on the teacher focus on preservice teacher or teachers during initial implementation only (Atmacasoy & Aksu, 2018; Kanchanachaya & Shinasharkey, 2015; Kang & Sonya, 2017; Orit & Gila, 2016). Even then, most of the attention examines technology with little research on teacher views and beliefs (Gerbic, 2011). Overall, most of the research on blended learning focuses on the technology and the use of the pedagogical approach at postsecondary institutions. Little research exists that addresses the teacher using blended learning in the K–12 setting (Halverson et al., 2014).

Blended learning and teacher beliefs. Various research studies on blended learning show common trends and conclude teachers who use this pedagogical approach reported growth in similar areas. One such area is greater class satisfaction and more engagement. Stockwell et al. (2015) discovered that students scheduled in a blended learning classroom expressed the want to attend class and were better prepared for the lesson. Classroom attendance also improved in classes that have transitioned to a blended learning environment (Stockwell et al., 2015). Yildirim (2017) reported those enrolled in a blended learning classroom exhibited greater retention of knowledge and had better participation in class discussions. Multiple studies

concluded students interacted more with the teacher and other students in a blended learning environment (Napier et al., 2011; Brunsell & Horejsi, 2013).

In the Netherlands, Bidarra and Rusman (2016) found students and teachers reported more authentic learning experiences in a blended learning environment that kept them engaged. Students in Turkey, according to Yapici and Akbayin (2012), enjoyed the flexibility and opportunity to use other sources for assistance. In the Midwestern United States, Baum (2013) uncovered that both teachers and students believe that learning using the blended learning pedagogical approach was a more effective use of class time. The repeated review through watching the videos multiple times in a flipped classroom benefitted students who struggled to understand the basic objectives of the class (Precel, Eshet-Alkalai, & Alberton, 2009). Altemueller and Lindquist (2017) and Gough et al. (2017) asserted that the blended learning pedagogical approach is a better structure for struggling learners.

Blended learning and teacher practices. Research on blended learning concludes students who learn using this pedagogical approach reported better assessment performance, immediate feedback, and student choice. Majority of the research reported that students had better performance on tests and were actively engaged in class (Altemueller & Lindquist, 2017; Kazu & Demirkolb, 2014; Pearcy, 2009; Stockwell et al., 2015; Yapici & Akbayin, 2012). Teachers reported they could give the students immediate feedback and engage in a deeper interaction with the students. Students can collaborate with each other and the teacher (Altemueller & Lindquist, 2017; BakarNordin & Alias, 2013; Baum, 2013; Napier et al., 2011; Yapici & Akbayin, 2012). The blended learning pedagogical approach also provides students the ability to choose the order in which they complete activities (Napier et al., 2011; Yapici &

Akbayin, 2012). Researchers reported students prefer to learn this way (Napier et al., 2011; Yapici & Akgayin, 2012).

External needs of a teacher in a blended learning classroom. For blended learning to be implemented with fidelity, teachers need stakeholder support and a common vision to plan for the pedagogical change. Changing the way material is presented is difficult for some stakeholders to understand. For blended learning to be successful, stakeholder support is key to successful implementation (Graham, Woodfield, & Harrison, 2013; Moskal et al., 2013; Ocak, 2011; Rivera, 2016; Schlossberg 2011). Beyond stakeholder support, Horton and Martin (2013) concluded schools need to have a common vision to ensure consistency within the classes. Without which the blended learning classes function in isolation and are more likely to fail.

Internal needs of a teacher in a blended learning classroom. For blended learning to be implemented with fidelity, teachers need ongoing professional development, access to resources, and time to plan for the pedagogical change. Teachers need ongoing professional development, first concentrating on the curriculum and then focusing on technology (Donnelly & Kyei-Blankson, 2014 ; Gerbic, 2011; Guri-Rozenblit, 2010; Ocak, 2011; Parra, 2010; Reynolds, 2018; Rivera, 2016; Watson, 2008) Teachers need access to resources (Baucum-Manross, 2016; Darling-Hammond & McLaughlin, 2011). According to Gautreau (2011) and Barber (2011), teachers should be involved in choosing technology for blended learning to be successfully implemented. Schools need to invest in resources as the benefits of this pedagogical approach outweighs the overall costs (Moskal et al., 2013; Ocak, 2011). Schools need to be aware of the digital divide and determine a plan to reach all learners (Bermann & Sams, 2012; Reynolds, 2018). Transitioning to blended learning requires time for both professional development and designing lesson plans (Ocak, 2011; Parra, 2010; Rivera, 2016).

Teacher efficacy in the blended learning classroom. Oman, Al-Busaidi, and Al-Shihi (2011) discovered how blended learning is used in the classroom is influenced by the teachers' teacher efficacy. Teachers are more effective in the classroom, no matter the pedagogical approach used, when they are provided opportunities to reflect, observe other teachers, and collaborate with each other (Feger & Arruda, 2008; Valentine, 2012). Sorbie (2015) asserted teachers learn how to implement a new pedagogical approach best when they can collaborate and understand why the change is important. Researching the role of teacher efficacy in the implementation of blended learning is important because the classroom teacher has the largest impact on student success (Gough,et al., 2013).

Teacher efficacy and collaboration. Teachers, much like students, learn best through collaboration and their teacher efficacy plays a role in the implementation of any pedagogical approach (Sorbie, 2015; Keller & Kusko, 2015). Teachers are the determining factor of success in a traditional classroom; whereas in a classroom that uses the blended learning pedagogical approach, both the students and teachers are responsible for success (Wanner & Palmer, 2015). Faculty members are more likely to work as a team if they share a common vision; individuals learn best through collaboration when they examine, observe, and model ideas (Bandura, 1977).

Review of Methodological Issues

The literature review for this phenomenological study includes quantitative, qualitative, mixed methods methodologies to research blended learning and teacher efficacy as well as meta-analysis of literature. Using OneSearch ONLINE to search for peer-reviewed literature related to teacher efficacy and its influence on overcoming obstacles and sustaining the implementation of blended learning produced zero results. Widening the search to include the terms teacher efficacy, blended learning, and science provided the researcher with 25 results. Of those 25

articles, one studied science teachers but the topic was how online learning can help promote sociotechnical capital (Karam, Straus, Byers, Kase, & Cefalu, 2018). Expanding the search further by searching for individual phrases of teacher efficacy, blended learning, and science teachers provided the information for the literature review. Much of the research on blended learning has focused on post-secondary education with little in the secondary setting, outside of dissertations. Many of the studies compared traditional teacher-directed classes to blended learning classes without taking the impact of the teacher into consideration (Atmacasoy & Aksu, 2018; Cullen & Greene, 2011, Graham et al., 2013; Hao & Lee, 2016; Kanchanachaya & Shinasharkey, 2015; Ocak, 2011; Rajkoomar & Raju, 2016; Siemens et al., 2015;).

Of the articles reviewed, majority used quantitative research methods (Al-Busaidi & Al-Shihi, 2011; Alrushiedat & Olfman, 2013; Baum, 2013; Drysdale et al., 2013; Kazu & Demirkolb, 2014; Gough et al., 2017; Kuo et al., 2014; Moskal et al., 2013; Nair & Bindu, 2016; Precel et al., 2009; Stockwell et al. , 2015; Wanner & Palmer, 2015; Wong, & Day, 2008; Yapici, & Akbayin, 2012); while fewer studies used qualitative and mixed methods methodologies (Brunsell & Horejsi, 2013; Menon & Sadler, 2017; Napier et al., 2011; Ocak, 2011; Smith, 2014; Smith, 2013;). The quantitative research focused on using surveys to determine how teacher and students felt about blended learning as well as pretest and posttest to evaluate student performance. Quantitative research tests hypotheses by looking at variables to determine their statistical analysis. The information is written in a set structure examining objective theories to determine their relationship (Creswell, 2014). Frequently used methods in quantitative research include questionnaires and surveys.

Qualitative research is a method used to explore and understand a problem within the social and human experience. Data are commonly collected from interviews and observations

using case studies and phenomenology then organized by common themes focusing on "individual meaning" (Creswell, 2014, p. 4). Mixed Methods research consists of collecting quantitative and qualitative data combining the two methods in a distinct manner to address research questions and hypotheses. Frequently used methods for these topics included surveys and questionnaires in combination with interviews and observations. This section will address the different methods used and discuss how their results exposed the gap in literature directing the research of this study.

Reviews of literature. Through a meta-analysis of 111 articles with a focus on 12 articles, Kleinsasser (2014) concluded that research on teacher efficacy has increased since the 1980s as researchers become more interested in understanding the teacher's role in student success. Kleinsasser found using quantitative and qualitative methods to examine teacher efficacy on both preservice and in-service teachers is necessary as teacher efficacy can change over time.

Through a meta-analysis of dissertations and theses, Drysdale et al. (2013) found research on blended learning in the K–12 setting is lacking. Drysdale et al. noticed that researchers are beginning to explore blended learning in the K–12 setting. Although blended learning in the K–12 setting is slowly receiving attention, researchers should not forget the theoretical foundations of blended learning and assert that the theoretical foundation of blended learning would allow for a broader and complete body of research. Likewise, Halverson et al. (2014) conducted a meta-analysis of 205 dissertations and theses to examine gaps in the literature. Because blended learning is a newer pedagogical approach, Halverson et al., believe it is important to understand what is being researched and the trends emerging from the research. Through this review it was discovered that most research on blended learning focuses on technology and learning outcomes

with little focus on teacher perceptions and the influence of teacher efficacy on its implementation, especially in the K–12 setting.

Using quantitative methods in research on blended learning is most common approach as Van Laer and Elen (2016) found through a meta-analysis of 95 published articles, but little focus is given to why the answers were given on the survey. They found research models are difficult to replicate based on the theoretical framework or the classroom design because the details provided are minimal. Van Laer and Elen found that using blended learning in the classroom can be effective in the proper environment, but they also acknowledged that holes exist in the research as much of the research focused on descriptions and not theory. Majority of the studies used surveys and did not investigate the reason behind the answers (Van Laer and Elen, 2016).

Multiple meta-analysis of existing literature, including both quantitative and qualitative methods, concluded the overall benefits of blended learning as a pedagogical approach. Altemueller and Lindquist (2017) asserted that blended learning, specifically the flipped classroom pedagogical approach, is more effective than the traditional instructional model in England. Similarly, the meta-analysis of literature conducted by Tomory and Watson (2015) concluded that blended learning is effective in the secondary science classroom in the United States, due largely to the material expected to be covered. Bidarra and Rusman (2016) discovered that blended learning is an effective way to create an innovative science class which allows students to participate in inquiry-based learning.

Completing a meta-analysis of existing literature showed blended learning to be effective, but if the needs of the teachers are not being addressed the effectiveness does not matter. Rivera (2016) found teachers in the southern United States support blended learning practices, but they need time to plan, stakeholder support, and ongoing professional development for it to be

properly implemented in the classroom. Additionally, Holland and Piper (2016) discovered that a high level of trust is needed between students and teachers for blended learning to thrive in the classroom in the western United States. Students and teachers will benefit from research concentrating on the teacher's role in the blended learning classroom.

Quantitative studies. Articles using quantitative methods reviewed as part of this literature review utilized surveys, pretests and posttests, and questionnaires to study the effects of blended learning (Al-Busaidi & Al-Shihi, 2011; Baum, 2013; Drysdale et al., 2013; Gough et al., 2017; Kazu & Demirkolb, 2014; Kuo et al., 2014; McNeill et al., 2013; Moskal et al., 2013; Nair & Bindu, 2016; Precel et al., 2009; Stockwell et al., 2015; Wanner & Palmer, 2015; Wong, & Day, 2008; Yapici, & Akbayin, 2012). Of the articles reviewed that used quantitative methods, a majority focused on the student while only a few articles focused on the teacher. Collectively using the blended learning pedagogical approach is effective in the K–12 setting as concluded by the articles, but more research is needed with a focus on the teacher.

One reason blended learning is an effective pedagogical approach Alrushiedat and Olfman (2013) found is improved student participation in this setting. The result of the field experiment in the United States comparing two types of asynchronous online discussions showed students felt a greater sense of responsibility toward helping their classmates understand the material leading to better collaboration and engagement in the class. One of the authors from this study was an instructor for the class, exposing a potential bias as to how students reacted to the material. Even with the potential bias, this study produced similar results as other studies exploring the student experience in blended learning.

Blended learning does not only give students the opportunity to be more engaged; more positive results are also reflected in posttest scores. Yapici and Akbayin (2012) used the

pretest/posttest model to determine the effectiveness of blended learning in the secondary science classroom. They found that the students who took part in blended learning classes performed better on the posttest. Students commented that they had the opportunity to reflect, self-assess, and work at their own pace in the blended learning classroom and were not always afforded that opportunity with the traditional classroom instructional model (Yapici & Akbayin, 2012).

In Turkey, the research of Kazu and Demirkolb (2014) produced similar results noting the pretest results were comparable, but the posttest results showed students who were taught in the blended learning class demonstrated greater curriculum knowledge. Interestingly, the assessment results, according to Kazu and Demirkolb, showed that female students perform better in a classroom that uses the blended learning pedagogical approach in Turkey. The researchers noted that these results aligned with nine other studies from 2003–2009 which examined the effectiveness of blended learning.

Further support includes Nair and Bindu (2016) and McNeill et al.(2013), who discovered that blended learning is an effective mix of traditional and transformational learning techniques that engage learners and allow for purposeful feedback. Using pretests and posttests, data showed students in the blended learning class performed better suggesting that the small group collaboration time and limited lecture time allowed for the students to take a more active role in their learning. Posttest results were consistent on both multiple choice and open response questions.

Success of blended learning is evident, and researchers also used questionnaires as a quantitative method to reveal the needs of teachers well as exposing items that influence student and teacher satisfaction. Al-Busaidi & Al-Shihi (2011) claimed from their research, successful continuation of blended learning lies with instructor training, satisfaction, and support by

administration. Some instructors have anxiety about technology making them hesitant to try blended learning. The instructor satisfaction with blended learning determines the continuation in the class no matter the mitigating factors.

Student concerns have been addressed by two research articles using a questionnaire. Precel et al. (2009) claimed that students had an overall high satisfaction rate of being enrolled in a blended learning classroom in Israel. Interestingly, the students responded that they did not think watching the videos was better than face-to-face lectures, but they enjoyed being able to watch the videos again. Students did not enjoy the more detailed tasks assigned in the blended learning class but found them to be helpful for acquiring and storing knowledge. Also, the students responded in the questionnaire that they preferred the online course books as they could access them anywhere

Stockwell et al. (2015) found students in the northeastern United States preferred the blended learning classroom. Students performed better on assessments which they attributed to having more time in class to solve problems instead of listening to a lecture. Responses also indicated that attendance was better in a blended learning class because the students felt more engaged and were better prepared.

Finally, some articles used surveys to examine blended learning through quantitative methods. Again, students were the focus with some input from teachers further proving the need for more research on the teacher experience within a blended learning classroom. In the Midwestern United States, Gough et al. (2017) discovered teachers are in favor of the flipped classroom as it benefits students who are absent and/or struggling as well as allows for more collaboration in an active learning environment. The 44 teachers surveyed reported students prefer blended learning classes as it allowed them to collaborate with other students and the

teacher. However, the teachers did express concerns about students having access to adequate technology to complete assignments inside and outside of the classroom.

Similarly, Moskal et al. (2013) found that without adequate investment in technology resources and professional development it is difficult for the blended learning pedagogical approach to be successful. The authors concluded that the benefits of blended learning outweigh the cost. The information was collected from over one million student course survey responses from 2008–2011 at the undergraduate level. Undergraduate students found they needed to re-evaluate how to approach learning in a blended learning class, showing the benefit of a blended learning environment.

This approach also means students can perform better due to a deeper understanding of the content, as discovered by Kuo et al. (2014) through their survey of 22 students in the intermountain western United States. The students also noted the importance of interacting with other students and the instructor in improving their understanding. Extroverted students responded more favorably to blended learning indicating they enjoyed the interactive classroom. Introverted students, on the other hand, responded that they struggled with this pedagogical process and were worried they would not be successful with this educational modality.

The survey of 109 students by Wanner and Palmer (2015) showed that students want to collaborate and have a say in what and how they are learning. The students believe that teachers need to be flexible and allow for personalization within the classroom. Blended learning is not a quick fix to student achievement issues but is a way to make education more flexible and student-centered.

In the Midwestern United States, Baum (2013) also surveyed 22 undergraduate students and found that not only was blended learning a successful pedagogical approach to use in his

chemistry class, but it would be effective to use in any science course. The responses showed that the students were better engaged in the class. The 22 undergraduate students believed that blended learning was a clearer pedagogical approach and a better use of time than guided-inquiry instruction alone.

In addition to quantitative research on blended learning, it is important to review quantitative research on teacher efficacy. Very little quantitative research exists on teacher efficacy. Hughes (2012) surveyed 789 teachers at 70 schools, elementary, middle, and high schools in the southern United States, concerning teacher retention and the role of teacher efficacy. Data from this study suggests the characteristics of schools and teacher efficacy have little impact on teacher retention. Teachers, regardless of teacher efficacy, are more likely to remain in impoverished schools. Although the present study did not show correlation in high teacher efficacy and teacher retention, more technologically advanced teachers were less likely to remain in the profession. Hughes (2012) indicated research is needed to find out the role teacher efficacy plays in the classroom.

Qualitative research. Articles reviewed as part of this literature reviewed that used qualitative methods utilized case studies, interviews, observations, and document analysis to study the effects of blended learning. Of the articles reviewed that used qualitative methods, majority focused on the student with little attention on the teacher. Collectively, the articles concluded using the blended learning pedagogical approach is effective in the K–12 setting, but more research is needed which focuses on the teacher.

By using a multiple case study approach with six teachers using surveys, interviews, and artifacts, Parra (2010) discovered that professional development is crucial to the success of technology integration into the classroom. When teachers' practices changed, they responded

they adopted new technology in the traditional classroom after receiving training. Each teacher's journey was unique based on previous experience, content knowledge, and teaching practices. Teachers reported they need support by providing time for planning and ongoing professional development to effectively implement blended learning.

Ocak (2011) interviewed 117 faculty members from four different universities in Turkey and discovered that teachers who struggle to transition to blended learning do so because they are not given time to prepare, do not receive support from administration, and are not provided ongoing purposeful professional development. Those who have tried to transition to a blended learning classroom without these supports found it to be complex and overwhelming.

Through observations, Brunsell and Horejsi (2013) found when teachers attempted to use the flipped classroom instructional model, successful or not, the teacher understood why it has become such a big deal and found ways to adjust their teaching to meet the needs of his or her students. Teachers reported using this pedagogical approach re-energized them. Active learning time is increased when classes used the flipped classroom instructional model. Students reported they learned from each other and the teacher. The prepared students also reported they felt annoyed when they had to explain concepts to those who were unprepared.

Along with case studies on blended learning, the case study method has been used to examine teacher efficacy. In one such case study in the Netherlands, Velthuis (2015) claimed that teachers' teacher efficacy develops differently based on experiences and support received at the school. Collaborating with other teachers and small group instruction can improve teacher efficacy of teaching. Therefore, administrative support can affect teacher efficacy.

Using interviews, focus groups, and a blogging activity, Baucum-Manross (2016) claimed blended learning will help many students if it is transitioned with support, flexibility,

and administrative understanding. Blended learning had positive results for most but may not work for all students. To help the students make the transition from the traditional classroom to the blended learning classroom, the transition needs to be slow and purposeful. The shifting roles and responsibility of both the teacher and the students can be challenging. Baucum-Manross found teachers need to be supported and feel like it is okay to fail as long as it is re-evaluated and tried again. Teachers also shared they need the support from administration and ongoing professional development.

Examining the teacher's role in the blended learning classroom in the southeastern United States, Napier et al. (2011) found overall teachers were happy with blended learning but needed support to make the transition and time during implementation. The researchers used questionnaires and open-ended surveys to examine challenges for students and instructors when transitioning to a blended learning classroom. Student performance in the blended learning classroom was comparable to the traditional classroom but students reported that they enjoyed the flexibility of blended learning. Learning through the blended learning pedagogical approach allows students to work at their own pace rather than relying on the teacher's timeline, according to the results of Napier et al.. Although challenges exist, overall students reported better interaction with their teacher and surveyed satisfaction rose throughout the semester. Teachers did express concerns about how to make the transition to a blended learning class from the traditional class including needing planning time.

Through semistructured interviews examining student teacher efficacy in a blended learning environment, Bandura (2011) claimed some students' self-efficacy improved in a blended learning environment. The students were not prepared for this pedagogical approach and need to be taught how to function in a blended learning course, according to faculty, due to their

limited exposure this pedagogical approach. Despite the need for students to receive instruction in a blended learning course, students perceive blended learning to be an easy way to take a class. No matter which pedagogical approach was used, students reported engagement with the subject and faculty support were determining factors in their teacher efficacy.

Mixed methods research. Articles reviewed as part of this literature reviewed that used mixed methods methodology utilized surveys, interviews, observations, questionnaires, pretests and posttests, and document analysis to study the effects of blended learning. Of the articles reviewed that used mixed methods, majority focused on the student with little attention on the teacher. The collective articles concluded using the blended learning pedagogical approach is effective in the K–12 setting, but it is dependent on the financial investment, administrative support, and ongoing professional development.

Smith (2014) found students performed academically comparable in the traditional and blended learning classrooms, but the students in the blended learning class reported better interaction and collaboration. The students, according to Smith felt more supported, connected to the curriculum, and enjoyed the class. In 2013, Smith found similar results in reference to student engagement.

Moskal et al. (2013) also found students enjoyed learning with the blended learning pedagogical approach. By using multiple choice pretests and posttests, student attitude questionnaire and course feedback as part of a focus group, it was revealed that students perform better in a blended learning environment citing the technology integration as a benefit to the class as it helps problem solving.

Rajkoomar and Raju (2016) found blended learning to be an effective pedagogical approach in South Africa as it opens communication allowing for more critical thinking during

the lesson and reflection after the lesson. The flexibility of blended learning allows schools to tailor the modality to meet the needs of the students within the expectations of the school. Teachers and students reported better communication, and the material was disseminated easier. Within the blended learning pedagogical approach, there is increased support, and ongoing tutoring according to participant responses. It is not without its challenges for teachers as very little training is offered outside of on-the-job, learning through trial and error.

Similarly, Leo and Puzio (2016) reported positive results for the blended learning pedagogical approach in the northwestern United States. Using a quasi-experimental approach of pretests, posttests, quizzes, and informal data, Leo and Puzio discovered students can participate in active learning without teachers sacrificing the rigor of the curriculum. The flipped classroom instructional model had a positive influence on student grades and understanding of curriculum. Students reported they preferred watching videos and enjoyed active learning.

Another critical need reported by teachers is a supportive administrative team to help create an atmosphere of trust. Sorbie (2015) found teachers need ongoing professional development and time to collaborate with peers. This need was exposed through questionnaires, interviews, observations, and documents. Teachers are interested in using the blended learning pedagogical approach, but hesitant to attempt it without ongoing professional development and collaboration. Reynolds (2018) used cross-sectional surveys and interviews exposing that teachers need to have effective ongoing professional development in the blended learning pedagogical approach for it to be effective in the classroom. Ongoing professional development will also help improve teacher efficacy. Teachers with higher teacher efficacy, according to Reynolds, perform better in a blended learning classroom.

The need for ongoing professional development was a common response from teachers in multiple studies. Palmer et al. (2015) used a single-group pretest, intervention, immediate posttest and delayed posttest as well as surveys and interviews found that on-going professional development can help the teacher implement blended learning and raise teacher efficacy in Australia. Palmer et al. claimed that teacher efficacy is affected by their content knowledge, comfort in teaching subject area, and excitement about teaching. Teachers' teacher efficacy increased and remained raised 10-months after the study. Research concluded that to enhance teacher efficacy, the teachers needed to have a thorough understanding of the science content, understand how to teach science, and be excited about teaching science curriculum.

Yeh et al. (2011) found, using a Likert Scale and questionnaires, that blended learning is effective and preservice teachers benefit from teaching with this pedagogical approach. Teachers in Taiwan according to Yeh et al., need to become comfortable with the technology before attempting to use it in the classroom so their teacher efficacy can be strengthened.

Menon and Sadler (2017) also examined preservice teachers in Taiwan. They used a pretest to determine the participants and for the study itself used a science teaching efficacy belief instrument, semistructured interviews, observations, and artifacts. According to Menon and Sadler, elementary preservice teachers in Taiwan have higher teacher efficacy in science teaching, specifically physical science, when they are exposed to the content by an instructor who has high interest in the material. Ongoing professional development will help the teachers maintain higher teacher efficacy as they become in-service teachers.

Synthesis of Research Findings

Conducting a review of literature on blended learning and teacher efficacy revealed common themes and the gap in the literature. Examining teacher efficacy while using blended

learning will help stakeholders begin to understand why teachers implement new pedagogical approaches in their classes while others abandon them. Additionally, through this research stakeholders can gain insight as to what causes some teachers to persevere through difficult times, and how their teaching practices change over time. Further exploration of this topic is important because teacher efficacy, as Reynolds (2018) found, is linked to student achievement. The research of both Michalsky (2012) and Olmez and Ozbas (2017) showed that teachers with higher teacher efficacy were more effective in the classroom leading to greater student achievement. The teacher efficacy of a person contributes to how one reacts to change and with a new pedagogical approach such as blended learning. It is important to examine how a teacher can overcome the fear of change to be successfully implement a pedagogical approach that could positively influence student achievement.

Blended learning. Blended learning, as defined by Horn and Staker (2015), is a pedagogical approach that combines online learning and in person teaching giving the students some choice over how, what when, and where they learn the material. Most models of blended learning fall within one of four categories—flex, a la carte, enhanced virtual, and rotation—with the teachers selecting the model that works best for their curriculum and targeted age group.

The rotation model encompasses station rotation, lab rotation, flipped classroom, and individual rotation. In this model, the students rotate between online and face-to-face instruction at the teacher's discretion (Horn & Staker, 2015). The flipped classroom "flips" the traditional idea of instruction. The students watch a recorded lecture as homework and then complete work that is traditionally reserved for homework in the classroom where the teacher facilitated the work (Bergmann & Sams, 2012). For the purposes of this phenomenological study, the rotation model will be examined, specifically the flipped classroom instructional model.

Teacher efficacy. Teacher efficacy, as defined by Bandura (1977), is the belief one had in his or her ability to accomplish tasks. Teacher efficacy can be developed through mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. According to Bandura (1994), mastery experiences, defined as finding success during a difficult experience, is an effective way to develop a strong sense of teacher efficacy. This involves the person persisting through different experiences until he or she is successful. The second way to develop teacher efficacy is through vicarious experiences, when a person learns through other people's experiences (Bandura, 1994). The third source of teacher efficacy development is verbal persuasion, which is when someone is led by the words of other people to believe they can succeed. According to Bandura (1994), it is difficult for teacher efficacy to develop based on verbal persuasion. The fourth way to develop teacher efficacy is through their emotional arousal. The emotional state of a person can affect their teacher efficacy and response to stress (Bandura, 1989; Bandura, 1997).

Themes

Blended learning design. A theme that emerged through the literature review is the design of blended learning. Blended learning, according to Yıldırım (2017) is a shift in thinking, reshaping how students learn. Because of the flexibility for students through their choices in this instructional arrangement, Markoff (2014) asserted teachers use the blended learning pedagogical approach to best meet the needs of the students as there is no one correct way to design a classroom using and of the instructional models within the blended learning pedagogical approach. The change in classroom structure can be a difficult transition for both the students and teachers if the teachers are not given an appropriate time to plan for the transition. Yıldırım

(2017) espoused that without appropriate time to plan for blended learning, it is unlikely to be successful.

Stakeholder influence. Another common theme found in the literature review is stakeholder influence. The success of using the blended learning pedagogical approach depends on the support from stakeholders (Napier, Dekane, and Smith, 2011). Without stakeholder support, according to Napier et al., the implementation of blended learning can be difficult to adopt because it requires a mindset shift. In a blended learning class in the intermountain western United States, as Kuo et al. (2014) discovered, students learn to think independently, manage their time, and become comfortable with technology. This is different than what most people are used to in a traditional classroom with the teacher lecturing while the students take notes.

Teachers and administrators, as Velthuis (2015) found, need to work together to ensure blended learning is properly implemented. Wanner and Palmer (2015) asserted that without this understanding, administrators may be quick to force teachers to abandon the use of the blended learning pedagogical approach as it requires a change of thinking. Pedota (2015) revealed that stakeholders need to be part of the plan and implementation or teachers will struggle with fixing the details of it. One-way administration can support teachers is through ongoing professional development. Providing teachers with initial training will allow for them to design the transition but will provide little support once they are using the pedagogical approach to teach the class (Drysdale et al., 2013; Sims & Penny, 2015).

Instructional needs. The instructional needs of teachers were a common theme that emerged from the literature review. As stated previously, ongoing professional learning and time to plan is important to the development of teacher efficacy in a blended learning classroom. Multiple articles concluded that without proper time to plan, ongoing professional development,

and investment in resources, it is difficult for blended learning to thrive in the K–12 setting (Baucum-Manross, 2016; Ertmer et al., 2012; Gautreau, 2011; Ocak, 2011; Parra, 2010; Reynolds, 2018; Rivera, 2016; Schlossberg, 2011; Watson, 2008;). The professional learning should first concentrate on the curriculum and then focus on the integration of technology (Baucum-Manross, 2016; Gerbic, 2011; Guri-Rozenblit, 2010; Ocak, 2011; Parra, 2010; Reynolds, 2018; Rivera, 2016; Watson, 2008). Teachers need access to resources such as ongoing professional learning opportunities and technological devices (Baucum-Manross, 2016; Napier et al., 2011; Watson, 2008). The needs of the teachers should not be overlooked in the implementation of blended learning. Teachers should be involved in choosing technology with the administration investing in resources as the benefits outweigh the overall costs (Moskal et al., 2013).

Teacher and student benefits. Lastly, the benefits for teachers and students was a common theme in the literature review. Overall, teachers reported satisfaction with blended learning as a pedagogical approach and for student achievement. Stockwell et al. (2015) found that students were better engaged in the classes and reported greater satisfaction improving attendance. Multiple studies concluded students interacted more with the teacher and other students in a blended learning environment allowing for a deeper understanding of the material (Brunsell & Horejsi, 2013; Napier et al., 2011; Pearcy, 2009).

Students and teachers in the Midwestern United States, according to Baum (2013), believe using the blended learning pedagogical approach was a more effective use of class time than the traditional lecture class. The repeated review through watching the videos multiple times in a flipped classroom benefitted students who struggle to understand the basic objectives of the class Yıldırım (2017). Altemueller and Lindquist (2017) and Gough et al. (2017) asserted that the

blended learning pedagogical approach is a better structure for struggling learners and those who are absent from school.

Blended Learning and Teacher Efficacy

Mastery experiences. When implementing the blended learning pedagogical approach teachers need to have direct experience to feel confident about using it in the classroom. Kleinsasser (2014) asserted that teachers need to have experience in blended learning to understand how to persevere through difficult experiences. Teaching is challenging with the state assessment requirements, administrative demands, and student needs adding a new pedagogical approach to these daily stressors may contribute to teachers abandoning it. Because of this, Menon and Sadler (2017) contended that preservice teachers need to experience blended learning during post-secondary learning, so it is possible to master the pedagogical approach when they are in-service teachers. Reynolds (2018) discovered teachers who have high teacher efficacy are more likely to try new strategies in the classroom. But if the teachers do not demonstrate mastery of the curriculum before attempting a new pedagogical approach, their teacher efficacy will suffer. Palmer et al. (2015) further elaborated that curriculum expertise leads to teachers trying different instructional strategies to meet the needs of their students based on their experiences.

Vicarious experiences. Some of the experiences that build teacher efficacy are through collaboration and learning from other educational professionals, their vicarious experiences (Bandura, 1977). As multiple articles exposed, ongoing professional development is an effective way for teachers to develop higher teacher efficacy in blended learning (Finn, 2017; Napier et al., 2011; Ocak, 2011; Parra, 2010; Reynolds, 2018; Rivera, 2016). During the professional development sessions, teachers learn about effective strategies which worked for other teachers when transitioning to a blended learning class. The positive experiences of other teachers

enhance the teacher efficacy of teachers attempting the pedagogical approach. In addition to professional development, it is important for teachers to observe other teachers to see classrooms using the blended learning pedagogical approach. Velthuis (2015) found that teachers need multiple exposures to blended learning in different ways to build their teacher efficacy.

Verbal persuasion. In addition to mastery and vicarious experiences, teachers who are transitioning to a blended learning classroom can benefit from support of stakeholders (Bandura, 1997). Van Laer and Elen (2016) contended that for blended learning to last in the classroom and for teachers to persevere through obstacles, they need to have administrative support. Research in the Netherlands from Velthuis (2015) found that the encouraging or discouraging words from administrators can influence teacher efficacy when attempting a new pedagogical approach.

Emotional arousal. The emotional state of a teacher can influence how a new pedagogical approach is implemented in the classroom (Bandura, 1997). The background knowledge and curriculum mastery of teachers affects their teacher efficacy as Velthuis (2017) discovered. Teacher investment in the blended learning pedagogical approach and their excitement about attempting something new can influence how they overcome obstacles. The teachers with positive emotions working in an encouraging environment can determine the success of the pedagogical approach.

Critique of Previous Research

As research has revealed, the intention of blended learning is to allow students to take an active role in their learning. Students are given choice over how, when, and where the material is learned (Napier et al., 2011; Osgerby, 2013; Tomory & Watson, 2015; Yapici & Akbayin, 2012). They can work on the material outside of the school building and the school day. The philosophy behind this method is to foster small group instruction for students who struggle with different

classroom concepts, according to Altemueller and Lindquist (2017) and Bergmann and Sams (2012). For example, in classes that use the flipped classroom instructional model, the students can pause and re-watch the videos as needed. Gough et al. (2017) discovered that absent students do not miss instruction as they can access the materials from anywhere and still collaborate with the teacher and students.

Limitations to Blended Learning

Blended learning is not without its obstacles and limitations. The cost of implementing and maintaining a blended learning classroom is high. Moskal et al. (2013) and Ocak (2011) claimed that this undue cost causes schools to make changes to the budget, cutting money intended for other areas. Both teachers and students, according to Gough et al. (2017); Moskal et al.; and Ocak, need training as to how they can use technology in the classroom. Sorbie (2015) and Gautreau (2011) discovered teachers also need ongoing professional learning after implementation to hone their skills, but this is difficult to do over the course of the school year.

Moskal et al. (2013) asserted students need to learn how to act in a blended learning classroom as the expectations are different than those in the traditional classroom. It is a mindset shift for students and teachers which multiple researchers found that stakeholder support helped both the teachers and students make the transition (Baucum-Manross, 2016; Moskal et al., 2013; Ocak, 2011; Schlossberg, 2011). Although this pedagogical approach is effective for many learners, especially those who are struggling in class and/or absent, it may not address all learners. Smith (2014) believes that this could be the reason some students are disengaged in the learning process.

Gaps in Research

Minimal research has been conducted on blended learning in the K–12 setting in the United States which would help educators address the needs of 21stcentury learners as Hainline et al. (2010) asserted. Much of the research on blended learning has been conducted outside of the United States (Menon & Sadler, 2017; Palmer et al., 2015; Vermunt, 2013; Yeh et al., 2011). Similarly, additional research is needed on teacher efficacy and its influence on the implementation of pedagogical approaches. Even though research in the United States on teacher efficacy has increased since the 1980s according to Kleinsasser (2014), it is still an area where research is needed. Therefore, this literature review further revealed a gap in the research on teacher efficacy beyond the initial implementation of blended learning.

Although research in both blended learning and teacher efficacy has increased, much of the research has focused on the students, with little focus on the teacher (Siemens et al., 2015; Tomory & Watson, 2015). Majority of the research on blended learning and teacher efficacy focuses on the preservice teacher and does not consider the effect of in-service teachers. While examining literature, no research was found that analyzed the teacher efficacy of teachers using the blended learning approach beyond initial implementation in secondary science classrooms.

Research Recommendations

As a newer pedagogical approach, more research is needed to address the complexity of implementing blended learning and the role teacher efficacy plays in the effectiveness of the transition (Halverson et al., 2014; McNeill et al., 2013;). Majority of the research on blended learning focuses on the effectiveness of the pedagogical approach and/or technology used. But as Hughes (2012) postulated, more research is needed examining blended learning and the teacher efficacy of the teacher beyond initial implementation. Understanding teacher efficacy can

provide insight as to how teachers can overcome obstacles and improve their performance to improve the learning experience of the students.

Summary

This literature review served to expose the gaps in research on blended learning and the teacher efficacy of teachers. Much of the research has focused on the student experience and their use of technology, ignoring the vital role teachers play in education. The purpose of this literature review was to examine the role teacher efficacy plays in attempting and sustaining the implementation of blended learning. The literature supports the claim that investigating how teacher's teacher efficacy changes over time in the implementation of the blended learning pedagogical approach in secondary science classes is important. The findings from this phenomenological study may help district and campus administrators design ongoing professional learning which addresses curriculum and new pedagogical approaches focusing on the important role teacher efficacy plays in the classroom. Using a qualitative design allowed the researcher to interview teachers and understand how they overcame obstacles and whether their teacher efficacy played a role in the implementation. Chapter 3 includes the research methodology and design. This chapter will also define the purpose for the research; how the research will be conducted; how the data will be collected; and how the data will be analyzed. Additionally, the phenomenological study's limitations, credibility, and any ethical issues will be discussed.

Chapter 3: Methodology

Introduction

In this study, a phenomenological research design was used to explore the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach in the secondary science classroom. Most of the research on the influence of teacher efficacy on blended learning focused on preservice teachers and those who work at post-secondary institutions (Hainline, Gaines, Long Feather, Padilla, & Terry, 2010; Holland & Piper, 2016; Palmer et al., 2015; Parra, 2010; Yeh et al., 2011;). Beginning to understand how secondary science teachers in the southern United States overcome obstacles and sustain pedagogical approaches may assist district and campus administration as well as those who present professional learning design training around the teachers' needs. The professional learning facilitator, many times, is concerned with disseminating information not with the efficacy of the teacher which can influence how the pedagogical approaches are implemented in the teachers' classrooms (Åhman, Gunnarsson, & Edfors, 2015). Chapter 3 is organized into several sections which will provide an overview of the study's purpose, research questions, design of the study, participants of the study, data collection, data analysis procedures, limitations of the research design, validation, expected findings, and ethical issues.

Research Questions

1. To what extent does the self-efficacy of secondary science teachers influence the implementation of blended learning?
2. How do secondary science teachers' experiences overcoming obstacles in blended learning implementation reflect those of mastery experiences, vicarious experiences, verbal persuasion, and emotional state?

Purpose and Design of the Study

Purpose. The purpose of this phenomenological study was to begin to understand the role secondary science teacher efficacy plays in how obstacles are overcome in blended learning implementation and how the pedagogical approach is sustained over time. Specifically, to examine the influence of secondary science teacher efficacy has on the success of blended learning. According to Pedota (2015), teacher efficacy directly influenced student achievement, and therefore is important to understand. In fact, Bandura (1997) asserted teacher efficacy has more of an influence on student achievement than content knowledge, resources, and parent commitment. The influence of teacher efficacy on student achievement is further supported through Hattie's (2018) research which found collective teacher efficacy has the greatest influence on student achievement. The pedagogical approach a teacher uses to instruct students can be influenced by teacher efficacy as well.

Teacher efficacy is one of the best ways to predict whether a teacher will sustain a pedagogical approach (Bandura, 1997). Blended learning is a newer pedagogical approach, and as such unforeseen obstacles emerge, which may lead teachers with low efficacy to abandon it altogether (Palmer et al., 2015). Beginning to understand the influence of teacher efficacy on when and why a pedagogical approach is sustained can begin to help stakeholders support new pedagogical approaches and know how to overcome obstacles.

Research that focused on teacher efficacy has increased since the 1980s, but it is still an under researched subject (Kleinsasser, 2014). Throughout the research phase of this study, research on the role teacher efficacy plays in overcoming obstacles and sustaining blended learning in the secondary science classroom was not found, exposing a gap in research. Limited peer-reviewed research is available focusing on elementary teachers more than secondary

teachers regarding preservice teachers' training in blended learning; beginning teachers' initial training in blended learning; the impact of content knowledge on preservice teacher efficacy; and preservice teacher efficacy when preparing to teach using the blended learning pedagogical approach (Al-Busaidi & Al-Shihi, 2011; Atmacasoy & Aksu, 2018; Bidarra & Rusman, 2016; Cullen & Greene, 2011; Gough et al., 2017; Hughes, 2012; Kleinsasser, 2014; Leo, & Puzio, 2016; Menon, & Sadler, 2017; Velthuis, 2015).

Researchers noted that although teacher efficacy and blended learning research has increased since 1985, it is still important to continue examining teacher efficacy of preservice and in-service teachers because their experiences are different (Hughes, 2012; Kleinsasser, 2014) The researchers analyzed preservice and beginning teachers experiences with blended learning and their teacher efficacy (Bidarra & Rusman, 2016; Velthuis, 2015). Additionally, researchers examined K–12 teachers during their initial stages of blended learning implementation (Cullen & Greene, 2011; Gough et al., 2017; Menon & Sadler, 2017). Outside of the United States, researchers explored the impact of blended learning on preservice elementary teachers and teachers during their initial stages of implementation (Al-Busaidi & Al-Shihi, 2011; Atmacasoy & Aksu, 2018). Leo and Puzio (2016) stressed the need for professional learning during the implementation of blended learning.

Bandura (1997) postulated that the efficacy of science teachers is of concern because of the vocabulary and technology integrated in science classes. Uncovering the role secondary science teacher efficacy plays in overcoming obstacles and sustaining blended learning may help stakeholders begin to understand the lived experience of secondary science teachers implementing a pedagogical approach and how to better support their effort.

Once administrators, professional learning facilitators, and teacher leaders begin to understand how to help teachers implement pedagogical approaches with fidelity, the more likely the pedagogical approach will successfully help students thrive in the classroom (Klassen et al., 2010). Understanding how secondary science teachers overcome obstacles and sustain blended learning beyond the initial implementation can help school and district administrators help teachers as they implement new pedagogical approaches in the classroom. This study can also add to the body of literature of how teacher efficacy can affect classroom practices.

Research design. A qualitative methodology was selected as the research design for this study as it allows for a detailed understanding using a flexible style that empowers participants to share their stories to help researchers develop theories if partial or inadequate theories exist (Creswell, 2013, 2014). Qualitative research involves the "collection of data in its natural setting" and pays attention to the people of the research to capture the authentic voice of those who experience it (Creswell, 2013, p. 44). Exploring secondary science teachers and the role of teacher efficacy in overcoming obstacles and sustaining blended learning can best be described through phenomenological research methods to form a deeper understanding of the shared lived experience (Creswell, 2014; Glesne, 2016). Phenomenological studies seek to understand the bigger picture from multiple perspectives through attempting to find meaning to better understand a human problem using open ended questions to explore phenomena (Creswell, 2014; Glesne, 2016).

It was appropriate to use a phenomenological approach as it helps determine the meaning of an experience for the people who experienced it and to try to thoroughly describe their experience (Moustakas, 1994). Phenomenology was the selected research design for this study as it will help stakeholders begin to understand the common lived experience of secondary science

teachers in a southern state of the United States beyond the initial implementation of blended learning.

Using the phenomenological design for this study investigated the participants' experiences within the phenomena and attempted to uncover meaning to better understand why the experience matters (Saldaña, Leavy, & Beretvas, 2011). Quantitative research on teacher efficacy and blended learning included the use of surveys as well as pretests and posttests (Drysdale et al., 2013; Gough et al., 2017; Kazu & Demirkolb, 2014; Kuo et al., 2014; Moskal et al., 2013; Nair & Bindu, 2016; Stockwell et al., 2015; Yapici & Akbayn, 2012). .

Kuo et al. (2014) found, through surveys, that the students in the blended learning classrooms interacted with the curriculum at a deeper level. The students also interacted with each other more in the blended learning class, but introverted students may struggle learning with this pedagogical approach. In the United States, Gough et al. (2017) identified strengths of the blended learning pedagogical approach based on survey results. Teachers and students responded it was beneficial for all students, but specifically helpful for students who struggle in class as well as those who are frequently tardy or absent. Stockwell et al. (2015) found attendance was better in a blended learning class. The students had more time in class to interact with each other and the curriculum their exam performance improved. In Turkey, Yapici and Akbayn (2012) revealed that the blended learning pedagogical approach is more effective than the traditional teacher-directed classroom model.

In Turkey, Kazu and Demirkolb (2014) discovered, based on pretests and posttest performance, students in blended learning classes performed better on assessments. The students indicated they enjoyed the immediate feedback from the teacher and the ability to collaborate with other students. The research of Nair and Bindu (2016) revealed similar results based on

pretests and posttests. Students in classes that used the blended learning pedagogical approach performed better on assessments. Moskal et al. (2013) used a Likert scale to reveal that students favored the blended learning pedagogical approach. Drysdale et al. (2013) revealed that research in the K–12 setting is limited, specifically in studying the theory of blended learning.

A limited amount of research utilized the mixed methods research method (Menon & Sadler, 2017; Smith, 2013; Smith, 2014). In 2013 and 2014, Smith conducted research studies using surveys and online blogs revealing that students and teachers preferred the collaborative environment the blended learning classroom offered, and students expressed that they were better supported in the blended learning classroom. Using pretests, posttests, interviews, observations, artifacts, and surveys, Mason and Sadler (2017) discovered that teacher efficacy is higher when teachers are exposed to content material.

Previous research on teacher efficacy and blended learning has utilized both phenomenology and case study approaches (Coe, 2014; Ocak, 2011; Parra, 2010; Velthuis, 2015). But, for the scope of the sample and research questions posed, a phenomenology design was the most appropriate method for this study to begin to understand and find meaning of the lived experience of the secondary science teachers at a high school in the southern United States (Cilesiz, 2011; Kelly & Denson, 2017).

Ocak (2011) revealed teachers preferred the blended learning pedagogical approach, but teacher struggle with the transition because they are not given the proper preparation time, administrative support, and professional learning opportunities. Similarly, Parra (2010) conducted a case study in the United States and discovered that teachers believe professional learning is crucial to the success of blended learning in the classroom.

A case study conducted by Velthuis (2015) exposed that teacher efficacy develops different based on the teachers' experiences and support. Cilesiz (2011) postulated that phenomenology is an appropriate was to address teacher efficacy and blended learning in the classroom. Kelly and Denson (2017) discovered that when teachers used teacher created videos to support instruction in the flipped classroom, teacher and student efficacy rose. Teachers did indicate that there was a great amount of preparation required at the beginning, but as time went on it became easier to handle. Coe (2014) revealed, using a case study methodology, that students performed better in class, experience greater achievement on assessments, and reported better retention of the material.

Research population and sampling method.

Population. Generally, phenomenological research includes in-depth research with a small population sample where the researcher wants to understand everyone's experience to find similarities and differences in order to develop themes (Glense, 2016). According to Mason (2010), an appropriate sample size for a phenomenological study has at least five participants with no more than 25. Previous research supports selecting a sample size based on the participants' knowledge to ensure more detailed answers and in-depth knowledge of the subject (Gentles et al., 2015, Koch et al., 2014). Purposeful sampling was used for this study to ensure the most effective collection of information from willing participants who can clearly articulate their experience (Palinkas et al., 2013).

The sample included selecting nine participants who were knowledgeable about overcoming obstacles using blended learning and sustaining the pedagogical approach with at least four years of experience using this pedagogical approach. Because the flipped classroom instructional model has been the science department expectation at the high school for six years

with little teacher turnover, recruiting teachers who meet the criteria was not difficult. The sample included a diverse mix of secondary science teachers who work at the same high school in the southern United States to gather data from different types of experiences while overcoming obstacles and sustaining the blended learning pedagogical approach.

Sample. To select the participants for this study, purposeful sampling was used to ensure proper representation of the lived experience of the secondary science department at the school. The participants were provided a consent form informing them of their rights during the study, the confidentiality agreement, and the scope of the research. The sample came from a high school in the southern United States where blended learning has been the department's selected pedagogical approach for six years. Of the nine secondary education teachers, six teachers received undergraduate training in education, and three were alternatively certified as educators.

Because of a teacher shortage in this state according to the U.S. Department of Education, an alternative path to certification has been established to attract people to become educators (TSA, 2019). Alternative certified teachers used a nontraditional certification program such as a region service center, university, community college, or private entity after meeting the prerequisite program requirements to become teachers (TEA, 2018).

Instrumentation

To investigate the pedagogical influence of secondary science teacher efficacy on the implementation of blended learning, an interview protocol was used as the sole data collection instrument. In this study, nine participants were interviewed twice and took part in a focus group. Conducting two interviews and a focus group helped the researcher to investigate the experience of the participant within the context of the phenomena to derive meaning (Seidman, 2013). The

first and second interviews were conducted individually, face-to-face at the high school where the teachers are employed using open-ended questions.

The first interview of the phenomenological study gave the participant a chance to freely share their experience by telling the researcher as much as possible (Seidman, 2013). The information gathered during the first interview helped the researcher understand the teachers' overall experience implementing and sustaining the blended learning pedagogical approach. With the second interview the focus shifted from the overall experience to the details of the experience, to reconstruct and clarify the experience (Seidman, 2013).

The second interview focused on the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach. Instead of a third interview, the third interaction included a focus group with all nine participants to gain a better understanding of the shared experience of blended learning implementation and explore the influence of collective efficacy on the experience. Participants provided information about how their teacher efficacy influenced the implementation and how this affected the science department. Seidman (2013) suggested the focus group allows the group to reflect upon their shared experience. The focus group built upon the foundation of the first two interviews to explore how their lives interacted and the secondary science teachers overcame obstacles and sustained blended learning. All information collected was recorded and transcribed using Google documents voice-to-text feature. The transcribed information was checked by the researcher for transcription accuracy and then a hard copy was given to the participants for member checking. Member checking allows for the participants to check their script for accuracy to alleviate any subjectivity in the data collection (Mayoh, & Onwuegbuzie, 2015)

To ensure in-depth responses, researchers can best collect information through asking open ended questions (Englander, 2012). After the open-ended question interview where the participants will be asked to describe their journey using the blended learning pedagogical approach, a semistructured interview will occur to clarify information collected from the open-ended interview (Englander, 2012; Bevan, 2014). The open-ended interview allowed the researcher to gain a general understanding of the secondary science teacher's experience with the implementation of blended learning and the influence of teacher efficacy. The semistructured interview further investigated the information shared during the open interview and clarify points through structured inquiry. The questions for the interview found in the appendix focused on the four areas of teacher efficacy, as defined by Bandura (1977), and how teacher efficacy relates to the implementation of blended learning. The semistructured interview had eight to 10 questions with each interview, which lasted approximately 60 minutes.

Data Collection

The duration of the study was six weeks. The participants were informed that their responses were recorded with a digital recorder and the researcher's cell phone during the interview process. To collect data, Giorgi's descriptive phenomenology, a modified Husserlian approach, was utilized which included the natural attitude, intentionality, and reduction (Christensen, Welch, & Barr, 2017).

The natural attitude is how the person experiences something within the context of the world. Simply, it is our everyday life experience (Bradbury-Jones, Irvine, & Sambrook, 2010). Intentionality is the meaning derived from the experience, specifically the relationship between the subject and the object. The researcher used phenomenology to explore the different layers of an experience (Reeder, 2009). Reduction is bracketing information to understand the experience

without extraneous outside information (Christensen et al., 2017). The researcher took the information provided from the data collection and evaluates it without the natural attitude.

To collect the data two interviews were conducted for this phenomenological study, additionally the participants took part in a focus group. Doing this created an environment where the person interviewed was not the focus of the research, but the phenomenon itself was the focus (Englander, 2012). The purpose of using descriptive phenomenology was to describe how the experience of overcoming obstacles and sustaining blended learning fit into the four areas of teacher efficacy. Descriptive phenomenology allowed the researcher to keep all bias and opinions separate from the participants' answers to derive meaning from their experiences (Reiners, 2012). The participants shared interpretive information, and it was the job of the researcher to analyze the answers for clarity and meaning, not just accept it as understood (Bevan, 2014).

The first interview allowed the participant to describe his or her experience using the blended learning pedagogical approach followed by structural questions to provide further details and clarify statements (Bevan, 2014). By describing their experiences, the participants shared their journey without the confines of questions. The first interview allowed the participants to tell their story without any questions that could influence their answers (Chan, Fung, & Chien, 2013).

The data was collected by two different interviews: an open interview, semistructured interview, and a focus group. These interview techniques helped the researcher obtain information that aided in the data analysis techniques of phenomenological reduction and imaginative variation (Bevan, 2014). The interviews were conducted at the participants' high school—the open and semistructured interviews in the teachers' classrooms and the focus group

took place in the library conference room. Conducting the interviews in the teachers' classrooms allowed the teachers to feel comfortable in their environment which made them more likely to share information during the interviews (Jamshed, 2014). The library conference room is a neutral location that each teacher is familiar with, creating a feeling of security.

Interviews. The first interview was an open interview, which allowed the teachers to share their personal journey of blended learning. The participant was asked to describe using as much detail as possible his or her personal journey in the implementation and sustainment of blended learning. Through this interview, the researcher gathered background information to understand the participants' perspectives to begin to understand the influence of their teacher efficacy. This was the experienced phenomenon of the participant (Englander, 2012). The purpose of beginning the interview with open questions was to provide the researcher with information that helped discover the meaning of the phenomenon. In the phenomenological study the description obtained from an open interview helped reveal the phenomena (Englander, 2012).

The second interview was semistructured, building on the first interview. Questions were asked regarding the effect of teacher efficacy on overcoming obstacles and sustaining blended learning. The four areas of teacher efficacy are mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. This interview clarified the experience shared in the open interview (Englander, 2012). The participants were asked questions that focus on how they overcame obstacles to sustain blended learning based on their teacher efficacy. The questions were focused but did not lead the participant to provide a biased answer (Chan et al., 2013). This follows the format suggested by Amedeo Giorgi who believed that interviews in a

phenomenological study were two-tiered, the first interview is to obtain a description then the second interview helps discover the meaning (Bevan, 2014).

Focus group. The last interview was conducted as a focus group where the teachers discussed their shared experiences with blended learning based on the questions. Although not common in phenomenology research, Bradbury-Jones, Sambrook, and Irvine (2009), argued this approach is beneficial in phenomenological research. Because this was a shared experience amongst the science department at one high school in the southern United States, their discussions within the focus group elaborated on common experiences, providing insight as to how obstacles were overcome, and the blended learning pedagogical approach was sustained as a department. Talking in a group setting allowed participants to listen to what others have to say while further reflecting upon their own experiences and sharing more information (Bradbury-Jones et al., 2009). Bradbury-Jones et al. found focus groups enhance rather than detract from collecting information. Participating in a focus group can also expose any collective efficacy, the shared beliefs of the teachers within the department (Protheroe, 2008).

Using this data collection process allowed the participants to share their personal journey in an open interview, answer specific questions in the semistructured interview, and finally discuss common experiences in the focus group. The two interviews and the focus group provided the interviewer a chance to analyze the overall experience of the participants within context and look for meaning within the experience (Seidman, 2013). If the researcher does not understand the context of the participants' experiences, then it is unlikely the researcher can find meaning from the experience (Seidman, 2013).

The use of the two interviews and the focus group ensured the researcher can triangulate the data using data source triangulation. The in-depth interviews provided the researcher with

individual responses about the phenomena, while the focus group provided a chance for the participants to interact about the shared experience (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). The three interactions with the participants allowed the phenomena to be explored deeply, comparison of the individual experiences and the collective experience, and helped the researcher to verify the validity of the information (Carter et al., 2014).

The time period for the data collection was six weeks. Two participants were interviewed a week for five weeks culminating with the focus group on the sixth week. To ensure confidentiality, pseudonyms were assigned to each teacher (Yin, 2011). The pseudonyms were assigned based on the order in which they were interviewed.

Identification of Attributes

Teacher efficacy was the primary attribute of this study. As defined by Bandura (1977), the four sources of teacher efficacy are mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. After the interviews are conducted, the responses were transcribed and coded according to the sources of teacher efficacy. Examining the participants' responses based on teacher efficacy revealed commonalities of how they overcame obstacles and sustained the blended learning pedagogical approach in their classrooms. The commonalities in the lived experiences of secondary science teachers at a high school in the southern United States could help administrators and district leaders understand the influence of teacher efficacy on the implementation of pedagogical approaches.

Data Analysis Procedures

Data analysis in descriptive phenomenological studies, according to Giorgi (2009), required the following principles: phenomenological reduction, establish units of meaning, and imaginative variation. When these principles are used in phenomenological studies, the

researcher will gain a better understanding of the lived experience of the participants and the meaning within it. The transcribed responses were organized according to the different themes of teacher efficacy in which they fall to address the research questions: mastery experiences, vicarious experiences, emotional arousal, and verbal persuasion. The themes were discovered by hand, color-coding the transcribed data. With the interview transcripts, transcribed using a Google voice to text and checked by the researcher, from each interview and the focus group, the researcher analyzed the responses.

Phenomenological reduction. Phenomenological reduction is the process of isolating knowledge of the world to focus on analyzing the experience or the phenomenon (Giorgi, 2009). With phenomenological reduction, the researcher will put aside all biases, pre-judgements, and preconceived ideas about the topic (Giorgi, 2009; Moustakas, 1994). By setting aside all previous knowledge and experience regarding teacher efficacy and the blended learning pedagogical approach and conducting the interviews with an open mind will allow the researcher to focus on the experience of the secondary science teachers instead of personal experiences (Moustakas, 1994). The researcher was transparent and honest to acknowledge opinions so the topic can be approached with an open mind.

Operating with this type of reduction is appropriate to study the phenomena as doing so allowed the researcher to look deeper at the lived experience and derive meaning from the experience (Christensen et al., 2017; Giorgi, 2009). One way to do this is by bracketing the identified preconceived notions of blended learning and teacher efficacy so that the relationships between the participants' responses and teacher efficacy can be meaningfully organized (Moustakas, 1994). The researcher has experience using the blended learning pedagogical approach in the classroom as well as creating and facilitating professional learning for teachers to

transition from the traditional teacher-directed classroom model to the blended learning pedagogical approach. Because of this experience, the researcher bracketed this knowledge and focus solely on the experience of the participants.

Units of meaning. Before units of meaning can be determined, the researcher read the entire transcript of interviews to gain a global sense of the phenomena (Giorgi, 2009). The researcher read the transcript of the first interview before the second interview to gain a global sense of the participant's experience. By understanding the overall experience from the first interview, the researcher learned the context of the experience to inform meaning (Bevan, 2014). After the second interview and the focus group, the participants' responses were analyzed by theming the data according to the categories of teacher efficacy—mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal (Saldaña, 2016). By organizing the responses into categories of teacher efficacy, patterns emerged answering the research questions. The participants' responses were themed according to the experiences that helped them overcome obstacles and those that helped them sustain the blended learning pedagogical approach. The researcher was then be able to begin to find meaning in the experience to help determine what helped the secondary science teachers implement the blended learning pedagogical approach in their classes over time. (Giorgi, 2009). Theming the data was also be done with the data collected from the focus group. The overall goal of this was to determine the role of collective teacher efficacy of the secondary science teachers in overcoming obstacles and sustaining the blended learning pedagogical approach.

Imaginative variation. The next step was imaginative variation. In this step, the researcher sought to derive meaning from the information answering the question of how the phenomena came to be (Moustakas, 1994). The researcher took the coded information and

attempt to find meaning from the experience of the teachers. According to Giorgi (2009), this was a process and not one that can be accomplished quickly. An important part of this process was to focus on the participants' responses to determine the accuracy of the statements and how information relates to the collective teacher efficacy. The study of how secondary science teachers at a high school in the southern United States overcame obstacles and sustained the blended learning pedagogical approach focused on the individual participants' experiences as well as their collective experience during the analysis phase.

Limitations of the Research Design

The study was not without its limitations. Since the data of the study was collected through interviews, the participants needed to clearly explain their experience and answer the questions with as much detail as possible. The goal of phenomenological research was to describe and understand the lived experience of the participants and if the participants failed to clearly articulate their experience, it would limit the researcher's analysis (Moustakas, 1994).

Another potential limitation of the study is the sample size of nine teachers. The focus of phenomenological studies was on the phenomenon itself and not the participants of the study. The participants voluntarily took part in the study potentially diminishing the available sample which could limit the information collected (Vähäsantanen, 2015). The researcher needed to collect enough information within the selected sample size to fully describe the shared experience of the participants (Moustakas, 1994). Although the researcher works in the same school district as the participants, the researcher does not evaluate or oversee the teachers, so this did not create any conflict of interest nor present a limitation to the research design.

Validation

Credibility. Internal validity is the point in which the research findings are considered believable and trustworthy (Creswell, 2013). The participants were selected based on their diverse experiences before, during, and after implementation of blended learning to alleviate an internal threat of validity in the selection of participants (Creswell, 2014). The participants received their certifications in both traditional and alternative methods as well as have experience using the blended learning pedagogical approach and/or the traditional teacher-directed method. The participants of the study reviewed the interview transcripts in order to, according to Creswell (2014), minimize errors and increase the validity. External validity is possible if the results are generalizable to other populations. Using the phenomenological method design may present non-generalizable results due to the small sample size but will help understand the shared experience of the secondary science teachers in the implementation of blended learning (Creswell, 2014).

Dependability. The dependability of the study relied on the interview questions. The researcher designed interview questions to encourage participants to share their lived experience of implementing blended learning and the influence their teacher efficacy had on overcoming obstacles and sustaining the pedagogical approach (Creswell, 2014). The questions were reviewed by the dissertation committee. The dissertation committee provided feedback to ensure the questions aligned with the purpose of the study in order to obtain reliable results.

Expected Findings

The expectation of this study was to begin to understand the role of teacher efficacy in overcoming obstacles and sustaining the blended learning pedagogical approach in secondary science classrooms. Teacher efficacy influences classroom instruction and can influence how

pedagogical approaches are implemented (McNeill et al., 2013). The study was expected to reveal whether mastery experiences, vicarious experiences, verbal persuasion, or emotional arousal had the greatest influence on how the secondary science teachers overcame obstacles and sustained the blended learning pedagogical approach.

When teachers collaborate with other teachers their teacher efficacy improves (Hattie, 2012; Velthuis, 2015). Menon and Sadler (2017) found teacher efficacy improves with the growth of teachers' content knowledge, creating a better academic experience for the students. Understanding the type of teacher efficacy that helps teachers overcome obstacles and sustain the blended learning pedagogical approach can be beneficial to the field of education. The results of the study may contribute to the professional development of educators, professional learning facilitators, instructional leaders, and administrators may benefit from this research, so they can better understand the role of teacher efficacy and its influence on students.

Ethical Issues

Conflict of interest assessment. At the time of the data collection, the researcher had a professional relationship with the school district. This is a non-evaluative position, the researcher oversaw instruction and implementation of a foundational core curriculum other than science. Therefore, there was not a conflict of interest for the study as the participants are secondary science teachers. Additionally, the researcher did not have an economic interest in the study. The researcher served as the principal investigator and was not influenced by outside sources.

Researcher's position. As a classroom teacher, the researcher found blended learning to be an effective pedagogical approach in the secondary classroom. When in the classroom, the researcher used the station rotation sub-model of the rotation model. The researcher designs and facilitates professional learning on blended learning at various conferences and schools. Finally,

the researcher supports using the blended learning pedagogical approach and works in the same district as the teachers interviewed.

Ethical issues in the study. The researcher did not foresee any ethical issues in the study. A possible issue could be the selected participants and their willingness to honestly answer the questions about how teacher efficacy influences how teachers overcome obstacles and sustain the blended learning pedagogical approach. To counter this, the researcher selected a diverse group of secondary science teachers who have a variety of experiences in education and with blended learning. All identifying information was removed to ensure the teachers' confidentiality, which allowed them to answer questions honestly. Teachers could have withdrawn participation from the study at any time and were made aware of their rights regarding the research. Additionally, a possible issue could be the storage of the participants' interview responses. To avoid any ethical issues, the audio recording of the participants' responses were securely stored in the researcher's safe. The transcripts of the participants' interviews were saved in a password protected document on the researcher's personal laptop. A final potential ethical issue could be if the researcher did not obtain approval from the university and the school district and falsified the documents. IRB approval was sought from Concordia University and the school district in which the study took place with all paperwork submitted to the appropriate parties.

Summary

Chapter 3 describes the research methodology to be used in the study while providing a rationale within the problem and research questions. This chapter includes the purpose and design of the study, sample, instrumentation, data collection, data analysis, limitations, credibility, dependability, and ethical considerations. The use of an open interview,

semistructured interview, and focus groups allowed the researcher to collect an in-depth account of the shared experience of the secondary science teachers and the role teacher efficacy played in overcoming obstacles and sustaining blended learning using Bandura's theory of self-efficacy as the conceptual framework. The purpose of this chapter is to provide readers with data to learn from and possibly replicate the study for research on overcoming obstacles and sustaining pedagogical approaches in secondary science classrooms. The next chapter will provide the analysis of data and study results.

Chapter 4: Data Analysis and Results

Introduction

As teacher efficacy influences student achievement, it is important to understand how it influences the implementation of pedagogical approaches (Hattie, 2003; Reynolds, 2018). Because blended learning is a modern pedagogical approach, teachers with low teacher efficacy may abandon it all together (Palmer et al., 2015). Understanding how teacher efficacy influences the implementation of a pedagogical approach can help teachers, school administrators, and district administrators support and coach teachers. When school and district administrators coach teachers with their teacher efficacy in mind, teachers may respond better and feel connected to the coach (Akhavan, 2015). According to Goddard, Goddard, Kim, and Miller (2015), leaders who support teacher improvement using purposeful feedback had an impact on teacher performance and school improvement. Administrators' understanding of teacher efficacy provides an ability to coach teachers based on their strengths and improve student performance (Goddard et al., 2015). The purpose of this study was to explore the influence of secondary science teacher efficacy on overcoming obstacles and sustaining blended learning implementation in a southern United States high school.

In the review of literature, no studies were found that focused solely on the influence of secondary science teacher efficacy on obstacles and sustaining the blended learning pedagogical approach, indicating that a gap exists in the literature. Current qualitative studies focusing on teacher efficacy and blended learning focus on the preservice teacher or those in the initial stages of implementation, failing to examine those with more than four years of experience (Gerard et al., 2011; Ho et al., 2014; Kelly & Denson, 2017; Velthuis, 2015). In this study, the researcher explored the collective experience of a group of secondary science teachers who use the blended

learning pedagogical approach and the influence their teacher efficacy had on overcoming obstacles and sustaining the pedagogical approach. A descriptive phenomenological approach was selected to focus on finding meaning in the lived experience of the secondary science teachers (Giorgi, 2009). The methodology was selected to allow for the researcher to bracket her experiences to avoid judgements and biases while collecting and analyzing data. The researcher wanted to emphasize the participants' responses and focus on the shared experience of the participants without the influence of past experiences (Moustakas, 1994). Chapter 4 includes a description of the influence of secondary science teacher efficacy on the implementation of blended learning at a high school in the southern United States.

The researcher hand coded the data collection and themed the data according to the four sources of teacher efficacy: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. Theming the data this way allowed the researcher to determine the teacher efficacy source that had the greatest influence on overcoming obstacles and sustaining the blended learning pedagogical approach. The participants' responses suggested that mastery experiences had the greatest influence on their teacher efficacy followed by verbal persuasion, vicarious experiences, and finally emotional state.

Within the sources of teacher efficacy, subthemes emerged and provided more details about the implementation of blended learning in the science department at a high school in the southern United States. These results are described in detail later in this chapter. Also in this chapter is a description of the study; researcher methodology; data analysis; and a summary of the findings. Details of the data analysis from theming the data and discovering subthemes based on the participants' experiences are also included in this chapter.

The following research questions were used to guide the research:

Research Questions

1. To what extent does the self-efficacy of secondary science teachers influence the implementation of blended learning?
2. How do secondary science teachers' experiences overcoming obstacles in blended learning implementation reflect those of mastery experiences, vicarious experiences, verbal persuasion, and emotional state?

Role of Researcher

The researcher used the blended learning pedagogical approach as a classroom teacher and found the station rotation model to be effective in the secondary English classroom. The researcher has designed and facilitated blended learning professional learning for various state, region, and district workshops. Because of this experience, the researcher developed an interest in the role of teacher efficacy and its influence on overcoming obstacles and sustaining the blended learning pedagogical approach. The researcher believes that blended learning is an effective pedagogical approach in the secondary science classroom and wanted to better understand how to support teachers.

The researcher determined the phenomenological approach was the most effective way to begin to understand the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach. Because the flipped classroom instructional model has been the department expectation for six years for the science department at a high school in the southern United States, phenomenological methodology was determined to be best to understand the shared experience of the participants. Utilizing two interviews and a focus group provided the researcher with data which exposed the lived experience of implementing blended learning.

The researcher has a professional relationship with the same district as the participants of the study. The position is non-evaluative of teachers. The researcher's position in the district was not a conflict of interest. To avoid bias and prevent a conflict of interest, the researcher's knowledge and opinions of blended learning and the phenomena were bracketed to remain neutral which allowed the participants' responses to be the focus of the study (Giorgi, 2009).

Description of the sample. The nine participants were selected based on purposeful sampling and their common availability for the focus group. The researcher scheduled interviews with the teachers after they returned a signed consent form. Each interview took place after school in the teacher's classroom to allow for comfort (Jamshed, 2014). The focus group was held in the library conference room, a neutral yet familiar location for all participants.

Of the 10 original participants in the study, only nine participants were able to participate in both interviews and focus group. The 10th participant did not participant in the focus group, and for this reason the two interviews from this participant were not included in the data analysis. All data collected from the first two interviews was deleted and any printed material concerning the participant was shredded. Losing a participant did not prevent the researcher from collecting the appropriate data to answer the research questions. The researcher was still within the appropriate range of participants, three to 10, for a phenomenological study (Creswell & Creswell, 2018). The tenth participant's information could have provided more information to add to the study, but it was unlikely to have changed the overall results. The nine remaining participants provided thorough, honest accounts of their experiences over the department's six years of implementation, achieving data saturation.

Purposeful sampling is used to identify and select participants who are knowledgeable about the situation. In this study, purposeful sampling was appropriate for these participants who

had experience with the phenomenon (Palinkas et al. 2015). Specifically, for this study criterion sampling was used. Criterion sampling requires the participants to meet selected criterion (Polkinghorne, 2005). The participants for this study needed to provide details about overcoming obstacles and sustaining the blended learning pedagogical approach in the secondary science classroom.

To participate in the study, the participants needed to meet the following criteria: (a) appropriately certified to teach secondary science (state certification in Life Science, Physical Science, and Composite Science); (b) teach secondary science at the same high school in the southern United States; and (c) have at least four years of experience teaching using the blended learning pedagogical approach, specifically the flipped classroom instructional approach. The criteria listed above ensured proper representation of the lived experience of the secondary science department at the school. The researcher determined 12 teachers met the criteria of this study.

Of the 12 teachers who met the criteria, the researcher scheduled interviews with 10 teachers after they returned a signed consent form. Each interview took place after school in the teacher's classroom to allow for comfort (Jamshed, 2014). The focus group was held in the library conference room, a neutral yet familiar location for all participants. Of the 10 original participants in the study, only nine participants were able to participate in both interviews and focus group. The 10^{th} participant did not participant in the focus group, and for this reason the teacher's two interviews were not included in the data analysis. All data collected from the first two interviews were deleted, and any printed material concerning the participant was shredded.

As column three of Table 1 shows, three of the nine teachers earned their certification from alternative programs (p. 77). Nine teachers taught using the traditional teacher-directed

lecture pedagogical approach before transitioning to the blended learning pedagogical approach as indicated in column four of Table 1. Columns two and five show the participants in the study have at least four years of experience using the blended learning pedagogical approach in biology, integrated physics and chemistry, chemistry, physics, earth and space science, environmental systems, dual credit biology, and Advanced Placement biology classes.

Table 1
Participants in the Study

Teacher	Years of BL Experience	Certification	Pedagogical Experience	Science Classes Taught
1	6	Traditional	Traditional and Blended Learning	Chemistry Physics
2	6	Traditional	Traditional and Blended Learning	Chemistry Pre-AP Chemistry AP Chemistry Physics Pre-AP Physics
3	6	Alternative	Traditional and Blended Learning	Chemistry Integrated Physics and Chemistry
4	6	Alternative	Traditional and Blended Learning	Chemistry Environmental Systems AP Environmental Systems Dual Credit Biology AP Biology
5	6	Traditional	Traditional and Blended Learning	Physics Pre-AP Physics
6	5	Traditional	Traditional and Blended Learning	Biology Pre-AP Biology Chemistry Environmental Systems Forensic Science Medical Microbiology Pathophysiology AP Biology Dual Credit Anatomy and Physiology
7	5	Traditional	Traditional and Blended Learning	Biology Pre-AP Biology
8	5	Alternative	Traditional and Blended Learning	Biology Integrated Physics and Chemistry Chemistry Physics
9	4	Traditional	Traditional and Blended Learning	Biology

Table 2 shows seven of the nine participants were female and two of the nine participants were male, reflective of the science department. Six of the nine teachers received undergraduate training in education, and three of the nine teachers earned certification through alternative programs.

Table 2 summarizes the participants' teaching experiences. As shown in column 3, five of the nine teachers had less than 10 years teaching experience and four of the nine teachers had over 10 years teaching experience. All of the participants had taught on-level classes, as noted in column five. Additionally, four of the nine participants had taught Pre-Advanced Placement (Pre-AP) classes, and three of the nine have taught advanced courses—Advanced Placement (AP) and/or Dual Credit (DC). Seven of the nine teachers had only taught secondary science classes, while two of the nine had taught elementary and secondary science classes. In column four, six of the nine teachers earned certification through a traditional program and three of the nine teachers earned certification through alternative programs. Seven of the nine participants had taught physical science classes and five of the nine participants had taught life science classes as described in column five.

Table 2

Participant Experience

Teacher	Sex	Years in Education	Certification	Science Classes Taught
1	F	12	Traditional	Chemistry Physics
2	F	9	Traditional	Chemistry Pre-AP Chemistry AP Chemistry Physics Pre-AP Physics
3	F	7	Alternative	Chemistry Integrated Physics and Chemistry
4	M	7	Alternative	Chemistry Environmental Systems AP Environmental Systems DC Biology AP Biology
5	F	12	Traditional	Physics Pre-AP Physics
6	F	18	Traditional	Biology Pre-AP Biology Chemistry Environmental Systems Forensic Science Medical Microbiology Pathophysiology AP Biology DC Anatomy and Physiology
7	F	14	Traditional	Biology Pre-AP Biology
8	M	6	Alternative	Biology Integrated Physics and Chemistry Chemistry Physics
9	F	7	Traditional	Biology

Data collection procedures. The researcher completed all appropriate paperwork and gained approval from Concordia University's Institutional Review Board (IRB) and then received approval from the school district's IRB. After receiving permission from the university and the school district to conduct research, the high school was contacted to schedule a meeting with all interested science teachers who met the criteria for the study. In total, 12 teachers met the criteria and attended the meeting. During the meeting, the researcher shared permission was granted to conduct the research from both the university and school district. The researcher also explained the purpose of the study and provided interested teachers with an informed consent form. The informed consent form explained their rights during the study, the confidentiality agreement, and scope of the research.

The participants were interviewed individually twice in their classrooms and participated in a focus group in the library conference room of the high school. Data from the first interview included 54 responses to semistructured, open ended questions about the teachers' overall experience implementing blended learning at a high school in the southern United States. The data collected from the second interview included 81 responses to semistructured, open ended questions about teacher efficacy and its influence on the implementation of the blended learning pedagogical approach. Data collected from the focus group included responses to nine semistructured open-ended questions about teacher efficacy and the influence on the implementation of blended learning at a high school in the southern United States. The researcher transcribed all data, and each participant checked their respective transcripts for accuracy.

Each participant verified the accuracy of both interviews and the focus group transcripts. A PDF copy of the appropriate transcripts were sent to each participant via email with each

participant replying and attesting to the correctness of the material. Two participants indicated changes needed to be made. Teacher 3 was inaccurately attributed to one quote and Teacher 7 found grammatical errors in her interview. Both transcripts were fixed and approved by the appropriate participants.

Research Methodology and Analysis

To investigate the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach, a descriptive phenomenological design was used. Phenomenological research, according to Moustakas (1994), focuses on the experience of the participants to find meaning of the phenomena. Descriptive phenomenology was selected as the methodology to capture the experience of secondary science teachers who work at the same high school in the southern United States to derive meaning from their lived experience (Giorgi, 2009). Using a descriptive phenomenological approach provided a way for the researcher to bracket all bias and opinions keeping them separate from the participants' answers (Reiners, 2012). The flipped classroom instructional model has been the department expectation for six years and by interviewing these participants the researcher learned about the experiences beyond the initial stages of implementation.

The most effective data collection tool in phenomenological studies is an interview (Creswell & Poth, 2018). Throughout the data collection process, the researcher bracketed personal knowledge so as not to influence the information shared by the participants. Doing so removed the researcher's personal bias to allow the lived experience of the participants to be the focus. The questions revealed information about the participants' careers, history, and their experience implementing the blended learning pedagogical approach.

The first interview focused on the overall experience over the six years of flipped classroom implementation within the science department. The second interview allowed for the teacher to share what influenced the implementation of the flipped classroom instructional model. Through the two interviews and the focus group, the participants and the researcher explored the experience of implementing blended learning and the influence of teacher efficacy on the implementation. During the interviews and the focus group, the participants answered questions about their background, the implementation of blended learning, the training, observed changes in teaching, observed changes in student learning, teacher efficacy, administration actions, motivation to continue use of the blended learning pedagogical approach, abandoning pedagogical approach, and how the teacher would describe their teaching style.

The focus group allowed the researcher to gain a better understanding of the shared experience of blended learning implementation and explored the influence of collective efficacy on the experience. The participants shared detailed information about the implementation of the flipped classroom instructional model in secondary science classes at a high school in the southern United States and provided the researcher with information which was later themed according to the four sources of teacher efficacy. Based on the participants' responses, the researcher identified how teacher efficacy influenced the implementation of the flipped classroom instructional model.

Analyzing data within the descriptive phenomenological method includes three steps: phenomenological reduction, establish units of meaning, and imaginative variation (Giorgi, 2009). Phenomenological reduction requires the researcher to put aside all bias, judgements, and prior knowledge of the topic to allow the phenomena to be the focus of the data analysis (Giorgi, 2009; Moustakas, 1994). The researcher bracketed all knowledge of teacher efficacy and blended

learning before analyzing data. Afterwards, the researcher read the transcripts to gain an overall sense of the phenomena (Giorgi, 2009). Given that the flipped classroom instructional model has been the department expectation for the last six school years in the secondary science department at the participants' high school in the southern United States, the researcher needed to understand the overall experience with implementing blended learning. By reading the transcripts, the researcher understood the overall experience, both the struggles and successes the teachers experienced over their time of implementing the flipped classroom instructional model.

The researcher analyzed the data with a general sense of the participants' experiences and found meaning from them (Giorgi, 2009). Learning the context of the experience helped the researcher understand the experience to find meaning in the data (Bevan, 2014). Once a global sense of the phenomena was established, the researcher then read over the transcripts to determine units of meaning. The information was categorized according to the sources of teacher efficacy—mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. Within the sources the researcher could determine what helped the participants to overcome obstacles and sustain the blended learning pedagogical approach. Theming the data is as intensive as coding and required reflection on both the detailed responses and the overall experience of the participants (Saldaña, 2016). The researcher read and reread the transcripts to appropriately mark the data when significant meanings were noticed (Giorgi, 2009). Reading through transcripts several times helped the researchers to understand the overall experience and identify significant phrases and themes to deeply describe the phenomena (Creswell, 2013).

The heart of the method, according to Giorgi (2009), is the third step in data analysis: imaginative variation. The researcher took the themed information and analyzed it to expose the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning

pedagogical approach in the secondary science classroom. The third step took a considerable amount of time, as this was where the researcher had to go back to the data and conduct imaginative variation, meaning the researcher reviewed the themed data to discover the meaning of the secondary science teachers' experiences. It is important that the researcher was explicit as possible about the information to show the phenomena and how teacher efficacy influenced it.

By analyzing data using this method, the researcher not only discovered subthemes within the four sources of teacher efficacy, but also exposed the importance of collective teacher efficacy. Collective teacher efficacy, according to Bandura (1997), is the teacher's shared belief that the efforts of the entire faculty will positively influence students. This is based on his self-efficacy theory. If collective teacher efficacy of a department and/or school is high, they believe all students can succeed, and they work together to try to achieve this. Groups of teachers with a high level of collective teacher efficacy participate in decisions of the school, work toward a common goal, and support each other's efforts in the classroom (Donohoo, 2017). According to the research of Hattie (2017), collective teacher efficacy has the greatest influence on student achievement. Exposing the influence of collective teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach in a secondary science department at a high school in the southern United States showed the importance of both individual teacher efficacy and the influence of the entire department. Once data analysis was complete, the researcher returned to the transcripts make sure the context was correct. This was done repeatedly until all units of meaning were determined (Giorgi, 2009).

The data was themed according to the four sources of teacher efficacy: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. As the researcher read and reread the transcripts, marks were made to denote significant events later that could fall

into one of the four sources of teacher efficacy (Giorgi, 2009). By theming the data this way, the researcher could better understand what part of teacher efficacy had the greatest influence on the implementation of blended learning for the secondary science teachers. Within the four sources, subthemes also emerged. For mastery experiences, the teachers expressed needing time to plan and time to implement the pedagogical approach. Within vicarious experiences, teacher shared that they relied on the experiences of teachers on and off campus as well as research on the flipped classroom instructional model to help them. The teachers disclosed verbal persuasion came from more than administrators, sharing teachers from the science department, other subject area teachers, students, and parents affected their efficacy as well. One teacher shared information about emotional state, which exposed the influence of extended medical leave on students and the teacher.

Summary of the findings. The researcher hand coded, or "themed," the data according to the four sources of teacher efficacy: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. The data analysis does not go beyond what is presented; any gaps are filled in with more data, not "theoretical speculation" (Giorgi, 2009, p. 127). The data analysis process uncovered subthemes and repetitious concepts in the review of the participants' experiences. Although vicarious experiences are how eight of the nine responded as to how they first began using the blended learning pedagogical approach, mastery experiences dominated the responses. Throughout the data analysis process, recurring ideas that fit within the four sources of teacher efficacy were present. Each participant shared their experience with the implementation of blended learning in the secondary science classroom at a high school in the southern United States. The participants' responses predominately fell in the mastery experiences category, followed by verbal persuasion, vicarious experiences, and finally emotional arousal

Only one teacher responded with information regarding emotional arousal. The overall implementation of blended learning, according to the participants, was influenced by their teacher efficacy.

Research question 1. The first research question was: *To what extent does the self-efficacy of secondary science teachers influence the implementation of* blended learning? The purpose of this question was to learn the role of teacher efficacy in the implementation of a pedagogical approach. As the researcher collected data for this study, the participants were asked about their teaching experience as well as their experience implementing blended learning, specifically the flipped classroom instructional model in their secondary science classes. Additionally, the teachers were asked about their teacher efficacy and how it influenced their classroom performance. Each participant shared they had confidence in content knowledge and attributed the influence of their teacher efficacy on how successful the implementation of the flipped classroom instructional model was for them. When asked which source of teacher efficacy had the greatest influence, the participants overwhelmingly responded mastery experiences, followed closely by verbal persuasion, then vicarious experiences, and only one teacher spoke of emotional state. The lived experiences of the participants supported the four sources of teacher efficacy and uncovered subthemes which will be discussed in the presentation of the data and results sections. The subthemes are summarized in Table 3.

Table 3

Emerged Themes Related to Research Question 2

Participants	T1	T2	T3	T4	T5	T6	T7	T8	T9
Mastery Experiences									
Time to Plan	X	X	X	X	X	X	X	X	X
Time to Implement	X	X	X	X	X	X	X	X	X
Small Groups	X	X	X	X	X	X	X	X	X
Student Growth	X	X	X	X	X	X	X	X	X
Student Engagement	X	X	X	X	X	X	X	X	X
Professional Growth	X	X	X	X	X	X	X	X	X
Structure and Routines	X	X	X	X		X	X	X	X
Grades	X	X	X	X			X	X	X
Absences		X	X		X	X	X		
Vicarious Experiences									
Specialist		X	X	X	X	X	X	X	X
Workshops	X	X				X	X		
Observations	X				X	X			
Research	X			X		X			
Verbal Persuasion									
Administrators	X	X	X	X	X	X	X	X	X
Other Teachers	X	X	X	X		X	X	X	X
Parents	X	X		X		X			
Students	X				X	X			
Emotional Arousal									
Maternity Leave		X							

Researcher question 2. The second question was: *How do secondary science teachers' experiences overcoming obstacles in* blended learning *implementation reflect those of mastery experiences, vicarious experiences, verbal persuasion, and emotional state?* The purpose of this question was to uncover how the secondary science teacher's experiences in the implementation of the flipped classroom instructional model were reflective of the four sources of teacher efficacy—master experiences, vicarious experiences, verbal persuasion, and emotional arousal. The data collection revealed that all nine participants shared experiences with mastery experiences and verbal persuasion, eight of the nine participants referenced vicarious experiences, and one participant reflected on emotional arousal.

Presentation of the data and results. The purpose of this study was to begin to understand the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach. The findings from the data collection revealed the four sources of teacher efficacy influenced the implementation of blended learning and exposed subthemes within each source. The subthemes are reflective of the shared experience of the secondary science teachers who work at the same high school in the southern United States. To ensure the participants' identities remained confidential, pseudonyms were assigned to the teachers according to the order in which they were interviewed. Detailed accounts of their experiences are discussed in the following sections.

The first theme, mastery experiences, included the following subthemes: time to plan for the change in instructional model, time to implement the flipped classroom instructional approach, structure and routines, small groups, student growth, student engagement, professional growth, grades, special populations, and absences. The second theme, vicarious experiences, allowed the participants to share information gathered from the science instructional specialist at

the high school, workshops, other teachers, and their personal research. Verbal persuasion, the third theme, produced subthemes of administrators, other teachers, parents, and students. Only one participant referenced the final theme, emotional arousal, which was in reference to extended medical leave and its influence on the classroom.

Mastery experiences. When compiling and analyzing research for this study, data revealed that within mastery experiences subthemes emerge which increased the participants confidence in the implementation of the flipped classroom instructional model. The two strongest subthemes that emerged were time to plan for blended learning and time to implement the pedagogical approach. The participants shared that having the opportunity to plan with their content area teams over the summer and during the school year helped their confidence in the implementation of the flipped classroom instructional model. Each of the nine participants stated they felt the time they were given to plan for the transition and the units themselves as well as the time given to implement the pedagogical approach made a difference in their confidence levels and led to greater mastery experiences.

Time to plan. The participants planned together one summer and some of the teachers spoke of this specific experience raising teacher efficacy levels. The participants were given time the summer after the first year of implementation to curriculum plan. Teacher 1 shared the teachers had not been given enough time to "really get comfortable with the approach" and "on the other side of summer, once we got back in the fall things started clicking." Teacher 2's confidence level rose after given time to plan with other teachers in the department.

> We started putting together a lot stuff we'd already been using but we just restructured it into modules so there was a coherent flow to everything. . . . We restructured the format several times, but we spent probably three weeks over the summer just trying to get

everything laid out and ready to go. Everything flowed a lot better, we had everything so much better planned. Just knowing what I was doing and not having to worry.

Teacher 4 believed that having the time to plan made the teacher better prepared and more excited to implement blended learning which raised teacher efficacy levels. The transition proved to be a daunting task in the beginning but was excited by the chance to create something new that was unique to the science department that would help his students. Teacher 7 agreed with Teacher 4, further supporting the teacher efficacy growth because of the planning. Teacher 7's confidence grew because they were building the structure together as a team, it was not just one person trying it and hoping for the best. Teacher 9 also attributed the planning time to positively influencing teacher efficacy. The team could adjust their plans without having to recreate everything from scratch. They could focus on planning more targeted intervention within the class period instead of just having time to lesson plan.

Teacher 4 additionally believed the time dedicated to planning lessons using the blended learning pedagogical approach led to a better student experience. The work it took to prepare the lessons to implement the flipped classroom instructional model was all worth it when the students were successful in ways they had not been using traditional teacher-directed methods. For Teacher 4, it was these moments that made all the time, effort, student complaints, and parent meetings worth it. Teacher 3 experienced a mastery experience when given the time to plan over the summer with the other secondary science teachers. Having that time together to share ideas since everyone teaches differently and address misconceptions, according to Teacher 3, positively influenced teacher efficacy. Teacher 2 attributed planning over the summer as how the teachers were prepared to implement blended learning properly in their secondary science classrooms. Without the three weeks of planning together during the summer, Teacher 2 does not

believe they would have been able to implement the flipped classroom instructional model with fidelity.

Time to implement. Not only did the time to plan for the implementation positively influence teacher efficacy, the participants also noted the importance of being given time to implement the pedagogical approach as positively influencing their teacher efficacy. Fullan (2011) suggested giving teachers and schools a three-year time period to determine if the change is effective. Lambert and Mitrani (2017) recommend that teachers are given three to five years with support to implement a pedagogical approach to understand it and address any problems. The participants shared initial resistance from various stakeholders, but over time found their teacher efficacy was influenced because they were given time to implement the pedagogical approach.

Teacher 6 was positively influenced by a mastery experience over the time of implementation. After Teacher 6 passed the stage of resistance from the students, the teacher could see it was working. Teacher 6 got to the point where it was working and making everyone's lives easier.

Teacher 5 reported being initially open to the flipped classroom instructional model, struggled with the transition, and then experienced success with the instructional approach. The teacher needed the time to implement the pedagogical approach with a mastery experience in order to raise teacher efficacy levels. Open to the idea in the beginning, Teacher 5 felt control had been lost in the classroom. But Teacher 5 continued to do it and realized over time that control had not been lost in her classroom, in fact it was an easier to manage, and the students are performing better than when traditional teacher-directed methods were used by the teacher.

Teacher 4 found that over the time of implementation teacher efficacy was positively influenced making the teacher better overall because of the flipped classroom instructional model. The confidence of the teacher grew by going through the process of working with students and finding different way to overcome problems. As the time of implementation continued, the teacher could see the students grow and reflect on their learning.

Making it through the first year of implementation in which Teacher 3 saw students grow after initial resistance positively influenced teacher efficacy allowed more mastery experiences over time. Had the teacher abandoned the pedagogical approach after initial resistance from the students and fearing disappointment from administration, Teacher 3 would not have seen students improve as much as they did using the flipped classroom instructional model.

Teacher 6 noticed changes in students from freshman year to junior year, noting that the process of using the flipped classroom instructional model became easier the longer the teachers and the students used it. The longer the pedagogical approach was used in the department, the more likely students and teachers bought into the process. At first, no matter the grade level, teachers experienced push back from students. But as Teacher 6 shared, over time the more success the teachers experienced the easier it was to feel confident about the pedagogical approach.

Teacher 6's mastery experience came over time of implementation and how the pedagogical approach transformed the teacher.

> But for me the big turning point was letting go and recognizing that blended learning didn't mean one thing. It was still your classroom; you could still put in your particular stuff that kids got a lot out of. So it's not taking everything that you know and love and throwing it away, it's formatting it in a different way and it doesn't mean that even though

> you might go from one chemistry classroom to another and what you're doing is very similar, it's not like you're going to go in and see Stepford teachers where everything is the exact same at the exact same time because your kids are different and they are in different places. That's kind of the point of this, isn't it, your third period can be in a different place than your fifth period and that's okay. You are still teaching both periods, it's a way to tailor the classes to your style and your kids to help them be successful.

Now, in the sixth year of implementation students come into class ready to work in the blended learning format. Each participant shared specific stories of how their teacher efficacy was positively influenced over the time of implementation because they witnessed firsthand the dramatic change in their teaching ability and the students' growth.

Professional growth. Beyond the time to plan for and implement the flipped classroom instructional model, each of the participants noted their confidence grew as they grew professionally. Teacher 2 even noted that the implementation of the blended learning pedagogical approach in the classroom changed the teacher's approach to teaching. Even though the teacher is considered the chemistry expert of the science department at the high school in the southern United States, transitioning to using the flipped classroom instructional model gave the teacher confidence to begin presenting at conferences and a better sense of what it is like to try something dramatically different in the classroom. Teacher 8 grew professionally from using the flipped classroom instructional model by personalizing learning for different students. The teacher found that teacher efficacy was positively influenced by working with students one-on-one and in small groups to help them succeed.

Teacher 4 found mastery experiences through the implementation of blended learning helped the teacher grow professionally as personal lifelong love of learning was stimulated

which was passed on to students that could not be accomplished in a traditional teacher-directed class. For Teacher 7, it was not just content knowledge and pedagogical improvements. Teacher 7 grew exponentially in how to use technology effectively for instruction and reach students outside of the classroom and traditional school day.

Structure and routine. Another subtheme that emerged from the data collection was the structure and routine using the flipped classroom instructional model brought to the teachers. Teacher 9 found that because of the structure and routines the flipped classroom instructional model provided, teacher efficacy was positively influenced. Using the flipped classroom instructional model, Teacher 9 relied on strengths and experiences to adapt it to fit the teacher's teaching style. Teacher 9 was able to get the best results from the students using the flipped classroom instructional model because an organized system was established. Teacher 2 shared how that teacher efficacy was positively influenced because over the time of implementation the teacher realized the overwhelmed feeling had gone away. The teacher was not scrambling to find lessons and activities. The structured allowed time to plan better and be more intentional about the delivery of content.

Student growth in the classroom. Each of the nine participants also shared because of the flipped classroom instructional model, the participants' confidence grew when they saw the growth in student performance through more engagement in class. The teachers discovered this through working with students in small groups. Teacher 4 noted students were more engaged retaining more information than when using the traditional teacher-directed pedagogical approach. It was easier for Teacher 8 to identify students who needed one-on-one and small group instruction. Teacher 8 realized some students needed more instruction than the information contained in the videos and could supplement this while allowing other students to move on

within the module. Because of this the teacher saw students' growth both in classwork and on assessments.

Teacher 5 noted there was monotony in explaining the same thing over and over to different small groups, but teacher efficacy influenced the implementation because the students grew based on the change in instruction. If the teacher was addressing the entire group, some students would tune out, but when she addressed the students in small groups they would listen. Working with small groups to quickly reteach and clarify misunderstandings, especially for students who receive specialized services, made an impact on Teacher 9. "By being constantly active and organized, I was able to see how students were working and understanding the concepts based on multiple small group and one-on-one interactions."

Teacher 7 found that it was easier to differentiate for the students when using the flipped classroom instructional approach. Students could work at their own pace—those who had mastered the concepts had the freedom to move on and those who needed supplemental instruction had that available to them. Most importantly, Teacher 7 stated, the students would ask questions earlier in the learning cycle allowing misconceptions to be caught and retaught.

Student STAAR performance. Five of the nine participants grew in confidence because of their students' positive changes in grades and improved performance on the STAAR Biology test. Teacher 7 noted the failure rate of classes went down and students performed better on the Biology STAAR test. Teacher 8 mentioned several students who struggled to pass classes and the STAAR tests thrived in the class set up with the flipped classroom instructional model. A greater number of students are reached with better results when the teacher uses the flipped classroom instructional model. Students left Teacher 9's classroom not only with better grades,

but with a better understanding of how to stay organized, manage time, and become responsible for their own learning.

Student absences. Five of the nine participants also referenced the success students who were absent found in the class because they could continue to work on the content material. The participants noted this to be true for truant students as well as those who are absent due to extra-curricular activities. Teacher 7 really enjoyed the fact that no matter where the students were located, whether they were absent from class due to illness or extra-curricular activity. They could work on the material on their own time and at their own pace. Students could keep up with the class and not fall behind even though they were not physically in class.

Teachers 2 and 6 stressed how difficult it was for a student to make up work in a traditional teacher-directed instructional approach. Even if the students were given the assignment, it was difficult for them to engage in the learning process because they were missing the direct instruction of the lesson. Students who are not present physically can still work through the process. Because learning is fluid in the blended learning classroom, the students are not expected to learn something and complete work while moving on to a new concept. Students return to class with an idea of what is going on and are caught up quicker.

Verbal persuasion.

Administrators. Each of the nine participants responded that administrators both built their confidence and negatively influenced their confidence in implementing the flipped classroom instructional model. The administrator who oversaw the science department and the science instructional specialist played the biggest role in positively influencing the teacher efficacy of the secondary science teachers. Teacher 4 said their support was not the number one determinant to success, but it played a big role. If they had not had the encouragement from the

administrator who oversaw the science department and the science instructional specialist, the results may have been different. Teacher 1 was grateful for the opportunity for teachers to try something, fail, and be coached through the process. Teacher 1 believed the teachers would have reacted differently to setbacks had they not been supported with positive words from the administrator who oversaw the science department.

Teacher 2 felt that a lot of the experienced success came from the positive influence of the administrator who oversaw the science department. Their conversations centered around refining lessons and reflecting on student learning. The administrator and science instructional specialist supported them and when the teachers were struggling, they would show the teachers data that proved the opposite to be true. The teachers were positively influenced by this action. Teacher 2 shared that the confirmation they were doing a good job positively influenced teacher efficacy, especially in the beginning when they were getting started.

Teacher 8 stressed the importance of a supportive administrator providing appropriate and timely feedback positively influenced teacher efficacy. When Teacher 8 shared teaching history, the teacher shared that the first year of teaching overall was the worst and was extremely frustrated when hired at the high school in the southern United States. Teacher 8 even noted that the teacher would not be at the level of performance today without the support of the administrator who oversaw the science department and the science instructional specialist.

Positive words from administrators also influenced Teacher 3. Teacher 3 found when struggling, the teacher relied on the administrator knowing, “this was going to be something that we may face a few uphill struggles but, in the end, it was going to be something amazing and it was.” Had Teacher 3 worked with administrators who “didn't see the light at the end of the

tunnel and wasn't happy with not seeing immediate successful results and kids cheering because of the flipped classroom, it would have been extremely challenging."

Teacher 3 also relayed the importance of administrators attending planning to "give ideas and guide us through the student learning process" in addition to spending time in their classrooms. The administrator who oversaw the science department coached teachers given specific feedback that improved teaching ability. In the beginning it was difficult to tell if it was working because everything was so new. But having an administrator and science instructional specialist come into the teacher's classroom and provide positive feedback about what was right helped positively influence teacher efficacy.

Similarly, Teacher 2 felt the feedback received from some administrators positively influenced teacher efficacy. The administrator over the science department would come in, watch the lesson and provide constructive feedback about how "we will work to make this better." The 2018–2019 school year was rough on Teacher 2 because the teacher only had a few informal observations from administrators where the feedback provided "half-hearted feedback with no conversation." Teacher 2 feels that the current administration is not as engaged in what goes on in the classroom and does not provide effective feedback on performance.

This positive influence extended to other administrators on the campus as well. Teacher 6 shared that administrator over the science department really understood what was happening so the administrator was constantly there to support and encourage the teachers. With two different evaluators for the last two years who were not part of the blended learning initiative, Teacher 6 still had a positive experience. Both administrators complemented her teaching style mentioning that it was beneficial for the students to access material outside of the classroom. One administrator told Teacher 6 she was an asset to the district and the district was lucky to have the

teacher, which gave the teacher the confidence boost needed to deal with any pushback from other stakeholders.

But not all administrators supported the transition from the traditional teacher-directed class to the flipped classroom instructional model. One administrator told Teacher 1 that transitioning to the flipped classroom instructional model was fine for chemistry and physics because those classes did not have a state assessment tied to it, but biology instruction was best delivered using traditional teacher-directed methods. Another administrator told Teacher 1 she could never learn that way and did not know why the science department thought kids could learn that way, without ever conducting research or attempting to understand the blended learning pedagogical approach. Teacher 2 agreed, adding that some administrators treated it like a "game of telephone" passing incorrect information without sitting down to have a structured conversation about using the pedagogical approach.

The academic dean did not understand the pedagogical approach and the dean's verbal persuasion could have negatively influenced their teacher efficacy. Teacher 8 was told that if the teacher "wanted to make a mark" the teacher should try to move away from the flipped classroom instructional model. In response, Teacher 8 produced data that showed the teachers who implemented the flipped classroom instructional approach with fidelity scored higher on assessments and had less students failing than teachers who opted to "go rogue." Instead of being negatively influenced by the academic dean's verbal persuasion, Teacher 8 used it as motivation to show if teachers moved away from the flipped classroom instructional model, it was detrimental to the students. Teacher 1 had a similar conversation with the same academic dean, who loved the idea of blended learning, but when the dean described what should be seen in the classroom detailed traditional teacher-directed instruction. "That was one huge disconnect and

then (the dean) proceeded to tell me I need to go back to that." Teacher 1 shared that unless administrators are getting into classrooms and seeing the flipped classroom instructional model in action, it is impossible to understand it.

As much as Teacher 6 was grateful for the administrators who positively influence teacher efficacy, shared other administrators had a difficult time with the flipped classroom instructional model because there were so many misconceptions about what was happening in the classes. Teacher 5 also expressed the need for administrators to spend more time in the teacher's classroom and give better feedback, which has proven difficult since few administrators understand the instructional model. Teacher 7 feels like there has been a shift in administrative support during the 2018–2019 school year, noting they have been encouraged to not use the flipped classroom instructional model with fidelity. The teacher is worried that the structure the department has spent six years building and refining will be thrown away. Teacher 4 emphasized that if the entire administrative team was opposed to blended learning, the science department's experience would have been much different. It would not have prevented the flipped classroom instructional model from succeeding, but it would have been difficult. Overall, the administrators knew it was a good system and saw the success of the science department.

Other teachers. Eight of the nine participants referenced how other teachers influenced their confidence levels. Some teachers, according to Teacher 3 based their opinions of blended learning on students who complained, not the students who had positive experiences. These teachers used those complaints to form their opinions, negatively affecting some secondary science teachers' teacher efficacy without even observing it in action. Teacher 6 believes it goes back to teacher basing their opinions on what was heard. Some teachers, even after it was

explained to them, still associated the flipped classroom instructional model with something ineffective for students.

Teacher 8 had similar experiences, but teachers would come to the classroom to observe the flipped classroom instructional approach in action and respond positively, which in turn positively influenced his teacher efficacy. Similarly, when Teacher 4 talked with other teachers and showed them the research, they could see the purpose, noting "maybe it's just that the kids are uncomfortable with the change."

***Parents*.** Four of the nine participants shared information about parent influence on their confidence level, most of which was negative. Teacher 4 found that some parents just refused to listen to the change in instruction and worked to stonewall all efforts made by the teacher. Parents would make comments such as, "Why aren't you doing your job, you're the teacher, you should be telling them this sort of thing." Teacher 1 felt the parents who did not like the flipped classroom instructional model were more vocal than those who appreciated the instructional model.

An example of this as Teacher 6 shared, came from a district administrator with a student at the high school. The employee met with the science instructional specialist and the administrator who oversaw the science department to express dissatisfaction with the flipped classroom instructional model as he did not agree with the way it was being implemented. But when the student was in Teacher 6's class, he commented that his daughter learned so much in her class. The instructional model was the same.

Teacher 2 disclosed the pushback from parents led to many extended conversations because there were parents who did not believe the flipped classroom instructional model was going to work because it was new and therefore bad because the teacher wasn't using traditional

methods to teach their children. Other parents, after the same conversations, knew what the flipped classroom instructional model was and thought it was beneficial for students.

Students. Three of the nine participants talked about the influence of student's verbal persuasion on influencing their confidence in their ability to implement the flipped classroom instructional model. Teacher 6 spoke about the pushback from the students who would come and tell her "horror stories" about the flipped classroom instructional model in other classes.

Vicarious experiences. Although vicarious experiences are how the teachers first became interested in implementing the flipped classroom instructional model in their classrooms, it did not prove to grow their confidence as much as mastery experiences and verbal persuasion. Still, four subthemes emerged that influenced their teacher efficacy about using the pedagogical approach in their classrooms. The participants shared information about the instructional specialist, teacher observations, professional learning, and research.

Instructional specialist. Eight of the nine participants attributed the science department instructional specialist's experiences to have positively influenced their confidence levels of using the flipped classroom instructional model. When the flipped classroom instructional model was first introduced to the participants, they used the science instructional specialist's materials. Teacher 6 commented that it was a good start and really helped them begin to understand the flipped classroom instructional model.

Teacher 3 disclosed teacher efficacy was positively influenced by the science instructional specialist's experiences using the flipped classroom instructional model as a teacher. To Teacher 3, the thought of moving away from traditional teacher-directed methods and constantly giving PowerPoints was exciting. When they first started, the science department used the science instructional specialist's materials, so the specialist became a "magical voice"

on the screen to the students. Teacher 3 found teacher efficacy was positively influenced by the success of the science instructional coach. As Teacher 3 navigated through the first year of using the flipped classroom instructional model, the teacher relied on the science instructional coach for support who would always have an answer or find an answer to any question.

When the flipped classroom instructional model was first introduced to Teacher 2 by the science instructional coach, the teacher was intrigued based on the fact that students had the ability to work at their own pace instead of being held to the needs of the entire class. Teacher 8 received training from the science instructional coach and the science administrator who oversaw the science department. They would come into the classroom to model different techniques and help let go of the control.

Teacher 7 was grateful for the science instructional specialist's guidance in the transition. The teacher felt guided and supported, especially because this is the first time the instructional approach had been introduced. As a second-year teacher, Teacher 4 found the science instructional specialist's material and guidance to be very valuable. Teacher 4 compared it to finding a gold mine stating that it was "incredible to know exactly what I'm teaching my children."

Professional learning. Four participants' confidence grew from attending different professional learning opportunities to learn how other secondary science teachers experience success in implementation. During the first year of implementation, some of the participants attended Mini-CAST, a science conference, and learned from other secondary science teachers a different way to use the flipped classroom instructional model. Teacher 2 shared that when reflecting on the conference, multiple teachers referenced attending sessions on blended learning.

Although the sessions were different, the message was consistent, and the teachers were willing to try different strategies within the instructional model.

The participants later contacted some of the presenters and spent a day observing their classrooms. Teacher 1 shared that they asked them tons of questions to work out logistics and kept in contact with them to see how they structured it. Teacher 2 accredits attending a session at Mini-CAST on using the flipped classroom instructional model in the AP classroom to have the greatest influence on her teacher efficacy. “I hadn't even thought about attempting it our first year of doing blended learning because I was the only person teaching AP. Hearing from somebody else who was teaching a similar level of student was helpful.”

The school district hosted a day of blended learning professional development with a presenter from outside of the district. Teacher 7 referenced this training as one that positively influenced teacher efficacy. Listening to someone present about the different ways to incorporate blended learning into secondary science classrooms helped support their efforts.

Teacher observations. Three participants found confidence growth in observing other teachers. The teacher efficacy of Teacher 1 and Teacher 5 was positively influenced by observing other teachers at a different high school. They noted it was helpful to go beyond the professional development session and see it in action with students.

Because Teacher 6 was not part of a core science team, i.e. biology, chemistry, or physics, the experience was different than most of the participants. The teacher felt supported because the teacher could observe other teachers in the department and discuss the approach. In turn, other teachers, the science instructional coach, and science administrator would observe her teaching and provided support. Teacher 6 relied on Teacher 4, but the entire science department positively influenced the teacher’s teacher efficacy. “I did have the support of other teachers to

ask here's an issue I ran into have you guys run into it? Sometimes I didn't do it quite the same way as everybody else, but I still had the opportunity to learn from other folks."

Research. Additionally, three of the nine participants stated their own research on blended learning and the flipped classroom instructional model grew their confidence. Before committing to using the flipped classroom instructional model in his classroom, Teacher 4 conducted a lot of research. Teacher 4 wanted to understand the pedagogical approach, how it worked, and why it was effective for students.

Emotional arousal.

Maternity leave. Only one of the nine participants shared information about emotional arousal and its influence on her teacher efficacy. The participant shared how maternity leave during the third year of implementation convinced the teacher to keep implementing the flipped classroom instructional model to ensure the curriculum delivery was consistent. Teacher 2 shared that the school year would not go well without using the flipped classroom instructional model. "I don't want having a child be what the parents decide has derailed their child's entire education." Using the flipped classroom instructional model provided Teacher 2 with the confidence in the structure that the class could continue while the teacher was on maternity leave. The consistency of the class would allow learning to continue in her absence, but with her guidance even though a different person was teaching them in person.

Collective teacher efficacy. Over the course of the two interviews, the participants shared information about certain teachers or content teammates, but it was during the focus where the teamwork of the entire department positively influencing their collective teacher efficacy became apparent. Growing together as a team during common planning was brought up by Teacher 2, Teacher 3, and Teacher 4. Teacher 2 noted the importance of that protected time which allowed

the teachers to have extended conversations and reflect on student learning. Their time together was more than lesson planning which positively influenced their collective teacher efficacy. Teacher 2 also shared the importance of the flipped classroom instructional model being the department expectation to provide consistency for the students. The students could expect the same instructional model in each science class, even if it looked a little different. The teachers were not pitted against each other; the traditional teacher-directed methods versus the flipped classroom instructional model, they had to work together to be consistent across the board.

Teacher 3 grew as an educator because of the ability to learn from the other members of her team, the science instructional coach, and the administrator who oversaw the science department. “We would talk through the lesson and discuss what would be the best way to reach the students. It helped be become better by listening to how other people addressed topics in their classrooms.” Having a group to work with while developing the flipped classroom instructional model lessons, also positively influenced Teacher 3’s teacher efficacy, because the teacher did not know if the teacher could have made the transition to a blended learning classroom without the other members of the team.

When Teacher 4 first started using the flipped classroom instructional model, the teacher was a novice teacher and relied on the “team time” for information. Teacher 4 was able to learn much more than just what to teach during this time through analyzing student performance and reflecting on performance. Teacher 2, Teacher 3, and Teacher 6 each named Teacher 4 as someone they relied on throughout this process for the technology components whereas Teacher 4 relied on them for content support and teacher development. The participants’ teacher efficacy was positively influenced by relying on others based on their strengths.

Although Teacher 6's experience was a little different as a result of not being part of a core science team, the teacher still found the support of the department to positively influence teacher efficacy. Teacher 6 felt supported throughout the transition because teachers were willing to help. Anytime the teacher sought advice from another teacher, they were willing to help. Teacher 6 would meet with Teacher 4 regularly to discuss different issues and how they problem-solved different situations. But Teacher 4 was not the only teacher who was willing to help. Teacher 6 knew any teacher in the department would help with problems in the classroom. During full department meetings, Teacher 6 was included as well in all professional learning opportunities.

Because of Teacher 6's teaching experience, the teacher was invited to help the biology team transition to the flipped classroom instructional model. Teacher 6 gladly participated and learned a lot in the process. Other teachers on the biology team benefited from this process. Teacher 7 disclosed that the early years of implementation, where the department really leaned on and helped each other positively influenced teacher efficacy the most. The teacher felt support from the entire department, the science instructional coach, and the administrator who oversaw the science department. Over the course of implementation Teacher 7 has noticed the department's communication has improved and changed the conversations they have during meetings. Being a STAAR assessed class, Teacher 7 feels under a magnifying glass for scores and knows it is possible to rely on the other teachers for support whenever.

Summary

Chapter 4 included analysis of data from the participants' interviews using Giorgi's descriptive phenomenological approach—phenomenological reduction, establish units of meaning, and imaginative variation (Giorgi, 2009). In this study, nine secondary science teachers

who work at the same high school in the southern United States completed interviews about the implementation of the flipped classroom instructional model. Through interviews and the focus group, the data collection provided in depth insight of the shared experience of secondary science teachers and the influence of their teacher efficacy on the implementation of the flipped classroom instructional model.

The researcher sought to answer two research questions, which focused on the secondary science teachers' shared experience of implementing the flipped classroom instructional model in their classrooms and the influence of their teacher efficacy had on the implementation. Bandura's (1977) teacher efficacy theory is derived from four sources: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. From these sources, subthemes emerged. In mastery experiences, the researcher found subthemes of time of implementation; time to plan; professional growth; structure and routines; student growth in the classroom; student STAAR performance; and student absences. Vicarious experiences produced subthemes of the science instructional specialist; professional learning; teacher observations; and research. The verbal persuasion source revealed subthemes of administrators; other teachers; parents; and students. One subtheme emerged within emotional arousal, a participant's maternity leave. An additional subtheme that emerged was collective teacher efficacy.

Chapter 5 contains the researcher's personal analysis of the findings. The researcher will explore the themes described in Chapter 5 in relation to the literature from Chapter 2. Finally, in Chapter 5 the researcher will explore the implications of the research on policy and theory and include suggestions for further research.

Chapter 5: Discussion and Conclusion

Introduction

Researchers have discovered teacher efficacy directly influences student achievement and is important to understand (Hattie, 2003; Reynolds, 2018). As blended learning is a newer pedagogical approach in which unforeseen obstacles emerge, teachers with low efficacy may abandon it altogether (Palmer et al., 2015). Beginning to understand the influence of teacher efficacy on the implementation of a pedagogical approach, specifically the flipped classroom instructional model, can help stakeholders support new pedagogical approaches and know how to overcome obstacles. The purpose of this phenomenological study was to begin to understand the role secondary science teacher efficacy plays in overcoming obstacles in blended learning implementation and how the pedagogical approach is sustained over time. Specifically, the goal of this research was to discover common themes and patterns regarding the influence secondary science teacher self-efficacy has on the ability to overcome obstacles and sustain the blended learning pedagogical approach.

Through conducting this phenomenological study, the researcher gained insight as to how other stakeholders can support and equip teachers with tools to successfully implement the flipped classroom instructional model in the secondary science classroom. Kin and Nomikou (2017) found that teachers are aware of the need to improve instruction for students, but do not always have the support and resources to make it happen. The successful implementation of a pedagogical approach, according to Velthuis (2015), is dependent on the efficacy of the teacher. Uncovering the role science teacher efficacy plays in overcoming obstacles and sustaining blended learning may help stakeholders begin to understand how to support teachers' efforts to improve their instructional practices.

The results of this study may provide valuable insight as to how other teachers, school administrators, and district administrators can support secondary science teachers to successfully implement the flipped classroom instructional model. Chapter 5 provides a summary and discussion of the results, key findings, and their relationship to literature. Also discussed in this chapter are limitations of the study, implications for practice, policy, and theory, with recommendations for future research and the conclusion.

Summary of the Results

The purpose of this study was to better understand the influence of secondary science teacher efficacy on the implementation of the blended learning pedagogical approach. Specifically, the researcher addressed the following questions:

1. To what extent does the self-efficacy of secondary science teachers influence the implementation of blended learning?
2. How do secondary science teachers' experiences overcoming obstacles in blended learning implementation reflect those of mastery experiences, vicarious experiences, verbal persuasion, and emotional state?

The research questions were addressed using two frameworks: blended learning and teacher efficacy (Bandura, 1997; Horn & Staker, 2015). Blended learning is a pedagogical approach where students learn partially from online sources and partially through in person teaching. The students in this pedagogical approach are given control over the “time, place, path, and/or pace” of their learning (Horn & Staker, 2015, p. 35). Teacher efficacy is a teacher’s belief in his or her ability to overcome obstacles to help students find success (Bandura, 1977).

The influence of teacher efficacy on the implementation of the blended learning pedagogical approach is under-researched. Kleinsasser (2014) stressed the importance of

examining teacher efficacy in the K–12 setting and that research should continue on this subject. While much of the peer-reviewed research focused on blended learning at the post-secondary level, teacher efficacy research primarily focused on preservice teachers (Hao & Lee, 2016; McNeill et al., 2013; Menon & Sadler, 2017; Napier et al., 2011; Palmer et al., 2015; Stockwell et al., 2015; Wanner & Palmer, 2015).. The gap in the research lies with in-service teachers who have implemented the blended learning pedagogical approach. Very little research exists on teacher efficacy and its influence on the blended learning pedagogical approach (Gerard et al., 2011; Ho et al., 2014; Kelly & Denson, 2017; Velthuis, 2015). The gap in the literature exposed a need to examine the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning pedagogical approach.

The descriptive phenomenological method was selected to gather data about the shared experience of the secondary science teachers implementing the blended learning pedagogical approach at a high school in the southern United States. A qualitative methodology allowed for a detailed understanding of the experience using a flexible style where participants can share their stories (Creswell, 2013; Creswell, 2014). Nine participants were selected to take part in two interviews and a focus group. Phenomenological studies aim to recognize and better understand the phenomena from multiple perspectives to find meaning through open-ended questions (Creswell, 2014; Glesne, 2016).

Although vicarious experiences are how the participants first became interested in the flipped classroom instructional model, vicarious experiences did not prove to positively influence their teacher efficacy over time, only during the initial implementation. Overall, the participants strongly responded with information that aligned with mastery experiences. Verbal persuasion played a strong role as well in positively influencing their teacher efficacy, especially

from the other teachers in the department and some of the administrators. Only one teacher responded with information that aligned with emotional state. The other participants' responses did not indicate that their emotional state positively or negatively influenced their teacher efficacy.

Discussion of the results. If the implementation of blended learning pedagogical approach is expected to be sustainable, school and district administrators need to understand the needs of the teachers implementing the changes. Fullan (2011) asserted that change is most difficult on the people who are going through the transition. It is the job of the leaders to support the teachers through the difficult times, if the pedagogical approach is to be implemented with fidelity.

Through this study, the researcher identified four key findings that had the greatest influence on secondary science teachers' teacher efficacy: (a) time to plan for the transition, (b) time to implement the pedagogical approach with support, (c) support and coaching from school leaders, and (d) collaboration to build collective teacher efficacy.

***Teachers need time to plan for the transition*.** The participants realized after the first year of implementation that when they used the science instructional specialist's materials they were not completely bought into the process; they supported the pedagogical approach, but the material was not their own. Taking time during the summer before the second year of implementation to thoroughly plan the first semester positively influenced their teacher efficacy by providing mastery experiences of the planning process. Teacher 1 shared during the first year, the teachers did not have enough time to get comfortable with the instructional model before implementing it in the in classroom. The summer planning time provided the teachers time to better understand the instructional model and become more comfortable. The participants took

ownership of the pedagogical approach and could defend it. For example, Teacher 7 acknowledged teacher efficacy was positively influenced because the participants were building the material together, and it was not just one person trying it and hoping for the best.

The participants also better understood the flipped classroom instructional model as they were no longer relying on the vicarious experiences of the science instructional specialist and the administrator who oversaw the science department. Teacher 4 believed the time together over the summer gave the teachers a better understanding of the instructional model and made the teachers more excited to use it with fidelity in their classrooms. Had the participants not had that time together, they would have spent the second year of implementation, as Teacher 2 stated, scrambling to get everything done.

The teachers spent time together over the summer getting used to the change in instruction by organizing the curriculum and planning instruction based on the new instructional model. Teacher 3 found the summer planning sessions provided time to learn from other teachers and become a better teacher by addressing different misconceptions. Planning together during the year also raised their teacher efficacy levels. Teacher 3 shared most of the teacher's learning occurred during the common planning period with the other teachers in the content, the science instructional specialist, and the administrator who oversaw the science department. Teacher 9 found teachers could focus on adjust plans to target instruction for the students during that planning time.

Providing teachers time to plan would allow the ability to understand the pedagogical approach without sacrificing the content. Säfström (2018) stated that the constant state of change in education undermines the value of education. Teachers need time to plan for transitions of

different programs and pedagogical approaches and the more school and district administrators understand this, the more likely the content will be delivered effectively in the classrooms.

Teachers need time to implement the pedagogical approach with support. Lambert and Mitrani (2017) recommend that teachers are given three to five years with support to implement a pedagogical approach to understand it and address any problems. It cannot be expected for teachers to implement a pedagogical approach perfectly the first time. Too often systems are put in place without time to process in the classroom and then when performance is not at a mastery level, it is quickly abandoned for the next educational fad. Teachers need to have command of the pedagogical approach and as Bandura (1997) identified, mastery experiences have the greatest influence on teacher efficacy. Mastery experiences cannot occur without the teachers having time to implement the pedagogical approach.

Teacher 5 was open to the flipped classroom instructional model, but once she used it in the classroom was nervous about the loss of control. Over the time of implementation given time to get comfortable with the pedagogical approach, the teacher became used to it and was glad it was not abandoned early in the process. The participants needed time to experience success and overcome obstacles to better understand the pedagogical approach. Teacher 6 shared the time allowed for the teacher to work through obstacles and get passed the stage of student resistance. Now that the participants are in the sixth year of implementation, students come into class ready to work in the blended learning format, it is part of the culture of the science department. Each participant shared specific stories of how their teacher efficacy was positively influenced over the time of implementation because the participants witnessed firsthand the dramatic change in teaching ability and the students' growth. Without being given the time to implement the flipped

classroom instructional model, it is unlikely the entire department would have witnessed the overall change in instruction.

Teacher 4 stated implementing the flipped classroom instructional model with fidelity over time allowed for the teacher to see the influence it had on student performance which made all of the struggles worth it. The teacher's ability improved because of the time dedicated in planning and in class to overcome obstacles and experience success. Without time to overcome obstacles, Teacher 4 would have become frustrated unlikely to implement the flipped classroom instructional model with fidelity losing the ability to raise teacher efficacy levels through a mastery experience.

The longer the flipped classroom instructional model was used in the department, Teacher 6 noticed changes in students from freshman year to junior year. Teacher 6 noted the process of using the flipped classroom instructional model became easier the longer the teachers and the students used it. Teachers experienced push back from students at first because this was something new. The longer the flipped classroom instructional model was used in the department, the more students and teachers understood the purpose of the pedagogical approach change. Teacher 6 shared as time of implementation went on, the more success the teachers experienced the easier it was to feel confident about the pedagogical approach. Teacher 6 believed that over the time of implementation, the teacher was better able to understand personal teaching beliefs and how that influenced the flipped classroom instructional model. It was a time of clarity when the teacher realized that blended learning was not one particular way to teach. The teacher still retained autonomy without losing the intent of the flipped classroom instructional model. Once Teacher 6 understood that the classroom experience could be

personalized for each student over time, changing the teacher's view of the student learning experience.

Teachers need support and coaching from school leaders. Because the science instructional specialist and the administrator who oversaw the science department both had experience using the blended learning pedagogical approach in their classrooms, the process was understood. Both instructional leaders continued to research the blended learning pedagogical approach to understand the different needs of the secondary science teachers and the participants noted if the science instructional specialist or the administrator who oversaw the science department did not have the answer, they found the answer. Teacher 4 shared the support from the science instructional specialist and the administrator who oversaw the science department was not the number one positive influence on teacher efficacy, but it played a big role.

Teacher 4 stressed that without support, especially when lessons did not go well it is unlikely that the implementation would have been as successful. The teacher noted the modeling, coaching, and feedback from the science instructional specialist and the administrator who oversaw the science department made a difference in the teacher's level of performance. Teacher 1 was grateful for the opportunity for teachers to try something, fail, and be coached through the process. The teachers knew the support was in place to help the teacher overcome obstacles and sustain the flipped classroom instructional model. The teachers could have reacted differently to setbacks without the support of science instructional specialist and the administrator who oversaw the science department.

Teacher 2 felt the teachers' success came from conversations with the science instructional coach and the administrator who oversaw the science department which centered around refining lessons and reflecting on student learning. Receiving confirmation from the

science instructional coach and the administrator who oversaw the science department that Teacher 2 was doing a good job positively influenced teacher efficacy, especially in the beginning when the implementation started.

Teacher 8 stressed the importance of appropriate and timely feedback to positively influenced teacher efficacy. The science instructional coach and the administrator who oversaw the science department took the time to coach and support Teacher 8 to the level of ability the teacher is at today. Teacher 3 also shared the importance of receiving appropriate and timely feedback. The science instructional specialist and the administrator who oversaw the science department gave the teachers ideas and guided the teacher through obstacles to facilitate growth.

Teacher 2 found that teacher efficacy was raised because the science instructional specialist and the administrator who oversaw the science department were invested in the teachers' improvement, using phrases such as "we will work to make this better," not just formally appraising the teachers. In the same respect that encouraging words and support can raise teacher efficacy, administrators' negative words and lack of support can lower teacher efficacy leading teachers to abandon a pedagogical approach. The participants shared different experiences where some of the administrators at the high school expressed negativity about the flipped classroom instructional model.

Teacher 1 offered an interaction with an administrator who said it would not be possible to learn that way and the science department should not expect that students can learn that way either. Just because one person does not learn the same way does not mean the pedagogical approach should be abandoned. According to Shamsi (2015), only 20%–30% of learners learn bet through auditory means, yet lecture continues to be the dominant teaching style in the United States.

***Teachers need time to collaborate and build collective efficacy*.** Because this was a department wide expectation, the teachers supported each other in various ways. The support came from each teacher in the department no matter the teacher or level of knowledge as everyone had some expertise to offer to the team. Teacher 2 also shared the importance of the department expectation to provide consistency to the students. No matter the science class, the students could expect the same instructional model, even if the execution was a little different. The teachers worked together to be consistent across the board.

During the first four years of implementation, biology, chemistry, and physics teachers had common planning together providing the teachers time during the day to collaborate. Years five and beyond of implementation, the high school transitioned from an eight-period day to a seven-period day and only Biology had common planning during the day as it is a state assessed subject. The other subject area teachers work together outside of the school day.

Teacher 2 noted the importance of the protected time during the day which allowed the teachers to have extended conversations and reflect on student learning. The teachers' time together was more than lesson planning which positively influenced collective teacher efficacy. Teacher 3 does not know if the flipped classroom instructional model could have been implemented with fidelity without the support of the other teachers in the department. Teacher 4 believed that the planning time with other teachers during the school day allowed for deeper conversations about the standards and how to properly address student needs. The teacher learned more than how to create effective lesson plans. Rather, the teacher learned how to create lessons based on analyzing student performance and reflecting on teacher performance.

Teacher 2 also noted the importance of the flipped classroom instructional model being the department expectation to create cohesion for the teachers. The teachers were not put against

each other, no matter the classroom the students would experience the flipped classroom instructional model. Although the instructional delivery and activities may be different, the pedagogical approach was consistent. The collective teacher efficacy was positively influence because the teachers needed to support each other to ensure the pedagogical approach was implemented with fidelity. The results of this study further support Hattie's (2018) theory that collective teacher efficacy has an influence on student achievement.

Discussion of the Results in Relation to the Literature

The results of this study further support Bandura's (1997) teacher efficacy theory, which is based on four sources: mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. The participants in this study overwhelming responded that mastery experiences had the greatest positive influence on their teacher efficacy, which aligns with the literature. Following mastery experiences, the participants shared that verbal persuasion also influenced their teacher efficacy followed by vicarious experiences. Only one participant responded about emotional state. The results of this study echo the results of the limited available literature on blended learning and teacher efficacy.

Mastery experiences. Kleinsasser (2014) asserted that teachers need to experience the blended learning pedagogical approach to understand how to overcome obstacles. Without experiencing obstacles and trials while implementing the blended learning pedagogical approach, it is unlikely the teacher would feel confident in the classroom. Teachers with high teacher efficacy, according to Reynolds (2018), are more likely to try new strategies in the classroom to help their students. Teacher 6 shared over the time of implementation, the teacher's comfort level grew with the pedagogical approach and more personalized learning then became the norm in those science classes. Although Teacher 6 used hands-on activities to teach science prior to

transitioning to a blended learning classroom, it was not until then that the teacher felt comfortable taking risks to address the needs of the students. Teacher 6's teacher efficacy was positively influenced through mastery experiences leading the teacher to seek out ways to personalize the learning experience for the students, supporting Reynold's (2018) findings.

Each of the participants indicated that their science content knowledge was high. Teacher 2 is the self-proclaimed chemistry expert of the science department. It is because of the confidence in content knowledge that the teachers felt they could take a pedagogical risk. This further supports the findings of Palmer et al. (2015) who discovered curriculum expertise led to teachers using different instructional strategies to meet the needs of their students. Further, Palmer et al. asserted teachers need to have a thorough understanding of science content and understand how to teach it before attempting a different pedagogical approach. Because the participants had a strong understanding of the science content, they were willing to attempt a new pedagogical approach to improve the students' learning experience.

The participants' experiences align with the research of Unruh et al. (2016). Unruh et al. found teachers using the flipped classroom instructional model reported their teacher efficacy was positively influenced after going through a mastery experience. Further, Unruh et al. (2016) stated teachers who have never experienced failure lacked a foundation to build upon their teacher efficacy. The teachers needed to experience obstacles and trials and find success in order to raise teacher efficacy.

Verbal persuasion. Bandura (1997) revealed that teacher efficacy can be raised by stakeholder support. But, Bandura (1994) also asserted that it is difficult to build a foundation of high teacher efficacy on verbal persuasion. Other sources of teacher efficacy are needed to create

a strong foundation. Verbal persuasion of others can positively or negatively influence teacher efficacy.

The participants shared the science instructional specialist and the administrator who oversaw the science department both positively influenced their teacher efficacy. Teacher 4 shared, that the support of the science instructional specialist and the administrator who oversaw the science department played a large role in the teachers successfully implementing the flipped classroom instructional model. Teacher 2 felt supported through reflective conversations with the science instructional specialist and the administrator who oversaw the science department.

The participants' responses aligned with the research of Van Laer and Elen (2016), who contended that for teachers to successfully overcome obstacles in blended learning they need to have the support of their administrators. Teacher 3 disclosed knowing the science instructional specialist and the administrator who oversaw the science department would observe the class and then provide both support and constructive criticism positively influenced teacher efficacy and improved the teacher's performance.

Further, Velthuis (2015) found that administrators' encouraging or discouraging words can influence teacher efficacy when attempting a new pedagogical approach. Teacher 2 has noticed a change in feedback from administrators with the turnover that has occurred at the high school. Although the teacher has high teacher efficacy, the teacher would appreciate feedback that could lead to improved performance. Teacher 7 noticed the shift in administrative support as well, noting some administrators are encouraging teachers to not use the flipped classroom instructional model with fidelity.

Pedota (2015) identified different ways verbal persuasion can positively influence teacher efficacy. Teachers, much like students, need to work in a positive emotional climate where they

are supported and given constructive feedback. Teacher 3 shared how teacher efficacy was positively influenced because of the supportive environment created by the science instructional coach and the administrator who oversaw the science department. The teacher was more willing to accept the feedback because of the positive emotional climate.

Vicarious experiences. Bandura (1994) found when teachers witness the success of others, a teacher can believe they are capable of the same success. In this study four participants noted different forms of professional learning influenced their teacher efficacy supporting the literature. The participants learned about the success of other teachers, which positively influenced their teacher efficacy and gave the teachers the confidence to attempt it in their classes.

Ongoing professional development is an effective way for teachers to develop higher teacher efficacy in blended learning (Finn, 2017; Napier et al., 2011; Ocak, 2011; Parra, 2010; Rivera, 2016; Reynolds, 2018). The positive experiences of other teachers, specifically the presenters at Mini-CAST, influenced the secondary science teachers' teacher efficacy. Additionally, participants noted the day of observing teachers using the flipped classroom instructional model positively influenced their teacher efficacy. The results of this study further support the research of Velthuis (2015) who found that teachers need multiple exposures to blended learning to build teacher efficacy.

Learning from other teachers and instructional leaders as Keller and Kusko (2015) found is also an effective way to positively influence teacher efficacy. The research of Keller and Kusko (2015) supported Bandura (1977), who discovered diversified modeling teachers is important. Teachers learning from a variety of social models can lead a teacher to believe she or he can be successful because other people were successful.

Emotional arousal. As only one teacher shared information that aligned with emotional state, this is not enough support to add to the literature of the influence of emotional arousal on teacher efficacy. A person's mood can influence teacher efficacy (Bandura, 1977). When a person is in a positive mood their teacher efficacy is positively influenced. In the same respect when someone is in a negative mood their teacher efficacy is negatively influenced (Bandura, 1994). The participants shared different events that occurred over the six year of implementation, but only one participant stated her emotional state influenced teacher efficacy.

Morozova and Malysheva (2016) asserted the emotional state of teachers influence the implementation of pedagogical approaches. Only one participant, Teacher 2, shared information regarding emotional state, it played a role in positively influencing the implementation of the flipped classroom instructional model. Because Teacher 2 was determined to keep instruction consistent while on maternity leave, the teacher pushed to implement the pedagogical approach with fidelity.

Although research in both blended learning and teacher efficacy has increased since the 1980s, much of the research has focused on the students, with little focus on the teacher (Kleinsasser, 2014; Siemens et al., 2015; Tomory & Watson, 2015). Majority of the research on blended learning and teacher efficacy focuses on the preservice teacher and does not consider in-service teachers. This study will add to the body of literature and provide insight as to the influence of teacher efficacy using the blended learning instructional approach beyond initial implementation in secondary science classrooms.

Limitations

A limitation of this study was that it was restricted to a qualitative methodology, the phenomenological approach. The data of the study was collected through interviews and a focus

group, which created a potential limitation as the researcher could only rely on the nine participants' responses. To collect data for this phenomenological study, the researcher used purposeful sampling to select participants according to specific criteria. The nine participants provided enough detail for data saturation clearly articulating their responses. According to Moustakas (1994), the goal of phenomenological research is to describe and understand the lived experience of the participants.

The study was limited to a sample of nine secondary science teachers who worked at the same high school in the southern United States with at least four years' experience using the blended learning pedagogical approach. The nine participants provided as much detail as possible about their experience implementing the flipped classroom instructional model clearly articulating their responses. The limited number of participants impeded the findings from being generalized to a larger population, reflective of qualitative research (Sohn, Thomas, Greenberg, & Pollio, 2017). The findings from the study, however, may be transferrable into practice because of the insight from the nine participants on how teacher efficacy influenced the implementation of the flipped classroom instructional model their classrooms.

Implications of the Results for Practice, Policy, and Theory

Implication of the results for practice. Even though a phenomenological study prevents generalizing the findings, it does not prevent the results from being put into practice (Creswell, 2014). Based on the results of this study, the implementation of blended learning was influenced by the participants' teacher efficacy. Each of the nine participants shared they needed time to plan for the transition as well as needed time to implement the pedagogical approach. The fact each participant stressed the importance of these two subthemes suggested to the researcher that

as schools implement new pedagogical approaches, teachers need time to plan for transition and time while implementing the pedagogical approach to understand it through practice.

Over the course of implementation, the participants shared the changes made to the daily schedule moving from an eight-period day to seven periods. Because of this change, the core teachers no longer had two periods off during the day, losing the collaborative planning time. The exception to this is the Biology team as the course is a state assessed subject. The other science courses plan outside of the school day. As Teacher 2 shared, without the time during the day to plan, it would have made the initial implementation difficult. As administrators plan for pedagogical changes in the school, it is important to consider how leaning will be affected by teachers planning during the day or outside of the school day.

The positive influence mastery experiences give to teacher efficacy are key in successfully implementing new pedagogical approaches. The information from this study revealed that for secondary science teacher efficacy to increase, they must have confidence and ownership over the pedagogical approach being implemented. Although the participants were initially interested in using the flipped classroom instructional model based on the science instructional specialist's materials, it was not until after creating original material the participants were fully invested in the implementation of the flipped classroom instructional model.

The participants shared the time provided to plan over the summer helped them gain a better understanding of the flipped classroom instructional model and feel better prepared for the school year. Put into practice, it is imperative for school and district administrators when attempting to implement a new pedagogical approach, to provide time for the teachers to plan for the transition as well as give them time to implement it before assessing the effectiveness of the pedagogical approach. As indicated in the results, doing this will raise teacher efficacy levels.

Additionally, during implementation supportive administrators can play a role in raising teacher efficacy levels. The participants in this study shared examples of supportive administrators who positively influenced their teacher efficacy and unsupportive administrators who negatively influenced their teacher efficacy. Teachers with high teacher efficacy will figure out ways to work around impediments whereas those with low teacher efficacy are likely to give up instead of fighting through the problem (Bandura, 2011).

Implications of the results for policy. During the 86th legislative session in a state in the Southern United States, House Bill 3 (HB 3) was passed which addressed school finance educational reform (HB 3, 2019). Part of the bill included funding for the blended learning Grant Program (BLGP), which will fund 25 planning grants of up to $125,000 (HB 3, 2019). The BLGP is for the planning and implementation of the blended learning pedagogical approach which the results of this study could help school and district administrators find ways to support teachers transition from traditional teacher-directed methods. Although the results of this study are isolated to the secondary science teachers who work at the same high school in the southern United States, their experiences could help others as they plan for the transition.

Teachers attempting to transition to the blended learning pedagogical approach need time to plan and ongoing professional development. As the blended learning pedagogical approach becomes more commonplace in the secondary classroom, the needs of the teacher cannot be forgotten. As Bergmann (2018) asserted too often new pedagogical approaches, such as the flipped classroom instructional model, become buzzwords and the intent of the implementation is lost. Bergmann further stated that the intent of the flipped classroom instructional model is to reach every student every day and if teachers lose sight of this concept then the implementation will not be effective.

During the 85th legislative session, the legislature allocated funds to reimburse school districts that participated in an approved blended learning professional learning series (Claussen, n.d.). The state recognized the need for teacher training and for the initial training to be consistent across the state for interested districts. As the legislature continues to support the implementation of the blended learning pedagogical approach in the K–12 educational setting, it is important to understand the role of the teacher and how instructional leaders can be supportive. For the professional learning to be effective, it will need to be ongoing and currently the state does not have anything in place. Further legislative sessions will need to address the implementation of blended learning if it is to become a standard curriculum delivery model.

Implications of the results for theory. According to Bandura (1997), teachers with high teacher efficacy are intrinsically motivated, take risks, and are persistent to overcome obstacles. Teachers with low teacher efficacy, on the other hand, rely on extrinsic motivation, do not take risks, and are less likely to persist to overcome challenges. As any pedagogical approach is implemented teacher efficacy needs to be considered to understand how to support the teachers during implementation. Teachers with high teacher efficacy should be supported differently than those with low teacher efficacy. Kleinsasser (2014) discovered teacher efficacy can change depending on the situation, so it is important that instructional leaders leading the implementation of the pedagogical approach to understand the teachers' experience and content knowledge.

Wanner and Palmer (2017) discovered the blended learning pedagogical approach requires teachers to examine and reflect upon their teaching ability as they are no longer just disseminating information to students. The students and the teacher are both responsible for the learning in the classroom. Teachers are at the center of the blended learning pedagogical

approach movement. The pedagogical approach is transforming education back to its Socratic origins (Altemueller & Lindquist, 2017). For teachers to be successful in this process, instructional leaders need to observe the teachers and provide feedback throughout the school year.

The results of this study give evidence for support of Bandura's (1977) teacher efficacy theory, as the participants in this study shared their teacher efficacy was influenced by mastery experiences, vicarious experiences, verbal persuasion, and emotional arousal. The literature review supported the validity of the findings in the study because it extends previous studies which focused on preservice teachers or initial implementation (Holland & Piper, 2016; Kleinsasser, 2014; Palmer et al., 2015; Rivera, 2016; Velthuis, 2015; Yeh et al., 2011). The results of this study may add to the field of education when helping teachers implement pedagogical approaches.

Recommendations for Future Research

The study focused on the influence of teacher efficacy on the implementation of the blended learning pedagogical approach in the secondary science classroom using phenomenological methods. Extending this study, the researcher could use a mixed methods approach to provide more insight as to the sources of teacher efficacy the participants felt influenced them the most. The researcher could take the results and survey the participants to determine which source and subtheme was most important to them in the implementation of the blended learning pedagogical approach. By doing this, the researcher could learn more about the different sources of teacher efficacy and its influence on the implementation of the blended learning pedagogical approach. The process would also quantify the qualitative data collected by the researcher.

Based on the participants' responses, another recommendation to extend this study would be to interview the teachers again at the end of the 2019–2020 school year to determine if the current administration's beliefs on blended learning influence the participants' teacher efficacy. Teacher 2 and Teacher 7 each shared that some of the current administrators are encouraging the participants to not use the flipped classroom instructional model with fidelity. Interviewing the participants again at the end of the school year, could show how administrators can negatively teacher efficacy, even when the teacher efficacy is high. Another option to extend the study would be to compare the results of the 2020 Biology STAAR test to previous tests. Given that some administrators are encouraging teachers to transition back to tradition teacher-directed lecture classes, the data comparison would provide insight as to the effectiveness of the flipped classroom instructional model at the high school in the southern United States.

Replicating this study with secondary science classrooms that use the blended learning instructional approach, specifically the flipped classroom instructional model, would create an environment where the researcher could make generalized results. As the flipped classroom instructional model is becomes more common in the southern part of the United States where the researcher lives, finding other secondary science teachers would not be difficult. Palmer and Archer (2015) recommended further research on in-service teachers who are implementing the blended learning pedagogical approach. Additionally, Kleinsasser (2014) recommended that research on teacher efficacy continues for in-service teachers as it is a complex topic and worth understanding.

Additional research is needed to address the complexity of implementing blended learning and the role teacher efficacy plays in the effectiveness of the transition (Halverson et al., 2014; McNeill et al., 2013). Majority of the research on blended learning focuses on the

effectiveness of the pedagogical approach and/or technology used, with positive results. Hughes (2012) disclosed that more research is needed to examine blended learning and the influence of teacher efficacy beyond initial implementation.

Conclusion

Teacher efficacy, according to Bandura (1977), is defined as teacher's confidence in his or her teaching ability to help students be successful. The purpose of this study was to begin to understand the role secondary science teacher efficacy plays in overcoming obstacles in blended learning implementation and how the pedagogical approach is sustained over time. The phenomenological study allowed secondary science teachers who worked at the same high school in the southern United States to share their experience about overcoming obstacles and sustaining the flipped classroom instruction model.

As a new pedagogical approach is implemented, teacher efficacy plays a significant role. In fact, high teacher efficacy has been linked to greater student achievement (Hattie, 2018; McNeill et al., 2013; Pedota, 2015). When a teacher has high teacher efficacy, he or she is more likely to plan more effective lessons and set higher goals for his or her students (Michalsky, 2012). The results of this study support the literature which found teacher efficacy influences the implementation of blended learning. All participants felt confident in their science teaching ability and over time developed confidence in their ability to teach using the flipped classroom instructional model. Each participant shared different sources of teacher efficacy that positively influenced how they overcame obstacles and sustained the flipped classroom instructional model.

The results of this study reinforced Bandura's (1977) idea that teacher efficacy is based on four sources: mastery experience, vicarious experience, verbal persuasion, and emotional arousal. For teacher's efficacy to be raised, they need to have certain experiences to build their

confidence. The results of this study set the stage for further research to ensure secondary science teachers are effectively supported as they implement blended learning in their classrooms.

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Appendix A: Participant Informed Consent Form

Research Study Title: The Pedagogical Impact of Secondary Science Teacher Efficacy on Blended Learning Implementation: A Phenomenological Study
Principal Investigator: Allison Willemin
Research Institution: Concordia University–Portland
Faculty Advisor: Dr. Belle Booker

Purpose and what you will be doing:

The purpose of this phenomenological study is to examine the influence of teacher efficacy on overcoming obstacles and sustaining the blended learning. We expect approximately 10 secondary science teachers as volunteers. No one will be paid to be in the study. We will begin enrollment in May, 2019 and end enrollment in June, 2019. To be in the study, you will have at least four years of experience teaching secondary science using the blended learning pedagogical approach at your school. You will participate in two interviews and a focus group. The first interview will focus on your overall experience implementing the blended learning pedagogical approach in your secondary science classroom. The second interview will be semistructured and consist of nine open ended questions for you to answer concentrating on teacher efficacy and using the blended learning pedagogical approach. The focus group will consist of 10 questions to examine the collective efficacy of the secondary science teachers participating in the study. Participation in the student should take less than five hours of your time.

Risks:

There are no risks to participating in this study other than providing your information. However, your information will be protected. Any personal information you provide will be coded so it cannot be linked to you. Any name or identifying information you give will be kept securely via electronic encryption and locked inside a personal safe. When the investigator looks at the data, none of the data will have your name or identifying information. We will only use a code to analyze the data. We will not identify you in any publication or report. Your information will be kept private at all times and all study documents will be destroyed three years after the study is concluded. The interviews and the focus group will be recorded. Recordings will be delete immediately following transcription and member checking. All other study-related materials will be kept securely for three years from the close of the study and will then be destroyed.

Benefits:

Information you provide will help to examine the pedagogical impact of secondary science teacher efficacy on the implementation of blended learning. You could benefit from this research by helping stakeholders begin to understand the role teacher efficacy plays in implementing pedagogical approaches, specifically blended learning.

Confidentiality:

This information will not be distributed to any other agency and will be kept private and confidential. The only exception to this is if you tell us abuse or neglect that makes us seriously concerned for your immediate health and safety.

Right to Withdraw:

Your participation is greatly appreciated, but we acknowledge that the questions we are asking are personal in nature. You are free at any point to choose not to engage with or stop the study. You may skip any questions you do not wish to answer. This study is not required and there is no penalty for not participating. If at any time you experience a negative emotion from answering the questions, I will stop asking you questions.

Contact Information:

You will receive a copy of this consent form. If you have questions you can talk to or write the principal investigator, Allison Willemin at [redacted]. If you want to talk with a participant advocate other than the investigator, you can write or call the director of our institutional review board, Dr. OraLee Branch (email obranch@cu-portland.edu or call 503-493-6390).

Your Statement of Consent:

I have read the above information. I asked questions if I had them, and my questions were answered. I volunteer my consent for this study.

_____ _____
Participant Name Date

_____ _____
Participant Signature Date

_____ _____
Investigator Name Date

_____ _____
Investigator Signature Date

Investigator: Allison Willemin; email: [redacted]
c/o: Professor Dr. Belle Zorigan Booker
Concordia University–Portland
2811 NE Holman Street
Portland, Oregon 97221

Appendix B: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously-researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

Statement of academic integrity.

As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

Explanations:

What does "fraudulent" mean?

"Fraudulent" work is any material submitted for evaluation that is falsely or improperly presented as one's own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate's final work without full and complete documentation.

What is "unauthorized" assistance?

"Unauthorized assistance" refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:

- Use of unauthorized notes or another's work during an online test
- Use of unauthorized notes or personal assistance in an online exam setting
- Inappropriate collaboration in preparation and/or completion of a project
- Unauthorized solicitation of professional resources for the completion of the work.

Statement of Original Work (Continued)

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University–Portland Academic Integrity Policy during the development and writing of this dissertation.

2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association.*

Allison Ann Willemin

Digital Signature

Allison Ann Willemin

Name (Typed)

11/25/2019

Date

Appendix C: Interview One Questions

1. Describe, with as much detail as possible, the experience of implementing blended learning at your school.
2. Describe, with as much detail as possible, your overall experience with implementing the blended learning pedagogical approach in your classroom.
3. Describe your first year of implementation. What initial training did you receive? How did stakeholders react to the change in instructional model?
4. Describe your second year of implementation. What changes did you notice about your teaching practices? What changes did you notice about the student learning experience?
5. Describe years three and beyond of blended learning implementation? What ongoing professional learning have you attended?
6. Describe how this pedagogical approach changed how you teach the curriculum and address student needs?

Appendix D: Interview Two Questions

1. What do you think had the greatest impact on the implementation of blended learning in your class?
2. Do you think that your level of teacher efficacy impacts the implementation of blended learning? How has your confidence of using the blended learning pedagogical approach changed over your time of implementation?
3. What factors do you believe influence your teacher efficacy?
4. Do you think your administration contributes to your teacher efficacy level or beliefs in your ability to teach? Why? How? What can administrators do to improve your teacher efficacy?
5. Can you describe a situation that motivated you to continue using the blended learning pedagogical approach?
6. At any point did you consider abandoning the blended learning pedagogical approach and returning to the traditional classroom model? What convinced you to keep using the blended learning pedagogical approach?
7. What are three words you would use to describe yourself as a teacher? Why?
8. How do you think using the blended learning pedagogical approach impacts students?
9. Is there anything else you would me to know about your teacher efficacy and how it impacted the implementation of blended learning in your classroom?

Appendix E: Focus Group Questions

1. Please share your current position and a little bit about yourself.
2. What were your classes like before blended learning was implemented?
3. Now that you have completed years four, five, or six of using the blended learning pedagogical approach, how has blended learning influenced your students and other teachers. How do students learn at your school now?
4. Describe how using the blended learning pedagogical approach affected student achievement in your classes.
5. Describe the resources that were offered/provided in the preparation of using the blended learning pedagogical approach. How often were you provided professional development opportunities?
6. How did science teachers react to blended learning in the beginning? Now?
7. How did other teachers react?
8. How did other stakeholders react to blended learning?
9. How has transitioning to blended learning affected you personally and professionally?
10. What additional thoughts would you like to share about your experience with blended learning?