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A Qualitative Study of the Implementation of an Evidence-Based Program in a K-12 Setting

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A Qualitative Study of the Implementation of an Evidence-Based Program in a K-12 Setting

Abstract

Implementation science has emerged in K-12 education to understand how new programs are introduced and sustained in schools and classrooms. The purpose of this study was to further the research relating to the implementation of evidence-based programs (EBP) in K-12 systems. Through the lens of the theoretical domains framework (TDF), the researcher analyzed the school-based implementation of a one-to-one computer initiative in an upstate New York district. Interviews with K-5 school principals, focus groups of K-5 teachers, and a review of the district's implementation documents provided the sources for the data. The study resulted in several interrelated findings. Educators lack determinant frameworks to guide the implementation of evidence-based programs, though a framework such as the TDF has applicability to K-12 settings. The environmental context, teachers' professional/social identity, and supportive principal leadership are vital to the implementation of new programs in a school. The findings provide the basis for several recommendations for future research and executive leaders. Further research is needed in the development of frameworks to study implementation in K-12 settings. Executive leaders enacting change in a system must consider the multiple forces that may impact an implementation process. Additionally, leaders must ensure meaningful, collaborative participation from key stakeholders to ensure support from the practitioners. The results of this study add a unique perspective to the growing body of knowledge in the field of implementation science for educators and educational researchers.

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K-12 Setting

By

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Submitted in partial fulfillment
of the requirements for the degree
Ed.D. in Executive Leadership

Supervised by

Dr. Marie Cianca

Committee Member

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St. John Fisher College

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Dedication

If I have seen further than others, it is by standing upon the shoulders of giants.

Isaac Newton

I dedicate this dissertation to my wife, Wendy, and our two children, Liam and Paisleigh. I am forever grateful for their unconditional love, support, and encouragement throughout the entire dissertation process. There were many times that I did not think I could make it, but you were always there to help me through the many challenges. Wendy, you always keep our family going and are a constant source of strength, inspiration, and proof reading as I have pursued my professional goals. Liam and Paisleigh, your patience, understanding, and humor keep me grounded in what really matters in life. I strive to be a better husband, father, and person because of the three of you.

I am also appreciative of the support from my extended family, friends, and colleagues throughout this dissertation process. I am blessed with parents who modeled hard work, perseverance, and laughter, even during the most trying times. My five older siblings, Paul, Joe, Kathleen, Eileen, and Kevin, have been my role models for my whole life. I draw inspiration and joy from you, your spouses, and children. I also have been blessed to have wonderful family support from the Huryszs, Quinlans, and Moores. Wendy and I have always been able to count you to be there for us when we need you.

I am grateful to my dissertation chair, Dr. Cianca, and my committee member, Dr.

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I would also like to thank my colleagues in the Webster Central School District, particularly Mr. Carmen Gumina, Mr. Brian Neenan, the Directors and the Humanities team. You all have been a constant source of support in my pursuit of a doctorate and the completion of this dissertation. Webster has provided me an opportunity to apply new knowledge while keeping me grounded in why I became an educator in the first place – the success of our students.

Lastly, I am thankful for the love, inspiration, and encouragement that I draw from my grandmother Ahna. Though it has been nearly 20 years since you entered heaven, I can still feel your presence. Your spirit fills me with the hope, humor, and humility that have been essential as I have traveled my path through life.

Biographical Sketch

Terrance McCarthy is currently the Director of Humanities at Webster Central School District. Mr. McCarthy attended the University at Buffalo from 1990 to 1995 and graduated with a Bachelor of Arts degree in History with a minor in Secondary Education in 1995. He earned a Master of Sciences degree in Physical Education degree from Canisius College in 2000 and then completed a Certificate of Advanced Studies in Education Administration from the University at Buffalo in 2004. In the summer of 2015, Mr. McCarthy began the Ed.D. program in Executive Leadership at St. John Fisher College. Mr. McCarthy pursued his research on the implementation of evidence-based programs in a K-12 setting under the direction of Dr. Marie Cianca and Dr. Linda McGinley and received the Ed.D. degree in 2017.

Abstract

Implementation science has emerged in K-12 education to understand how new programs are introduced and sustained in schools and classrooms. The purpose of this study was to further the research relating to the implementation of evidence-based programs (EBP) in K-12 systems. Through the lens of the theoretical domains framework (TDF), the researcher analyzed the school-based implementation of a one-to-one computer initiative in an upstate New York district. Interviews with K-5 school principals, focus groups of K-5 teachers, and a review of the district's implementation documents provided the sources for the data. The study resulted in several interrelated findings. Educators lack determinant frameworks to guide the implementation of evidence-based programs, though a framework such as the TDF has applicability to K-12 settings. The environmental context, teachers' professional/social identity, and supportive principal leadership are vital to the implementation of new programs in a school. The findings provide the basis for several recommendations for future research and executive leaders. Further research is needed in the development of frameworks to study implementation in K-12 settings. Executive leaders enacting change in a system must consider the multiple forces that may impact an implementation process. Additionally, leaders must ensure meaningful, collaborative participation from key stakeholders to ensure support from the practitioners. The results of this study add a unique perspective to the growing body of knowledge in the field of implementation science for educators and educational researchers.

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Chapter 1: Introduction

Educators in K-12 systems face a myriad of external pressures from policymakers, business leaders, and parent groups to improve student achievement (O'Donnell, 2008). The United States has considered expansive, system-level reforms a necessity for improvement since as far back as the 1950s (Fullan, 2009). The wholesale, programmatic changes put in place in response to these forces rarely fulfilled their promises. Research in the field of K-12 education has shown that the utilization of evidence-based curriculum programs can positively impact student learning (Whitehurst & Brookings, 2009). Yet, there exists a tension, both in practice and outcomes, between the expected results of these programs and how they were enacted within a school setting (Odom, 2009).

The launching of Sputnik by the Soviet Union in 1957 signaled the existence of an educational crisis in the United States, particularly in math and science (Fullan, 2009). Demands for increased student performance continued through the ensuing decades. The 1983 report *A Nation at Risk* ignited much of the same passions from earlier generations. In many states, pressures mounted to improve educational standards and increase student achievement (Jolly, 2015). The passage of No Child Left Behind in 2001, which included nationally mandated testing of children in language arts and mathematics, laid the groundwork for this most recent era of accountability (Fullan, 2009).

In 2009, President Barack Obama signed into law the \$800 billion American Recovery and Reinvestment Act. As part of this national economic stimulus package, the

U.S. Department of Education introduced a \$4.35 billion Race to the Top competitive grant funding program for states. The stated purpose of this funding was to encourage states to enact systemic reforms meant to close the persistent achievement gap (United States Department of Education, 2009). New York applied for, and received, \$700 million in exchange for instituting improvements to the state's instructional and accountability programs. New York promised to adopt the Common Core Standards and to redesign the state testing system to assess students' progress toward the new standards. Additionally, the state vowed to implement data systems to track and report student and teacher achievement (New York State Department of Education, 2014).

Each successive attempt at reform has led school districts to seek out new strategies to better meet the public's demands. Educators have clamored for, and increasingly been required to adopt, evidence-based programs (EBP) to improve student learning outcomes (Missett & Foster, 2015). These reforms have varied in their scope and foci, including comprehensive school reform, the adoption of specific building-wide behavior interventions, and the expansion of student access to instructional technology. In 1998, the National Center on Education and the Economy (NCEE) created the America's Choice (AC) school program with a focus on raising academic achievement using rigorous academic standards and an emphasis on literacy instruction (May & Supovitz, 2006). NCEE provided comprehensive curriculum materials, training, and support to school districts seeking to improve student outcomes (Corcoran, Hoppe, Luhn & Supovitz, 2000). Studies of the America's Choice model demonstrated the impact of the AC model on student attainment. May and Supovitz (2006), in a longitudinal study of the program's utilization in Rochester, NY, found that students at AC schools in that city

outperformed their peers in both reading and mathematics. In a broad comparison of schools with the AC model, other school reform models, and control group schools, AC students grew in literacy skills at a faster rate than students at other schools (Rowan, Correnti, Miller, & Camburn, 2009). Bolstered by this research, nearly 2,000 school districts adopted the America's Choice model to impact student achievement (Gewertz, 2010).

According to Pas and Bradshaw (2012), both the culture and climate of a school setting have an impact on student achievement. Schools have sought research-based programs to improve student behaviors, thereby producing an environment more conducive to academics. Positive behavior interventions and supports (PBIS) is a system of interventions focused on using positive feedback to reinforce acceptable student behavior (Spaulding, Horner, May, & Vincent, 2008). PBIS schools utilize explicit language to describe how students are expected to socially, emotionally, and academically engage in their environment. Teachers and school administrators collect, and regularly review, behavioral data to monitor and respond to changes in the school environment (Bradshaw, Pas, Debnam, & Johnson, 2015). Among the studies supporting its impact on student achievement, Pas and Bradshaw (2012) found that PBIS positively correlated with student achievement in a comprehensive study of its use in the state of Maryland. As a result of the success of this approach to student behavior, over 8,000 schools adopted some form of PBIS for use with their students (Spaulding et al., 2008).

Many districts have attempted to harness the power of computers as a potential tool to improve achievement for students (Johnson, Adams, & Cummins, 2012). The No Child Left Behind legislation specifically required districts to seek technology-based

approaches that were proven to be most beneficial for students (Lowther, Inan, Ross, & Strahl, 2012). Particularly, schools adopted one-to-one initiatives with the goal of engaging students with relevant digital technologies (Hadjithoma-Garstka, 2011).

School districts with a one-to-one computer environment provide students with their own Internet-accessible digital devices for use during the school day (Dorfman, 2016). One-to-one adoptions have seen a marked increase across the United States, since 2010, as the technologies have become more affordable for districts to purchase (Lowther et al., 2012). Increased access to computer technology has shown promising effects for students. Students who have the regular use of a laptop in school report being more motivated and engaged in their learning (Zheng, Arada, Niiya, & Warschauer, 2014). Teachers in districts with one-to-one initiatives more frequently use pedagogical practices that improve student achievement, such as inquiry-based explorations, project-based assessments, and experiential learning (Lowther et al., 2012).

Despite the possibly impactful consequences one-to-one initiatives have demonstrated, the results of the numerous implementations are mixed. In measuring online learning, Kennedy, Rhoades, and Leu (2016) found that students with access to their own computer devices outpaced their peers who did not have the same access. However, Lowther et al. (2012) reported that one-to-one initiatives had little impact on children's computer skills. Harper and Milman (2016), in their review of over 400 studies of one-to-one initiatives, found that conditions such as a lack of professional learning for teachers, inadequate technical infrastructure, and ill-informed leadership kept the goals of the programs from being reached. These same barriers appear to be ubiquitous challenges in bringing EBP to bear in a K-12 setting (O'Donnell, 2008).

The heightened need for accountability forced decision makers to take better account of the many factors that impact successful outcomes (Harn, Parisi, & Stoolmiller, 2013). What resulted was a more intense look at the intricate processes undertaken to implement a program (Roblin, Perez, McKenney, Nieveen, & van den Akker, 2012). The investigation of the gap between what program designers expect will happen and what occurs in practice reveal valuable insights for researchers and practitioners (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005).

Other disciplines are experiencing similar pressures to those felt in education. Fields such as health care, technology, and business have utilized empirically tested practices to secure positive results. Evidence-based programs have reduced mortality, achieved computer network stability, and improved the bottom line (Fixsen et al., 2005). The results of these interventions have been uneven (Gilley, Dixon, & Gilley, 2008). Confounded by the gap between interventions developed through research and what organizations use daily, attention has shifted to how these programs are brought to bear in the first place (Fixsen et al., 2005). This focus on process led to the rise of implementation science, which aimed to explore the forces that impact the enactment of EBP (Meyers, Durlak, & Wandersman, 2012).

Implementation science is now starting to make its way into the realm of educational research. Investigators are asking what fidelity means, particularly given the uncertain nature of a classroom full of children. Progress is being made to develop consistent language and unifying frameworks in the nascent field (O'Donnell, 2008). Concurrently, the focus is turning to the specific variables that impact implementation, such as school context and the role of the teachers in bringing a program to life (Reed,

2009). Practitioners do not work in a vacuum nor do they serve as passive conductors of content knowledge and skills (Penuel, Phillips, & Harris, 2014). An important step in ensuring effective implementation is for researchers and practitioners to understand better the factors that impact how to use evidence-based programs in their classrooms. Applying this knowledge could improve teacher practice and, ultimately, student learning (Harn et al., 2013).

Problem Statement

The recent progress made in implementation science, both broadly and within the scope of education, has produced evidence that implementation impacts outcomes (Meyers et al., 2012). Researchers have developed frameworks to characterize the various aspects that influence how organizations put evidence-based programs into place (Nilsen, 2015). In the field of education, the development of frameworks to assess the overall fidelity of implementation (FOI) of a curricular program provides a potential starting point (Carroll et al., 2007, Fullan, 2008; O'Donnell, 2008, Missett & Foster, 2015). There appears to be, however, a lack of empirical data to support the use of these tools to evaluate an implementation process in a K-12 setting (Harn et al., 2013).

The paucity of generalizable models for implementation has pushed researchers to investigate specific variables that may impact the fidelity of an implementation. Contextual factors such as a school's culture of collaboration (Buzhardt, Greenwood, Abbott, & Tapia, 2006; Kaiser, 2013; Reed, 2009; Roblin et al., 2012) and the availability of professional development (Odom, 2009; Reed, 2009) provide one lens from which to view a programmatic change. Investigations of implementation at the classroom level reveal the impact of factors such as teacher efficacy (Abernathy-Dyer, Ortleib, & Cheek,

2013; Friedrich, Flunger, Nagengast, Jonkmann, & Trautwein, 2015) and the interplay of teachers with materials (Frank, Zhao, Penuel, Ellefson, & Porter, 2011; Superfine, Marshall, & Kelso, 2015). Much work remains in studying the role educators play in bringing curricular changes to life.

Teacher effectiveness has been determined to be a key driver in student success (Abernathy-Dyer et al., 2013). Yet, strict fidelity to an evidence-based program, especially when that implementation is taken to scale, may inhibit the expertise of a teacher (Superfine et al., 2015). There is a need to better understand the balance between programmatic adherence and teacher-determined adjustments (Harn et al., 2013). Better guidance is necessary for determining what aspects of evidence-based programs should be the most strictly followed (Durlak & Dupree, 2008).

The implementation of an evidence-based program is a complicated endeavor in a K-12 educational setting (Long et al., 2015). Century, Rudnick, and Freeman (2010) found the lack of available comprehensive frameworks for schools to use to understand the various aspects of the implementation process required researchers to look at other fields. The utilization of a tool from a field such as health care, which identifies the determinant factors for implementation, could prove to be an important next step in improving student learning outcomes (Century et al., 2010).

Theoretical Rationale

The success of an evidence-based program, when utilized in a school-based setting, is often measured by the extent to which children meet desired outcomes (Noell, 2008). Most of these programs require adults, be they teachers, counselors, or administrators, to change aspects of their professional practice for that program to impact student achievement (Sanetti, Kratochwill, & Long, 2013). Noell, Gansle, and Stormont (2009) suggested, however, that program designers and school leaders often fail to acknowledge the need to actively address adult behavior change as part of the implementation process. Successful school change occurs when educators are provided with supports such as ongoing professional learning, access to appropriate resources, and ample time for planning (Greenwood, Tapia, Abbott, & Walton, 2003). Thus, it is critical for researchers to consider the factors that serve as determinants of change for the adults who are asked to implement school-based change.

The identification of the barriers and enablers that determine the success of a program implementation is necessary for a programmatic change to take place in a school setting (Noell et al., 2009). According to Cane, O'Connor, and Michie (2012), merely acknowledging the determinants, absent the identification of an anchoring theoretical basis, prevents an accurate understanding of the evidence-based factors that impact the behavior change. The detrimental effect of a lack of knowledge is notable when a program requires a practitioner to change his or her practices for an intervention to be successful with a patient or student (French et al., 2012). Michie et al. (2005) determined that less than a quarter of health-related programmatic change studies anchored the implementation construct to a behavior change theory. There was significant variance in

the behavior change theories identified by the few studies that named a theory. Of those theories focused on behavior, few demonstrated an applicability to the desired change (Cane et al., 2012). Thus, it was difficult to ascertain when a specific implementation intervention influenced the success of an adoption (Michie et al., 2005). The discovery of this gap in the research led to the development of the theoretical domains framework (TDF) (Michie et al., 2005; Cane et al., 2012).

The theoretical domains framework is a validated determinant framework designed to provide researchers with a tool to identify and assess the impact of specific barriers and enablers for an implementation (Michie et al., 2005; Cane et al., 2012; Nilsen, 2015). Anchored to the work of behavioral science, the designers synthesized 33 theories and 128 theoretical constructs into a single framework (Nilsen, 2015). Originally consisting of 12 domains and 112 unique constructs, the TDF was designed to “simplify and integrate a plethora of behavior change theories and make theory more accessible to, and usable by, other disciplines” (Cane et al., 2012, p. 2). An extensive validation process resulted in a streamlining of the initial model to 14 domains and 84 constructs (Nilsen, 2015). The 14 domains are listed in Table 1.1. The domains synthesized 33 behavior change theories into a useful and usable determinant framework to study implementation (Nilsen, 2015).

Table 1.1

The Theoretical Domains Framework

Domain
1. Knowledge
2. Skills
3. Social/Professional Role and Identity
4. Beliefs about Capabilities
5. Optimism
6. Beliefs about Consequences
7. Reinforcement
8. Intentions
9. Goals
10. Memory, Attention, and Decision Processes
11. Environmental Context and Resources
12. Social influences
13. Emotion
14. Behavioral Regulation

Statement of Purpose

The purpose of this study was to further the research relating to the implementation of evidence-based programs in K-12 educational systems. The burgeoning field of implementation science has made significant strides in disciplines such as business, technology, and medicine. Particularly, research in the health care industry sought to unify and synthesize various theories to better explain the factors that determine successful implementations. The TDF (Cane et al., 2012) is a framework that was developed to comprehensively study the barriers and facilitators for putting new

programs into place in a medical setting. Researchers in education, on the other hand, have not developed a similar comprehensive process.

The TDF was used in this study to better understand the implementation of an evidence-based program in a school setting. The power of this framework is in its ability to distinguish, through the application of theory, among distinct factors that impact the implementation process (Cane et al., 2012). For this study, the TDF was used to identify the factors that most impact programmatic implementation in a K-12 setting. Additionally, the TDF was used to systematically study the role of building-level leadership in influencing an implementation initiative.

Research Questions

The increased interest in implementation science provides researchers with a new lens through which to view programmatic change in K-12 educational settings. The lack of comprehensive frameworks for fidelity of implementation has led some researchers to zero in on data points that are easy to collect though not necessarily connected to outcomes (Harn et al., 2013). For example, Buzhardt et al. (2006) set out to investigate FOI by quantitatively tracking the number of times implementers contacted the designers. The complex nature of education, however, requires assessments of fidelity that view implementation as a means to the end, not an end (Odom et al., 2010). Harn et al. (2013) expressed that researchers should consider that curricular “fidelity data is inherently multi-leveled in structure” (p. 14), reflective of the dynamic relationship between a teacher, the design of the program, and the needs of his or her children.

The dynamic nature of the classroom requires a comprehensive study to understand better the factors that influence teachers’ adherence to FOI for an evidence-

based program. The qualitative approach, and its propensity for inductively building meaning would most readily apply to this topic (Creswell, 2014). The need to create meaning in a relatively young field adds further credence to investigate qualitatively. Three questions that built a deeper understanding of the implementation of the evidence-based program were:

1. What determinant factors (barriers and enablers) impact the extent to which teachers implement evidence-based programs with their students?
2. What actions do school leaders take to support teachers' implementation of evidence-based programs?
3. What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?

This study was designed to answer these three research questions to improve the implementation of evidence-based curricular programs and provide a theoretical understanding of behavior change in a school setting. Moreover, this study was designed to provide a better understanding of teachers' implementation practices that would be valuable for school leaders and program designers in bridging the gap between the promise of these programs and the realities of a K-12 classroom.

Potential Significance of the Study

Teachers are an integral component in the successful implementation of a programmatic change in K-12 schools (Long et al., 2015). The increasing pressures to improve teacher practice, absent of an acknowledgment of the complexities of the classroom environment, has left many practitioners unable or unwilling to adopt new methods (Werts, Carpenter, & Fewell, 2014). Conversely, when teachers felt supported

and understood as professionals, they were more apt to embrace the changes required to utilize an EBP (Parsons, Parsons, Morewood, & Ankrum, 2016). The identification of the barriers and enablers that determine the success of an implementation is necessary for programmatic change to take place in a school setting (Noell et al., 2009). Only stating the determinants without developing a theoretical basis impedes the true understanding of the evidence-based factors that impact behavior change (Cane et al., 2012). The lack of theory becomes particularly noticeable when an EBP requires a practitioner's practice to change for that program to produce the desired outcomes (French et al., 2012).

The development of a comprehensive, theory-based framework focusing on the implementation process is an important next step in improving student learning outcomes (Century et al., 2010). A tool that recognizes and accounts for the complexity of implementation in a school-based setting could improve the success of EBP. Educational leaders will be able to understand better and account for the factors that most impact the appropriate utilization of a program (Durand, Lawson, Wilcox, & Schiller, 2015). When teachers know that attempts have been made to prepare them for the challenge, they may be more apt to try to use an EBP with fidelity (Parsons et al., 2016). Knowing that a teacher plays a pivotal role in determining children's academic success, applying a comprehensive framework such as the TDF to an educational change could result in improved learning for students (Century et al., 2010).

Definitions of Terms

Proctor, Powell, and McMillen (2013) recommended that implementation studies clearly define the terms that are critical to understanding the research. As the emerging field of implementation science continues to evolve and develop, efforts have been made

to develop consensus on the primary terminology (Slaughter, Hill, & Snelgrove-Clarke, 2015). The definitions used for this study are based on extant implementation research literature; they are:

Evidence-Based Program (EBP) – multifaceted intervention that has been shown to be effective in producing the desired outcome (Fixsen et al., 2005).

Fidelity of Implementation (FOI) – quality or extent to which a program is put into use in comparison to its original design (O'Donnell, 2008).

Implementation – processes of bringing a specific intervention/program to use in day-to-day practice (May, 2013).

Implementation Determinants – variables that serve as either barriers or facilitators to the successful utilization of an evidence-based program (Nilsen, 2015).

Intervention – action utilized to change a specific behavior to create the desired outcome (Durlak & Dupree, 2008).

Chapter Summary

As various stakeholder groups have sought to improve student achievement outcomes, the work of schools in the educating of children has faced increasing scrutiny (O'Donnell, 2008). Educators have responded to these pressures by trying programs that have been proven to be successful (Fullan, 2007). The use of evidence-based programs has been shown to positively impact learning for students in a K-12 setting (Whitehurst & Brookings, 2009). The learning gains expected using EBP, however, are not often replicated when the EBP move from research to actual practice (Odom, 2009). One of the evidence-based programs that districts have adopted is one-to-one computer technology initiative. Studies have shown that providing every student with a computer device, such

as laptop or tablet, has had positive effects on student learning (Lowther et al., 2012), but numerous challenges often exist at the outset of one-to-one initiatives that thwart their overall impact (Harper & Milman, 2016).

Educators have turned their attention to the study of the forces that influence how schools put programs into place. Bringing about change through the implementation of evidence-based programs requires an in-depth understanding of the forces that serve to either block or facilitate the process (Durand et al., 2015). The application of the theoretical domains framework provides a theoretical understanding of the implementation process. The application of this framework to a K-12 setting could prove valuable as researchers and practitioners, alike, seek to understand the determinant factors that influence school-based change processes (Greenwood et al., 2003).

Chapter 2 presents a review of the literature pertaining to the development of implementation science and the path of implementation in the realm of K-12 education. The literature review demonstrates the challenges of implementing evidence-based programs in school settings. The theoretical domains framework (Cane et al., 2012; Michie et al., 2005;) is described, and literature is presented to explain why a determinant framework, such as the TDF, was appropriate to utilize in this study. The literature presented in Chapter 2 builds the foundation for the qualitative research methodology of the study described in Chapter 3. Chapter 4 presents a detailed analysis of the results and findings from focus groups with teachers, interviews with principals, and a review of district-created documents related to the implementation initiative. Chapter 5 discusses the findings and implications of the study and provides several specific recommendations for future research and practice.

Chapter 2: Review of the Literature

Introduction and Purpose

The use of evidence-based curriculum programs in K-12 educational settings has been shown to improve student learning outcomes (Whitehurst & Brookings, 2009). Despite the evidence that supports the use of such empirically tested programs, schools have struggled to adequately operationalize the programs that they adopt (Fixsen et al., 2005). As a result, teachers and students rarely experience the full effect of these programs in their classrooms (Odom, 2009). To better understand the gap between theory and practice, it is critical to investigate the variables that impact the implementation process in a K-12 setting (O'Donnell, 2008).

The review of the literature begins with an overview of the field of implementation science and an exploration of the state of implementation science in K-12 education. The literature reveals that education lags behind other disciplines in operationalizing the implementation process, leading to a lack of empirically tested, generalizable approaches to implementation. Teachers serve as the primary conduit for the delivery of evidence-based practices to children in K-12 schools. Leaders, such as superintendents and school principals, also play a crucial role in the success or failure of an implementation effort.

The chapter then examines the development and utilization of frameworks to study implementation. The scarcity of empirically tested models to explore and explain how to bring an evidence-based program to fruition plagues implementation science. The

concerns-based adoption model (CBAM), from Hall and Hord (2005), has been used widely in K-12 education and provides an example of implementation framework. While CBAM is strong in utility, it is not designed to identify the forces that impact implementation specifically.

Finally, the chapter explores the development and application of the TDF. The TDF is a validated, determinant framework that identifies potential barriers and facilitators to bringing an evidence-based program into use (Michie et al., 2005; Nilsen, 2015). The framework consists of 14 domains and 84 constructs anchored in behavior change and systems theories (Cane et al., 2012). The TDF has been shown to be a useful tool in guiding both researchers and implementers in the implementation process in health care settings (Huijg et al., 2014). The gap in educational research that exists, which is due to the lack of generalizable frameworks, provides an opportunity to explore how a model such the TDF could apply to a K-12 implementation process. The three research questions are at the core of the research study are:

1. What determinant factors (barriers and enablers) impact the extent to which teachers implement evidence-based programs with their students?
2. What actions do school leaders take to support teachers' implementation of evidence-based programs?
3. What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?

A study designed to answer these questions could be valuable for program designers and K-12 practitioners by building a deeper understanding of teachers' and leaders' roles in implementing curricular changes. The insights gained from this study of

the determinant factors of implementation could also provide a critical piece in the improvement of student learning and achievement.

Implementation Science

In recent years, medicine, mental health, and the business world have utilized a multitude of evidence-based programs or initiatives designed to bolster individual and organizational performance (Fixsen et al., 2005). Despite initial investments in time and resources, it was not uncommon for these changes to fail to produce the expected outcomes, (Karimi, Somers, & Bhattacharjee, 2007). Institutions often attributed this lack of success to a new program or practice without investigating how the organization put the program into place (Carroll et al., 2007).

Developers and practitioners are focusing more energy on exploring how programs are put into place (Fixsen et al., 2005). The goal has been to clarify whether the success of an intervention was the result of a particular design of the program or how it was enacted in the field (Carroll et al., 2007). The development of implementation science has emerged to close the knowing-doing gap (Pfeffer & Sutton, 2013). The move to more process-based measures has created both opportunities and challenges. Numerous literature reviews uncovered a lack of consistent language, terms, and practices to conceptualize implementation in the social sciences (Fixsen et al., 2005; O'Donnell, 2008; Nelson, Cordray, Hulleman, Darrow, & Sommer, 2012).

Implementation of Curricular Programs in K-12 Education

The same gaps that exist in the implementation field are present in education. Nearly 40 years ago, Fullan and Pomfret (1977) first reviewed the existing curriculum implementation research. They found that classroom practices often failed to replicate the

design of evidence-based programs (Fullan, 2008). These findings, and others like them, signaled to researchers that adopters were not nearly as accepting of innovation as had been previously thought. Up until that point, the prevailing wisdom was that practitioners would implement a program according to the explicit directions (Fixsen et al., 2005). Researchers in education continued to undersell the study of implementation in the years that passed since Fullan and Pomfret's (1977) report, despite the countervailing evidence (O'Donnell, 2008).

O'Donnell (2008) attempted to bring continuity to this branch of educational research by building shared understandings based on existing literature. She defined FOI as being "synonymous with adherence and integrity" (p. 39). This definition was an attempt to separate the implementation process of a program from its ultimate impact on achievement. She further clarified the purposes for the study of FOI in education and provided six guidelines for researchers when designing programs. This list included clearly defining what fidelity means for a program, identifying the most critical program components to be implemented, and developing instruments to measure the FOI unique to the program. Century et al. (2010) attempted to further build coherency among the many voices, including Fullan and Pomfret (1977), Dane and Schneider (1998), and O'Donnell (2008). They developed an FOI operationalized framework for a K-12 educational setting. Their work focused on the identification of critical components regarding the structure and instruction necessary for successful programmatic implementation.

The conceptualization of frameworks has not produced tools to study FOI in education empirically. Though a promising starting point for the early exploration of

implementation in K-12 education, the lack of comprehensive tools to guide practitioners through the enactment of EBP mirrors the broader field of implementation science.

Researchers have chosen to look more closely into specific variables that impact the success or failure of a program's implementation. A multitude of areas for exploration of FOI exists in an educational setting. Two key areas of study that have emerged include the systemic context of program adoption (Pas & Bradshaw, 2012) and the role of the classroom teacher in putting that program into place (Penuel et al., 2014).

Investigating the Role of Context

While the broader frameworks for the study of programmatic implementation in a K-12 setting lack empirical evidence, researchers have narrowed in on the factors believed to contribute to successful implementation. Fixsen et al. (2005) suggested that the starting point for any exploration of implementation must begin with an investigation of the broader community context. Context can be defined as “the conditions or surroundings in which something exists or occurs” (Nilsen, 2015, p.7). The complex nature of educational systems, with their many moving parts, make the need to attend to context during a programmatic change of critical importance (Roblin et al., 2012). The availability of professional development for teachers and the extent to which a school culture is collaborative are two areas that have garnered attention from researchers.

The professional life of a K-12 teacher is inherently one of isolation from colleagues. A teacher spends her work day interacting predominantly with students, resulting in separation from fellow educators. The demands of the profession and the individualization of the work make it challenging to implement curricular changes (Frank et al., 2011). One way to mitigate this challenge is for leaders to foster an environment

that promotes explicit, job-embedded professional learning connected to a specific program (Fixsen et al., 2005). Teachers presented with multiple opportunities to engage with a new program are more apt to put it into use (Odom, 2009). Successful professional development models are also differentiated for teachers' knowledge and experience (Frank et al., 2011). Educators who feel that they have control over their learning choices are also more likely to find curricular changes beneficial (Reed, 2009).

Related to professional learning, implementation within a culture of professional sharing supports programmatic implementation (Kaiser, 2013). In fact, the purposeful exchange of knowledge among teachers has been shown to be a critical factor in the utilization of a new curriculum (Frank et al., 2011). Fullan (2001), in acknowledging the complexity of teaching and learning in K-12 settings, stated that regular and purposeful collaboration was a vital ingredient in the adoption of a new program. Reed (2009) suggested that a focused, school-wide implementation would prove to be most beneficial, as it would align all educators around a common outcome. Conversely, more flexible collaborative options, including participation in curricular leadership teams, teacher-to-teacher sharing, and classroom visits, have also engendered a more open and professional atmosphere for implementation (Kaiser, 2013). Teachers who had access to, and communicated with, programmatic designers were also shown to more effectively implement a curricular change (Buzhardt et al., 2006; Odom, 2009; Roblin et al., 2012). Essentially, cultures that foster collaboration and support ongoing professional learning have been shown to produce more successful curricular implementations.

Accounting for Adaptations

Replicating evidence-based programs in schools has proven to be problematic, particularly as it relates to the often-unpredictable nature of the classroom environment. Some researchers chose to more closely investigate the programmatic adaptations made by teachers to meet the needs of their students (Harn et al., 2013). Kaderavek and Justice (2010) identified the goal of 100% fidelity as being the “gold standard” of implementation (p. 370). However, they indicated that such implementation was exceedingly difficult to approach, let alone attain, in a school setting (Kaderavek & Justice). Some researchers have pivoted to investigate how teachers and service providers balance the intended design of a program with the need to make alterations.

Teacher efficacy is one teacher-related variable that impacts the effectiveness of an EBP. Numerous studies have supported the concept that teachers’ view of their students’ abilities affected those pupils’ academic achievement (Friedrich et al., 2015). Attempts have been made to investigate how teachers’ perceptions of their own capacity is correlated to the successful use of EBPs. One study at the K-5 level found that teachers’ perceived skills affected how comfortable they felt in adjusting to a prescribed, evidence-based reading program (Abernathy-Dyer et al., 2013). Another investigation found that as teachers’ perceived knowledge of the EBP grew, the support that they needed for implementation changed. Educators unfamiliar with an initiative need intensive and directed professional learning to bring a program to life in their classrooms. Prolonged implementation occurs when professionals have the time and space to experiment with potential changes to the program (Frank et al., 2011).

The actual design of the written program and how teachers interact with those materials may also impact implementation. Questions have emerged about how useful

teachers believe the author-created ancillary materials are. Early on in implementation period, teachers most often interface with a program through its supplementary supports (Frank et al., 2011). Superfine et al. (2015) presented somewhat contradictory findings related to this issue. They reviewed the written curriculum materials made available to teachers to assist in classroom use of the EBP. Their conclusions suggested that teachers more actively implement materials when directions for use are prescriptive and explicit. However, the researchers also supported “the critical role that teachers play in constructing the curriculum together with their students” (p. 185).

Some studies suggested that strict adherence to a program limits the overall effectiveness of the intervention, and it may even negatively impact long-term implementation (Harn et al., 2013). The often frenetic and unpredictable nature of classrooms requires teachers to be flexible in response to the individual needs of their students (Webster-Stratton, Reid, & Stoolmiller, 2008). The need to be responsive runs contrary to the desire to maintain a program’s integrity. However, without some flexibility, educators may drop a program altogether (Harn et al., 2013). Swain, Whitley, McHugo, and Drake (2010) found that practitioners required to maintain high fidelity stopped using all aspects of the EBP within 2 years. Implementers of the same program who could make some adjustments to the EBP found both greater longevity and improved outcomes (Swain et al., 2010).

Teacher Roles and Reactions to Implementation

The shift in policy at the federal, state, and local level toward the use of evidence-based programs is laden with the assumption that teacher practice will change accordingly. Three studies spanning the last decade investigated the problems associated

with the chasm between the promise of the research and the realities of implementation. While there are external pressures to see change materialize in schools, there are equally powerful forces seeking to avoid any alteration of the current structures. Boardman, Argüelles, Vaughn, Hughes, and Klingner (2005) explored educators' beliefs about the use of evidence-based academic intervention programs and the barriers to their implementation. Kretlow and Helf (2013) investigated teachers' use of evidenced-based reading curricula in primary-level classrooms (kindergarten, first, and second grade). Hudson et al. (2015) examined teachers' implementation of evidence-based practice through a socio-cultural analysis. While each study engaged in different research methods with different populations, there were interesting parallels in their findings that could inform future work in the field.

Throughout the 1990s and into the early 2000s, numerous efforts were put into place to bring about improvements in student learning. The Individuals with Disabilities Education Act (1990 and 2004), the Goals 2000 initiative, and No Child Left Behind (2001) were all political movements meant to exert pressure to change instructional practices to serve children better (Detrich, 2014). The tide had swung toward the use of specific, research-based instructional programs in schools. It was in this climate of seemingly constant change that Boardman et al. (2005) sought teacher reflections on the attempts to bring about systems change. A focus group interview process was established to better understand the tumult through the voices of special education teachers (Boardman et al., 2005).

Special education teachers were identified as the target population, given the duality of their roles (Boardman et al., 2005). Special education teachers often work with

their students in both inclusive and exclusive settings. Instructing students alone and alongside their colleagues allows special education teachers to be independent actors and see how their peers teach. The researchers speculated that having these two lenses would open a door into how teachers view the research-based instructional practices that are expected to exist in the classroom (Boardman et al., 2005). In total, 49 special educators participated in interviews, as part of the Boardman et al. study. Four overarching themes emerged from the interviews: (a) program selection, (b) program use, (c) program sustainability, and (d) professional development and research (Boardman et al., 2005). Of the four themes, program use was the most discussed, with nearly half the teacher comments focused on this area.

Teachers' discussions of how they use evidence-based programs highlight the crux of the challenge in closing the knowing-doing gap (Pfeffer & Sutton, 2013). The teachers in the Boardman et al. (2005) study spoke extensively about the barriers to implementation of evidence-based practices. They often discussed that these obstacles prevented the use of research-based approaches. When researched methods were tried, they were usually adapted to fit the perceived needs of their students. Additionally, the limited availability of materials and training and the absence of supportive leadership thwarted their implementation efforts. This is not a surprising discovery considering O'Donnell's (2008) findings that most evidence-based programs do not explicitly include references on how to work through barriers during the implementation process.

Teachers who were adapting programs explained that they felt the needs of their students could not be met otherwise. Harn et al. (2013) found similar phenomena in their review of the literature on FOI. In general, teachers expressed an avoidance, if not

outright aversion, to research. They felt little pressure to bring evidence-based programs to bear in their classrooms, even while seeking new approaches to address what they saw as increasingly difficult students (Boardman et al., 2005). In the decade that followed Boardman et al. (2005), Kretlow and Helf (2013), and Hudson et al. (2015) found that little headway had been made to bring evidence-based practices to classrooms in the United States.

The building of foundational reading skills is critically important to a child's future. Reading at or above grade level by third grade is often cited as a key indicator of academic success for students as they progress through their schooling (Lesnick, Goerge, & Smithgall, 2010). Many school districts have pushed to bring evidence-based practices to their primary-level classrooms in recognition of the importance of developing students' early reading skills. There have been only a few studies that have taken a broad look at whether the rhetoric of the improved outcomes has come to fruition in actual practice (Kretlow & Helf, 2013). Using a survey mailed to a national sampling of primary-level teachers, Kretlow and Helf (2013) sought to uncover which evidence-based programs were most prevalent in today's classrooms.

Instruction in reading is one of the primary functions of a kindergarten, first-, or second-grade teacher. To explore the teaching of reading in the United States, the researchers developed a 15-question survey (Kretlow & Helf, 2013). The survey asked respondents to identify the evidence-based programs they utilized, what materials were used to guide their instruction, the frequency of the use of the materials, and the professional support that they received related to reading instruction. A random sample of teachers was developed based on a two-way stratification (geographic regions of the

United States and primary-grade level of teaching). Of the 1,500 surveys distributed, 35.6% were returned, with relative equal representation between the three grade levels and geographic regions. It is from this population that Kretlow and Helf (2013) analyzed their findings.

The U.S. Department of Education created the What Works Clearinghouse (WWC) to catalog and evaluate evidence-based educational programs. The researchers intended to cross-reference the programs reported in the survey with the national database (Kretlow & Helf, 2013). They discovered that the WWC evaluated only 1.7% of the programs listed by respondents. Teachers reported low implementation fidelity with the curricular materials that they did use. Only 35.5% of teachers stated that they used the scope and sequence daily. Phonemic awareness materials were used by only 36.8% of those who returned the survey, while nearly 40% of teachers did not teach phonemic awareness and/or phonics daily. This practice runs contrary to the recommendations of the National Reading Panel (Kretlow & Helf, 2013) that identified phonics and phonemic awareness as critical aspects of a student's reading instruction. An aversion to research is further shown in that 80.7% did not regularly (daily or 3-4 per week) incorporate evidence-based practices that they learned during their collegiate programs. Of the group that identified as not regularly using research to inform practice, 42.4% never used the information acquired from their prior academic training. It would seem, then, that evidence-based reading practices are largely ignored in primary-level classrooms (Kretlow & Helf, 2013).

Nearly 15 years into the No Child Left Behind-era, and 10 years after Boardman et al. (2005), Hudson et al. (2015) built on the findings of Kretlow and Helf (2013) by

studying the impact of research on pedagogical practices at the secondary level. The study involved a series of one-on-one interviews with high school special education teachers. A sociocultural lens was applied to the interview questions and used as a filter for the teachers' responses. The purpose of choosing this theoretical approach was to more carefully analyze the "social and organizational conditions in which decisions about practice are made" (Hudson et al., 2015, p. 2).

Hudson et al. (2015) aimed to more deeply explore the voices of the practitioners and understand their instructional decision-making process considering the complexities of educational systems. A group of 27 special educators participated in face-to-face interviews that utilized a semi-structured approach (Hudson et al., 2015). Questions were crafted so that they progressed from general-context questions to more narrow, professional-practice inquiries. The interviewees represented four different high schools in Seattle, Washington. The schools' student-body populations varied by socioeconomic factors and special education identification rate. Participants in the study included teachers of students identified as having emotional and behavioral disorders, resource room teachers, self-contained teachers, and the directors of special education. The variety of roles produced diversity in experiences and responses.

After the interviews, Hudson et al. (2015) analyzed and coded the responses of the study participants. Through this process, three overarching concepts relating to teachers' decision-making processes became apparent to the researchers (Hudson et al.). The personal characteristics of a teacher, the organizational structures of the schools, and the availability of professional supports impacted the use of evidence-based practices. Teachers with access to in-depth professional learning, coherent curricula, and relevant

materials were more likely to use an EBP (Hudson et al., 2015). While these broader themes echoed the findings of Boardman et al. (2005) and Kretlow and Helf (2013), some differences also surfaced.

The teachers in Hudson et al. (2015) provided a stark assessment of the state of evidence-based practice in their schools. Like the findings of Boardman et al. (2005) and Kretlow and Helf (2013), there existed a skepticism of educational research and its implications for improving students' learning. Some teachers reported dichotomous feelings, both desirous of new practices but unsure of their applicability to the population of students they served (Hudson et al.). In all three studies, the teachers shared that the research represented a force that was beyond them, which was external to their daily work with students. Whereas Boardman et al. (2005) reported a lack of administrative pressure to use evidence-based practices, the teachers in the Hudson et al. (2015) study felt that their administrators were much more vociferous in support of the use of research-based instruction. New programs were developed, decided upon, and implemented without the input of the practitioners. The lack of useful resources and readily applicable professional learning further added to the frustrations previously expressed by the teachers in Boardman et al. (2005) and Hudson et al. (2015).

The Role of Leadership in the Implementation Process

As the theoretical domains framework provides a tool to assess the barriers and enablers to the implementation process, leaders within organizations play a vital role in creating the conditions for a successful implementation (Bertram, Blase, Shern, Shea, & Fixsen, 2011). Systems-level leaders are often responsible for setting the context for organizational change by providing the vision and direction for change, supplying the

necessary resources and training, and creating an overall mindset for improvement (Aarons, Ehrhart, & Farahnak, 2014). Local leaders face the pressure of having to mediate between the day-to-day needs of their direct reports and the pressures placed on them from the various organizational priorities (White-Smith & White, 2009). The National Implementation Research Network (NIRN) identified “leadership” as one of its critical forces in the implementation of evidence-based programs (Bertam, Blase, & Fixsen 2014). Like implementation science itself, the role of leadership within an implementation context has had few empirical studies (Aarons & Sommerfeld, 2012)

The need to better explain the impact of leadership on the implementation of evidence-based programs led Aarons et al. (2014) to develop the Implementation Leadership Scale (ILS). They found that the extant research on leadership most often connected to the impact of a leader’s general style, such as transformational, transactional, or adaptive, would have on an implementation (Guerrero, Padwa, Fenwick, Harris, & Aarons, 2016). Aarons and Sommerfield (2012) discovered that transformational leadership was most effective when the culture of an organization was more open to change and presumably more predisposed to flexible thinking. However, the study could not specify which transformational behaviors provided the most leverage for change during implementation. The ILS bridged the research on implementation and leadership. It identified specific actions a leader should take to ensure that an evidence-based program will be put into place as designed (Aarons, Ehrhart, Torres, Finn, & Roesch, 2016). Using a validated survey, leaders can identify their capacity for action within four categories of implementation leadership: (a) proactive leadership,

(b) knowledgeable leadership, (c) supportive leadership, and (d) perseverant leadership (Aarons et al., 2014).

The identification of specific actions a leader can take to aid in an implementation process can be especially powerful when the leader is not an active agent in the decision to bring about change (Sloan, 2013). K-12 education has experienced a regular spate of “disturbances” (Sloan, 2013, p. 29) to its system in the form of new regulations or government mandates. Educational leaders have been required to guide their districts and schools through these changes, often without a voice as to how they are to play out on a local level (Fullan, 2007). Durand et al. (2015) studied the implementation of the Common Core State Standards (CCSS) in elementary schools in New York state. At the heart of the research was the exploration of the relationship between district-level leaders’ expectation of a strict fidelity of implementation of the CCSS and the impact on student learning. Districts with the most substantial growth in student learning had leaders who sought the right balance of a “loose and tight” (DuFour, DuFour, Eaker, Many, & Mattos, 2016, p. 13). These leaders were proactive and sought collaboratively developed local solutions for how to best incorporate the new standards into their teachers’ teaching practices (Durand et al., 2015). This study, echoing the discoveries of Superfine et al. (2015) and Harn et al. (2013), found that strict adherence to a program limited practitioner effectiveness and student learning outcomes.

Leaders in an implementation process require both an understanding of broader approaches to leadership and attention to specific actions that improve adoption of an evidence-based program (Aarons et al., 2014). The TDF provides theoretical specificity around the pressures that practitioners feel during the introduction of new practices (Cane

et al., 2012). Awareness of these barriers and facilitators and knowledge of those high-leverage leadership actions can prove to be most beneficial to ensure that an evidence-based program meets its fullest potential (Guerrero et al., 2015).

Implementation Frameworks

Recent work has attempted to bring both unity and clarity to the study of implementation. Dane and Schneider (1998), in discussing “program integrity,” identified five key facets necessary when considering implementation: adherence, exposure, quality of delivery, participant responsiveness, and program differentiation. Carroll et al. (2007) built upon these efforts by constructing a framework that explored both the structure of the design and the steps taken to put the program into place.

In 2005, the NIRN conducted a literature review of studies that identified and discussed the implementation of a program or intervention. Of the over 1,000 studies identified as having mentioned implementation somewhere in the report, only 22 had precisely measured or empirically examined implementation (Fixsen et al., 2005). This study reinforced earlier findings regarding the lack of focus on fidelity. The NIRN constructed a framework to capture those key components identified to be necessary for successful implementation. Implementation drivers (Bertram, Blase, & Fixsen, 2014) required organizations to emphasize the building of internal competencies, the application of both adaptive and technical leadership, and the promotion of structures that supported change. A triangle was chosen to equate the three components to one of the sides of the shape, with the leadership drivers serving as the base. The goal of the framework was to ensure heightened results using the adopted program.

Concerns-based adoption model. Whereas the NIRN implementation framework was used to encompass the broad process of implementation, the concerns-based adoption model (CBAM) focuses on the change process through the experiences of teachers (Hall & Hord, 2005). The CBAM framework consists of three distinct, but related, indices of change in a school setting: stages of concern (SoC), levels of use (LoU), and innovation configuration (Hollingshead, 2009). The SoC categorizes seven stages of teachers' personal feelings and public reactions to the introduction and use of a new program (Hall & Hord, 2011). Teachers' concerns progress early on, from a lack of awareness to a focus on one's needs and capacity. As the new program becomes part of daily practice, teachers think deeply about how to work through the new task requirements. Educators who have fully embraced the new initiative and have developed ways to make it useful in daily practice, shift their attention to how the change impacts students' learning (Hall, 2013).

The levels of use are structurally similar to the stages of concern, in that they represent a hierarchy of adoption as a teacher works through the implementation process. The LoU is intended to capture the teacher's actual use of the evidence-based program through the identification of seven distinct levels. The levels range from total non-use and early rote usage to the innovation becoming part of regular practice. Finally, expert usage often results in the teacher reaching the point of considering modifications to the program or even seeking a new approach to better meet the needs of his or her students (Hall, 2013).

Innovation configuration (IC) is the CBAM tool that was developed to address the issue of fidelity of implementation. Early studies to test SoC and LoU uncovered a gap in

the CBAM construct. Self-reporting and observation often form the basis of measurement for the SoC and LoU. Researchers revealed that groups of teachers tasked with putting the same program to use in their classrooms often had different visions of how that program would look in practice (Hall, 2013). The IC identifies and categorizes the essential components of a program. Working like a rubric, the IC characterizes how the implementation of each key element of a program would look in a range from full usage to non-usage (Hollingshead, 2009). The articulation of a shared vision for the usage of an evidence-based program has been shown to bring unity to the often-disparate practice of classroom teachers (Hall, 2013).

Taken in total, CBAM provides developers, implementers, and users of the evidence-based program a full suite of tools to assess progress toward the full implementation of a new initiative (Hall & Hord, 2011). The SoC and LoU have been tested and validated through the development of a number measurement tools and questionnaires (Hall, 2013). Like the frameworks created by Dane and Schneider (1998), the NIRN (Fixsen et al., 2005), and O'Donnell (2008), CBAM does not measure the critical components that impact implementation at the outset (Anderson, 1997; Hall, 2013). While these tools offer researchers a starting point for the discussion of an implementation process, the frameworks lack evidence to suggest that they could appropriately assess the determinant factors of implementation (Carrol et al., 2007). This persistent gap between the research and the field has prevented unified implementation studies from being validated (O'Donnell, 2008). Because of this shortcoming in the literature, education must turn to other areas for guidance and direction. Disciplines such as medicine and health have created empirically tested frameworks that recognize and

assess the complexities of the implementation process. A determinant framework that integrates the potential barrier and facilitators into a single theory-based and application-ready tool could prove to be a missing link in moving evidence-based programs forward in schools (Durlak & Dupree, 2008).

The Theoretical Domains Framework

The TDF is a validated determinant framework anchored to the work of behavioral science (Cane et al., 2012; Michie et al., 2005; Nilsen, 2015). The designers of TDF synthesized 33 theories and 128 theoretical constructs into a single framework (Nilsen, 2015). The result was a tool originally consisting of 12 domains and 112 unique constructs that could be used to “simplify and integrate a plethora of behavior change theories and make theory more accessible to, and usable by, other disciplines” (Cane et al., 2012, p. 2). Through a later validation process, the preliminary design was adjusted to consist of 14 domains and 84 constructs (Cane et al., 2012; Nilsen, 2015). The identified domains include:

1. knowledge;
2. skills;
3. social/professional role and identity;
4. beliefs about capabilities;
5. optimism;
6. beliefs about consequences;
7. reinforcement;
8. intentions;
9. goals;

10. memory, attention, and decision processes;
11. environmental context and resources;
12. social influences;
13. emotion; and
14. behavioral regulation (Cane et al., 2012).

The purpose of the framework is to provide a comprehensive, yet practical, interface for researchers and practitioners to design theory-based implementation strategies (Michie et al., 2005). The implementation of a new program is complex and multifaceted, often requiring changes in how the implementer conducts specific aspects of their work (Huijg et al., 2014). Researchers frequently focus on improving specific practices, without an understanding of how the practitioner internalizes the changes (Cane et al., 2012). Additionally, researchers tend not to be conversant in the multitude of psychological theories that help to explain behavior change (Francis, Curran, & O'Connor, 2012). Implementation researchers have recognized the need for tools to more precisely align the theory, design, and practice of proper implementation (Michie et al., 2005). The TDF provides an avenue for the development of a common language and understanding of how theory can inform strategies for behavior change (Cane et al., 2012).

In practice, the TDF has been applied in research in a variety of ways. Researchers have used the framework to identify specific domains and associated behavior-change theories to proactively develop the means to address potential barriers (Francis et al., 2012). The framework has been used to detect and ameliorate barriers when implementation is in progress and not taking hold (Alexander, Brijnath, & Mazza,

2014). Additionally, researchers have used the TDF to develop a validated questionnaire, connecting specific questions to domains to assess practitioner perceptions about implementation (Huijg et al., 2014).

History of the theoretical domains framework. Disciplines such as medicine, technology, and business have increasingly utilized empirically tested practices to secure positive outcomes (Fixsen et al., 2005). The results of these interventions have proven to be uneven (Gilley et al., 2008). Confounded by the gap between what was developed through research and what happened in organizations, attention shifted to how programs were brought to bear in the first place (Fixsen et al., 2005). This attention to process led to the rise of implementation science, which focuses on the fidelity to which evidence-based programs are utilized (Meyers et al., 2012).

Researchers worked to establish a variety of tools to better define and explain the import of implementation (Century et al., 2010). At the same time, the implementation field struggled to unify around a theory (Nilsen, 2015). Michie et al. (2005) determined that less than a quarter of health-related programmatic change studies anchor the implementation construct to a behavior-change theory. There was also variance in the behavior change theories identified by the few studies that named a theory. In a review of 235 programmatic guidelines and implementation studies, the majority lacked any reference to theory, while 4% aligned their work to a theoretical construct (Cane et al., 2012). Of those behavioral theories used, few were tested as to their applicability to the desired change (Cane et al., 2012). It was difficult to ascertain how a specific theory impacted the success of the implementation efforts (Michie et al., 2005). This gap in the

research led to the genesis of the theoretical domains framework (Cane et al., 2012; Michie et al., 2005).

The development of the TDF took place during five meetings from May 2003 to July 2004 with contributions from health psychology theorists, health services researchers, and health psychologists (Michie et al., 2005). Each of the team members brought their discipline-specific expertise to bear in the process. The group worked to identify, organize, and prioritize from the many behavior change theories that most impacted implementation (Michie et al., 2005). A list of 12 domains and 128 explanatory constructs within those domains were identified through a backward validation process (Michie et al., 2005). A review of the literature from 2005 until 2011 revealed that 21 empirical studies were based in the TDF (Francis et al., 2012). In 2012, the TDF underwent a more rigorous external validation process (Cane et al., 2012). A group of behavioral change experts without knowledge of the TDF were asked to more closely examine the 128 constructs through either an open or closed sorting method. The efforts of these experts produced a reorganized, streamlined, and validated TDF (Cane et al., 2012). Because of these efforts, the current TDF consists of 14 domains and 84 component constructs (Cane et al., 2012).

Critique of the theoretical domains framework. The TDF is an attempt to bring consistency to the application of theory in the expanding field of implementation science (Michie et al., 2005). The 14 organizing domains, anchored in 33 behavior theories, are intended to provide both researchers and practitioners with a comprehensive list of factors that most impact the successful implementation of an initiative (Michie et al., 2005). Behavior-based determinant frameworks such as the TDF, while serving to guide

the design and implementation of a program, have been found to have limitations in practice.

To bring order to the implementation field, Nilsen (2015) organized a taxonomy of the various theories and frameworks used in implementation studies. He sought to “distinguish between different approaches to advance clarity and achieve common terminology” (Nilsen, 2015, p. 2) to engage in “cross-disciplinary dialogue” (p. 2). Through a narrative review of the literature, Nilsen (2015) identified the existence of broad theoretical categories that served as anchors for the work of researchers. One of the constructs he identified were determinant frameworks. Determinant frameworks explore the barriers and enablers that determine a successful implementation. Nilsen (2015) labeled the TDF as a determinant framework.

Nilsen (2015) argued that determinant frameworks have an inherent incongruity in their design. While models such as the TDF are often rooted in some aspect of system theory, individual determinants are usually explored in isolation. Separating determinants limits the potential impact that may exist when factors are investigated in combination (Nilsen, 2015). Additionally, Nilsen (2015) posited that studies that test determinant frameworks, such as the TDF, are flawed in their design. The reliance on qualitative methods to study models such as the TDF presents barriers or enablers in individual questions. This design may raise an awareness of factors that may have not previously existed. Nilsen (2015) suggested that this may impact respondents’ perceptions, providing the identified factors undue status relative to others.

Determinant frameworks were also found to be lacking the guidance to determine how to best address barriers when engaging in an implementation process (Gagliardi &

Alhabib, 2015). The TDF does not provide users with direction on how to best alleviate barriers or strengthen enablers when implementing an evidence-based program. This gap exists even as designers sought guidance from the literature on how to best operationalize the findings from TDF-based studies (Gagliardi & Alhabib, 2015). The Guideline Implementation Planning Checklist was developed to provide the missing link for program developers (Gagliardi, Marshall, Huckson, James, & Moore, 2015). The researchers acknowledged that additional testing and validation of the checklist must be completed to make it fully operational (Gagliardi et al., 2015).

Advocates of the TDF recognized the need to provide additional usage guidance to address concerns raised by critics of the framework (Atkins et al., 2017). Atkins et al. (2017) published a guide to “assist in the application of the TDF” (p. 1) to be used for use in developing practical, theory-based solutions to persistent problems with the implementation of EBP. The guide outlined a six-step process for using the TDF to investigate an implementation process. The authors acknowledge “the inevitable drawbacks” (Atkins et al., 2017) of using the framework to investigate specific determinant behaviors. However, Atkins et al. (2017) argue that the focus on specific on individual forces that concerned critics such as Nilsen is a strength of the design. The ability to draw a direct line to the associated behavior change theory allows researchers and practitioners to more aptly uncover and change unwanted actions Atkins et al. (2017).

Evidence of the successful use of the theoretical domains framework. The TDF has started to make inroads in the literature as a tool to better describe implementation barriers and enablers through a theoretical lens (Huijg et al., 2014). A

growing number of studies have utilized the TDF framework to research implementation (Cane et al., 2012). Studies have explored a variety of applications of the TDF, including the use of the framework to investigate the utilization of a health screening program for preschool-aged children (Alexander et al., 2014), a study of the influences of doctors' usage of blood transfusions (Islam et al., 2012), and the development of a questionnaire to explore what impedes health care professionals from utilizing evidence-based practices (Huijg et al., 2014). The use of the TDF with studies such as these provide a crucial link to the theories that could better inform the implementation process (French et al., 2012).

In 2007, Australia identified a challenge to its health care delivery system. Despite being renowned for its life expectancy, Australian children were increasingly presenting with high-risk health indicators (Alexander et al., 2014). At the same time, the government was attempting to shift to a more preventative health care delivery model (Alexander et al., 2014). The Healthy Kids Checklist (Alexander & Mazza, 2010) is a preventative intervention tool designed to improve the health of children. This one-time check-up aimed to involve general practitioners more in identifying and intervening with preschool-aged children who were physically unhealthy (Alexander et al., 2014). Only 16% of children received the HKC in its first year, even though it was free to families, and doctors received government reimbursement for providing the service (Alexander et al., 2014).

Alexander et al. (2014) set out to determine why the reach of the checklist was limited and what steps could be taken to expand its use. The researchers held focus groups of practitioners and asked questions informed by the TDF. The responses to the questions were coded back to the TDF domains (Alexander et al., 2014). An analysis of

the doctors' answers was conducted considering the TDF. The researchers identified prospective areas the government could target to improve the implementation of the HKC (Alexander et al., 2014). Findings suggested that theory-informed interventions focused on the TDF domains of knowledge and beliefs about capabilities could improve physicians' use of the HKC (Alexander et al., 2014).

The TDF has also been used to dig deeper into medical practitioners' broader perspectives on specific aspects of their practice. Absent applicable theories, implementation science has struggled to identify appropriate interventions to change practitioner behavior (May, 2013). Islam et al. (2012) sought to explore the influences that impact intensive care physicians' use of blood transfusions in Canada. There lacked uniformity of practice in the field, despite research that suggested a more conservative approach to prescribing transfusions was most beneficial for patients (Islam et al., 2012). The researchers used the TDF to organize and frame interview questions aimed at addressing physicians' behavior (Islam et al., 2012). Questions were developed from each domain, and additional prompting and follow-ups were created. The doctors were interviewed in a one-on-one setting, and the responses were coded using the TDF to identify the targeted behavioral beliefs (Islam et al., 2012).

The researchers discovered that 7 of the 12 domains of the TDF could provide potential areas to target behavior change interventions (Islam et al., 2012). Through an examination of the questions aligned to the knowledge domain, physicians reported that the restrictive transfusion practices were counterintuitive, and they needed more evidence to support a change in practice. A discovery from examining the social influences domain questions was that doctors were often encouraged by other members of the treatment

team, and even the families of patients, to administer transfusions more frequently (Islam et al., 2012). The TDF allowed Islam et al. (2012) to more precisely identify and apply behavior theories to potential interventions that researchers and program developers suggested.

There has also been interest in the development of broader, more generalizable tools to better align determinant factors with behavior change theory (Michie et al., 2005). The complexity of the administration of the innovation, the availability of fiscal and human resources, the amount and type of training, and even a provider's self-efficacy are among the many factors that shape how a program is used (Huijg et al., 2014). Attempts to ameliorate these factors with specific strategies have seen limited success, as the approaches often lacked a basis in theory (Huijg et al., 2014; Nilsen, 2015). Huijg et al. (2014) sought to address this lack of theory in the research and application of intervention strategies by developing a TDF-aligned questionnaire. The TDF was selected as the basis for the tool because it purposefully integrated behavior change theory into a single framework. Intervention designers and implementation teams could then diagnose and treat any barriers to implementation through a thoughtful application of theory (Huijg et al., 2014).

The Determinants of Implementation Behavior Questionnaire (DIBQ) was developed as a 93-item query to assess the behavioral determinants that influence implementation (Huijg et al., 2014). The validation process involved the distribution of the tool to 496 physical therapists. Based on the feedback from the 270 respondents, the development team analyzed the results through a variety of variance measures (Huijg et al., 2014). The researchers concluded that the DIBQ was an appropriate tool to assess

determinant factors through the lens of the TDF (Huijg et al., 2014). Additionally, Huijg et al. (2014) suggested that the DIBQ, along with the TDF, could be utilized in the quest for theory-based implementation solutions.

Chapter Summary

Implementation science has made its way into the realm of educational research. Investigators are beginning to ask what fidelity means, particularly given the uncertain nature of a classroom full of children. The development of consistent language and unifying frameworks in the implementation field is progressing (O'Donnell, 2008). Concurrently, focus is turning to certain variables that impact implementation, such as school context and the role of the teachers in bringing a program to life (Reed, 2009). The barriers to the implementation of school-wide, evidence-based programs (Fagan & Mihalic, 2003; Pas & Bradshaw, 2012), challenges faced by teachers during implementation (Benner, Nelson, Stage, & Ralston, 2011; Frank et al., 2011; Kaiser, 2013; Lakin & Shannon, 2015), and the pivotal role teachers play throughout implementation process (Boardman et al., 2005; Kretlow & Helf, 2013; Hudson et al., 2015) are among the topics that illustrate the challenges of using an implementation process in an educational setting.

It is critical for researchers to consider how determinant factors influence, and are influenced by, the broader system of school-based change processes (Greenwood et al., 2003). K-12 education needs tools to understand the interaction of various forces upon an implementation initiative (Noell et al., 2009). Other industries, such as healthcare, could provide an empirically tested tool for researchers and practitioners to study implementation in schools. The theoretical domains framework (Michie et al., 2005) may

serve to understand better the determinant factors that impact implementation. Moreover, the framework could provide strategies for those charged with implementation to ensure the conditions exist for success. This framework has proven to be successful in investigating implementation in medicine, and it provides exciting possibilities to move the scales in schools and classrooms. The methodology used to apply the TDF to the field of education is explained in Chapter 3.

Chapter 3: Research Design Methodology

Introduction

Teachers and administrators in K-12 systems have faced a myriad of external pressures from policymakers, business leaders, and parent groups to improve student achievement (O'Donnell, 2008). Educators have increasingly been required to adopt evidence-based approaches to improve student learning outcomes (Missett & Foster, 2015). The results of these interventions have proven to be uneven, as actual achievement has rarely matched the success of controlled studies (Gilley et al., 2008). Confounded by the gap between the findings supported by research and what happens in practice, attention has shifted in recent years to how programs were used in the first place (Fixsen et al., 2005).

The nascent field of implementation science has emerged in the realm of educational research to understand better the process of bringing an evidence-based program to bear (Roblin et al., 2012). Lacking its own tested models to understand better the forces that either help or hinder implementation, education has had to turn to other fields, such as medicine and health care (Century et al., 2010). The theoretical domains framework is a theory-based, application-ready tool that identifies implementation barriers and facilitators in medical settings (Cane et al., 2012). The TDF, when applied to an educational environment, could help educators better understand the barriers and facilitators of implementation (Durlak & Dupree, 2008). The gap in educational research that exists due to the lack of generalizable frameworks provides an opportunity to explore

how a model such as the TDF could apply to a K-12 implementation process. The study aimed to answer three questions that could build a deeper understanding of teachers' roles in implementing curricular changes:

1. What determinant factors (barriers and enablers) impact the extent to which teachers implement evidence-based programs with their students?
2. What actions do school leaders take to support teachers' implementation of evidence-based programs?
3. What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?

The changing nature of K-12 schooling requires a comprehensive study to understand better the factors that influence teachers' implementation of EBP. This implementation study involved the use of focus group sessions with teacher-implementers and individual interviews with building administrators involved in the implementation. The qualitative approach is best suited for generative studies that seek to construct deeper meaning in an emerging field (Creswell, 2014).

Research Context

The setting for the study was Bay Point Central School District, located in upstate New York. Bay Point is a first-ring suburban town, encompassing approximately 8 square miles, bordering on a mid-sized city. The district serves students from the most racially diverse backgrounds and the highest overall economic need of all suburban school systems in the region. Of the approximately 3,000 students, 53.6% of students are labeled as White/Caucasian, 19.9% identifying as Hispanic, 18.5% as Black or African American, 5.8% as biracial, and 2.2% as Asian or Native Hawaiian/other Pacific Islander.

Students in Bay Point come from a preponderance of homes identified as being economically disadvantaged (New York State Department of Education, 2015). Based on parent/guardian self-reporting of income, 55% of students qualify for free or reduced-fee lunch, which is a benchmark measure for economic need in schools (New York State Department of Education, 2015).

Bay Point Central School District provided an appropriate setting for a study of the implementation of an evidence-based program in a K-12 setting. Beginning in 2012, Bay Point began exploring the expanded use of instructional technology in its classrooms. White-Smith and White (2009) suggested that the increased use of computers by students and teachers can transform existing systemic and cultural structures to improve student learning outcomes. Student achievement, as measured by graduation rates, New York State testing in Grades 3-8 English language arts and math, and high school New York State Regents Exams, saw a decline between the 2012 and 2015 (New York State Department of Education, 2015).

In 2014, the Bay Point Board of Education revised the district's strategic plan. In an attempt improve student achievement, the plan called for Bay Point to provide Internet-enabled computer devices to every child in its four elementary schools, one middle school, and one high school (Bay Point Central School District, 2014). The official launch of the program began in fall 2014 with a small-scale piloting of the digital conversion. In September 2015, all Bay Point students received a digital device. After one year of this one-to-one initiative, Bay Point teachers and administrators offered valuable insights into the barriers and facilitators of the programmatic implementation in K-12 schools.

Research Participants

The participants involved in this study included existing employees of the Bay Point Central School District. From grades K-5, fourteen teachers participated in focus groups. One focus group included teachers from one of the two primary schools (K-2). The second focus group included teachers from one of the two intermediate schools (grades 3-5). The target of six and eight participants, which is within the recommended range to produce substantive conversations in focus groups, was met (Onwuegbuzie, Dickinson, Leech, & Zoran, 2009).

Building administrators were also included in this study. Individual interviews occurred with a school principal from one of the primary-level buildings and one school principal from one of the intermediate schools. The separation of administrators and teachers was meant to avoid any potential conflicts from perceived power hierarchies. Alexander et al. (2014) employed this strategy when they conducted separate focus groups for nurses and doctors in a TDF-based study in a hospital. The separation produced more open conversations, allowing the researchers to more deeply understand the implementation issues (Alexander et al., 2014).

Instruments Used in Data Collection

The instruments employed in this study directly linked to the theoretical domains framework (TDF). The TDF is a validated, determinant framework that identifies potential barriers and facilitators to bringing an evidence-based program into use (Michie et al., 2005; Nilsen, 2015). The framework consists of 14 domains and 84 constructs that are anchored in behavior change and systems theories (Cane et al., 2012). The TDF has been shown to be a useful tool in guiding both researchers and implementers in the

implementation process in health care settings (Huijg et al., 2014). The gap in educational research that exists due to the lack of generalizable frameworks provided an opportunity to explore how a model such as the TDF was applied to a K-12 implementation process.

The questions used to gather data from teachers and administrators were open-ended in nature and developed by the researcher. The questions, anchored to the implementation process and informed by the TDF, were designed to elicit feedback from teachers and administrators. Focus group studies using the TDF have produced more revealing conversations about the implementation process (Alexander et al., 2014). The purpose of this nondirective approach was to create a vibrant dialogue that revealed insights into the barriers and facilitators to the implementation initiative (Brinkman & Kvale, 2015).

Before the start of the study, questions were pilot tested with teachers and administrators from a neighboring school district (Creswell, 2013). This school district was also implementing a one-to-one technology initiative, and the question topics were readily applicable to the pilot group. The feedback from the pilot allowed the researcher with the opportunity to enhance the questions so the focus groups could be more fruitful in producing rich qualitative data. Patey, Islam, Francis, Bryson, and Grimshaw (2012) employed this piloting approach to refine their TDF-anchored interview questions of surgeons' preoperative practices.

In addition to the focus groups and interviews, this study also included a document analysis of Bay Point's Digital Conversion implementation. During the implementation of a technology initiative in a K-12 setting, communication of the various aspects and stages of the plan should be frequent and varied (Ruedel, Brann, Gray, &

Zorfass, 2013). Bay Point created a specific website that served as the digital hub for the district's digital conversion documentation. The documents from this website used for the document review included a recap of the work that the district did prior to launch to prepare for the implementation, Bay Point's vision statement for the one-to-one initiative, the implementation plan that included the goals and benchmarks for the plan as stated by district office, descriptions of the professional learning utilized by the district, and details of the actual device deployment. These documents were reviewed and coded using the TDF. The purpose of examining these artifacts was to provide the opportunity for the triangulation of the responses of participants reported in the focus groups and interviews with the information found in the district documents (Leech & Onwuegbuzie, 2007).

Procedures for Data Analysis

Phillips et al. (2015) suggested that the design of the TDF allows for a rich, theory-based analysis of participants' reflections. Data from the transcripts of the three focus groups were analyzed using constant comparison analysis with a priori coding methods (Leech & Onwuegbuzie, 2007). The 14 domains of the TDF served as the primary categories (Cane et al., 2012). This deductive process of coding was conducted through a directed content analysis procedure. Utilizing the existing theoretical basis of the TDF, the directed approach provides a framework to extend the TDF beyond its current application in health sciences to the field of K-12 education (Hsieh & Shannon, 2005).

An inductive process was used to identify potential themes that cut across the three focus groups. This action occurred after the coding of the data from the separate focus groups based on the TDF domains. Alexander et al. (2014) used this strategy to

bring together coded data gathered from groups of nurses and doctors to provide a comprehensive understanding of the determinant factors for the implementation a research-based health screening tool for children. The study of the Healthy Kids Checklist (Alexander et al., 2014) revealed that the professionals were deficient in the TDF domains of knowledge and beliefs about capabilities. The designers of the checklist could redesign how they shared the checklist with medical professionals to improve how it was received and, ultimately, used (Alexander et al., 2014).

Additionally, data were collected and analyzed by reviewing the documentation that Bay Point developed to support their implementation. The themes that emerged from the documents were compared to the domains from the focus groups and interviews. Leech and Onwuegbuzie (2007) identified the process of triangulation with multiple forms of data as a critical step in legitimizing both the analysis and findings of qualitative research.

The establishment of procedures to ensure trustworthiness and validity were vital for this type of qualitative research (Creswell, 2013). This study employed the technique of inter-rater reliability to confirm that the data was an accurate representation of the implementation of technology initiative at Bay Point. The inter-rater reliability process provided what Marques and McCall (2007) referred to as “a powerful strategy” (p. 439) for qualitative research. For this study, the researcher worked with a colleague to review and code the same portion of the transcripts from the focus groups and interviews. The researcher and colleague independently coded the selected text using the a priori codes of the TDF. Periodically, the results of the coding were compared until there was

consistency in how the researcher and the colleague coded the text (Marques & McCall, 2007).

Steps were taken to maintain the confidentiality and protect the integrity of the responses provided by research participants. Information that could be used to identify the teachers or administrators based on their specific responses was removed to protect participant anonymity (Brinkman & Kvale, 2015). Additionally, the raw data files, transcripts, and field notes compiled during the research were stored on a password-protected external hard drive and will be retained for three years after the publication of this research. The hard drive is stored in a secure location within the researcher's home for further protection.

Procedures

1. Preliminary Steps
 - a. Obtained IRB approval from St. John Fisher College (Appendix A)
 - b. Finalized approval from Bay Point School District for the participation of their teachers and administrators in the study (Appendix B)
 - c. Worked with Bay Point School District to identify and recruit potential teachers and administrators to participate in the study
 - i. Sent e-mail (Appendix C) including the informed consent form (Appendix D) to interested teachers
 - ii. Sent e-mail (Appendix E) including the informed consent form (Appendix F) to interested administrators
2. Data Collection Preparation

- a. Piloted focus group questions with teachers (Appendix G) and administrators (Appendix H) from a different school district
 - b. Revised and finalized questions based on feedback from the pilots
3. Data Analysis
- a. Had recordings of the focus groups and interviews transcribed
 - b. Conducted inter-rater reliability process
 - c. Analyzed and coded transcripts of the focus group (Appendix I) and interviews (Appendix J) using a priori coding based on the TDF
 - d. Analyzed the focus group and interviews questions together using an inductive process to identify overlapping themes
 - e. Triangulated the data by analyzing Bay Point District documents relating to the district's plan to implement the digital conversion project and one-to-one initiative

Chapter Summary

The study of an upstate New York school district's one-to-one computer initiative provided an opportunity to learn more about the barriers and enablers that impact implementation in schools. Bringing about change through the implementation of evidence-based programs requires an in-depth understanding of the determinant factors that serve to either block or facilitate the process (Durand et al., 2015). The study conducted focus groups of teachers and administrators to gather valuable data on their experiences, as they worked through the technology implementation (Creswell, 2014). The application of the theoretical domains framework through a direct content analysis approach to the participants' responses provided a deeper, theoretical understanding of

the implementation process in schools. This information could prove valuable as researchers and practitioners seek to understand the determinants factors that influence the school-based change processes (Greenwood et al., 2003). Using the TDF in qualitative, focus-group-based studies has proven to be successful in investigations in the medical fields. Beyond health sciences, the TDF provides exciting possibilities to improve educators' practices in K-12 settings. A better understanding of how evidence-based programs are implemented in schools would help to ensure that schools meet the needs of the students that they serve.

Chapter 4 details the findings of this study. First, demographic data for the research participants is explored. Second, the chapter discusses each of the research questions through the lens of the one-to-one computer implementation at Bay Point. Third, the emergent TDF domains from the comments of the teachers and school principals are identified and explained. Fourth, a number of broader themes, separate from the TDF coding, are discussed. The findings from the review of district-created documents about the computer implementation are included, as well, finally, a summary of the findings of the study concludes the chapter.

Chapter 4: Findings

Introduction

The field of K-12 education, like many other public and private systems, is under increased scrutiny to ensure that the financial investment in schools produces benefits to society (O'Donnell, 2008). District-level leaders consider empirically proven programs to be important levers for student success in the classroom (Missett & Foster, 2015). However, the results of these programs in practice have proven to be uneven, as principals, teachers, and students struggle to replicate the achievement levels demonstrated in the clinical trials (Gilley et al., 2008). Program designers, educational researchers, and practitioners have increasingly turned to implementation science to explore the gap between research and practice in K-12 settings (Roblin et al., 2012).

Implementation science is a relatively new area of scientific exploration, having emerged as an organized field of inquiry in the 1990s (Fixsen et al. 2005). Domains such as medicine, health care, and business developed the earliest studies to explore the factors that impact an implementation process (O'Donnell, 2008). These explorations have led to the development of tested models that better explain how an evidence-based program is brought to bear in a business or medical setting. Educational researchers have had to turn to these fields because K-12 lacks valid and reliable frameworks to explain implementation in a school-setting (Century et al., 2010).

This study examined the barriers and enablers to the implementation of evidence-based programs in K-12 schools. The study utilized focus groups of teachers and

interviews of building principals from Bay Point Central School District to examine their experiences with the implementation of a one-to-one computer initiative in that school system. The responses from the focus groups and interviews were analyzed qualitatively using the theoretical domains framework (TDF) (Cane et al., 2012). The study was designed to answer the following questions:

1. What determinant factors (barriers and enablers) impact the extent to which teachers implement evidence-based programs with their students?
2. What actions do school leaders take to support teachers' implementation of evidence-based programs?
3. What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?

Cane et al. (2012) developed the theoretical domains framework (TDF) to be a theory-based, application-ready tool to identify implementation barriers and facilitators in medical settings (Cane et al., 2012). This study provided a unique opportunity to apply the TDF to an educational environment to better understand the barriers and facilitators of a school-based implementation (Durlak & Dupree, 2008). The gap in educational research that exists due to the lack of generalizable frameworks provided an opportunity to explore how a model such as the TDF could apply to a K-12 implementation process.

This chapter contains three sections. The chapter begins by reviewing the demographic information of the teachers and administrators that participated in the focus groups and interviews, respectively. The chapter then explores each research question through the lens of the one-to-one computer implementation at Bay Point. This section includes a general overview in which the TDF domains emerged as most frequently

identified by an analysis of the focus group and interview transcripts. An exploration of each research question occurs through a qualitative analysis of the teachers' and principals' dialogue during the focus groups and interviews. The most impactful TDF domains and broader, emerging themes are identified and explored. Bay Point created several documents about their digital conversion. A review of these is included, as applicable, to support and triangulate the data. A summary of the findings of the study concludes the chapter.

Demographics of Research Study Participants

At the time of the data collection, all the participants in this study were employed as either teachers or principals at one of the schools in the Bay Point Central School District. Before the start of the focus group and interview sessions, participants were asked to verbally provide basic demographic information, including their names, school level, and years of teaching experience. This information is presented in Table 4.1, with the names changed to pseudonyms to protect the identities of the participants. Participants were required to work in one of the four district's buildings that teach students from kindergarten to grade 5 to narrow the focus of the study. Bay Point has two primary-level schools that serve students from kindergarten to Grade 2 and two intermediate-level buildings that include students from Grades 3 to 5. Overall, staff from three of the four of Bay Point's eligible schools participated in the study. One of the focus groups included a mix of teachers from the two primary schools, while the other focus group included teachers from one intermediate school. One primary-level and one intermediate-level principal participated in individual interviews.

Table 4.1

Demographic Information for Focus Group Participants

Name	Position	Level	Years of Experience
Lydia	Teacher	Primary	3
Kathy	Teacher	Primary	10
Julie	Teacher	Primary	12
Alexis	Teacher	Primary	19
Madeline	Teacher	Primary	17
Nora	Teacher	Primary	12
Felicia	Teacher	Primary	3
Melissa	Teacher	Primary	11
Ellen	Teacher	Intermediate	13
Marie	Teacher	Intermediate	3
Brittany	Teacher	Intermediate	6
Nancy	Teacher	Intermediate	10
William	Teacher	Intermediate	25
Sarah	Teacher	Intermediate	19
Alan	Principal	Primary	11
Andrew	Principal	Intermediate	3

Data Analysis and Findings

The research design employed qualitative methods to arrive at the study's findings, with deductive and inductive approaches used. Constant comparison analysis (Leech & Onwuegbuzie, 2007) was conducted using the 14 domains identified by the theoretical domains framework (Cane et al., 2012) as the a priori codes. Transcripts of the participants' responses to the researcher-created focus group and interview questions were analyzed through the perspective of the TDF. Individual statements were first assigned one of the 14 TDF domains. Then, the domain was determined to be either a barrier or enabler based on the context of the comment. Due to the depth of some of the individual responses, some statements may have been coded with more than one domain. Table 4.2 shows the overall distribution of the domains, as either barriers or enablers, based on the analysis of the teacher' and principals' responses.

The TDF was designed to provide program designers and implementers with a research-based methodology to determine the factors that will most impact the implementation of an evidence-based program. As the implementation of a new program requires a practitioner to alter his or her practice, Cane et al. (2012) distilled 33 behavior change theories first into 12 domains and 114 constructs to form the TDF. The number of domains was increased to 14, and the constructs were reduced to 84 because of a rigorous validation process (Cane et al., 2012).

Table 4.2

Tally of Domains Identified as Barriers or Enablers

Theoretical Domain	<u>Barriers</u>			<u>Enablers</u>		
	Teachers	Principals	Total	Teachers	Principals	Total
Knowledge	13	1	14	2	0	2
Skills	10	2	12	17	1	18
Social/Professional Role and Identity	15	11	26	29	35	64
Beliefs about Capabilities	9	2	11	11	4	15
Optimism	9	4	13	7	2	9
Beliefs about Consequences	8	2	10	16	0	16
Reinforcement	1	0	1	6	0	6
Intentions	1	0	1	0	0	0
Goals	5	9	14	0	2	2
Memory Attention and Decision Processes	10	0	10	16	0	16
Environmental Context and Resources	32	16	48	28	31	59
Social Influences	9	1	10	18	17	35
Emotion	4	4	8	0	1	1
Behavioral Regulation	0	0	0	0	0	0
Overall Totals	126	52	178	143	92	235

Note. Refer to Appendix O for a full list of the domains and associated constructs.

Overall, the study participants found the system-wide deployment of devices to every student at Bay Point to be successful after one full-year. There were many positive comments from the teachers and principals about the path the district took and the impact the digital conversion had on students. Utilizing the TDF to analyze the transcripts more deeply revealed forces that both aided and detracted from implementation. As shown in Table 4.2, Environmental Context and Resources and Social/Professional Role and

Identity emerged as the most identified barriers to the one-to-one implementation at Bay Point. The same two domains, along with Social Influences, were most frequently referenced by teachers and principals as enablers for the implementation. It was determined that Behavioral Regulation was not identified as either a barrier or enabler and Intentions was not noted as an Enabler. While this study is not intended to be a quantitative analysis of the specific TDF domains, accounting for the domains that most frequently emerged as either barriers or enablers provided a starting point to then inductively identify broader themes aligned to the research questions.

Research question 1: results and analysis. *What determinant factors impact the extent to which teachers implement evidence-based programs with their students?* The primary purpose of this study was to determine the factors that make it easier or more difficult for teachers to implement evidence-based programs in their classrooms. An examination of the transcripts of the interviews and focus groups revealed several common influences affected the teachers' utilization of the one-to-one computer devices at Bay Point Central School District. Using the theoretical domains framework (Cane et al., 2012) as the framework for analysis, three domains emerged as the most influential for Bay Point's implementation. The domains of Environmental Context and Resources and Social/Professional Role and Identity were both barriers and enablers, while the domain of Social Influences served as an enabler. Exploring the influence of these domains on this implementation process provides deeper insight into how a new program is brought to bear in a K-12 setting.

Environmental context and resources as a barrier. During the focus groups and interviews, teachers and principals were asked broad questions to elicit their

impressions of the experiences of teachers during the first year of the one-to-one initiative. An analysis of the study participants' responses, when coded to the TDF domains, found that Environmental Context and Resources was most commonly referenced. Cane et al. (2012) associated constructs such as the material resources, an organization's climate or culture, and critical incidents to the Environmental Context domain. In analyzing the transcripts, responses that made references to topics such as the professional learning that was available throughout the implementation process, the management of the devices and applications used by students, and the specific devices students were using were coded as being an Environmental domain.

The most pressing Environmental barrier revealed by both teachers and principals centered on the adoption of the iPad for all students. Bay Point envisioned this device as a tool to be used to improve achievement and enhance the learning process. According to the district's Technology Plan (2014, p. 7),

every student will have the opportunity to use learning technologies to access and analyze information in ways that develop higher order thinking skills, increase their ability to use technology as a tool in solving problems, and support their confident use of the technology skills they will need for success in their future study and employment.

Though teachers and administrators were excited about the access their students would have to specific apps and the Internet, there were numerous concerns expressed about the device itself.

Study participants expressed the belief that the interactive nature of the tablets fit well with primary-level students' learning. However, teachers and principals from both

the primary and intermediate level wondered about the efficacy of an iPad as students progressed through their schooling. Alexis, a primary teacher and self-identified late adopter, conceptualized these concerns when she stated, “as our kids are getting older and growing up through the grades they're going to need computers to. . . create projects or do certain types of research that just can't be done on an iPad.” Intermediate-level teachers also openly questioned the iPad for their children. Brittany, an intermediate teacher, wondered “looking at [the choice of the device] for the older kids is it better to have a Chromebook?” Alan, a principal who was interviewed, echoed Alexis’s concerns, stating “we’ll need a more rigorous device that kids can actually work on and start doing the research.”

The actual management of the iPad devices was also shown to be an Environmental Context and Resource barrier for the one-to-one implementation at Bay Point. Teachers and principals consistently referenced challenges they faced related to the procurement and usage of iPads. Nancy, an intermediate-level teacher, who was part of the pilot program, was encouraged to try out as many apps as possible early on. However, as the number of apps in the district proliferated, the budget to purchase apps became increasingly limited. Reflecting on the progress of the one-to-one initiative regarding the availability of apps, she commented,

Four years ago, we had our pick of apps. . . . I got every single app I asked for. . . . now that there's a whole school and you want an app that costs money, any amount, it is really challenging to get it.

Alexis added “we have time to explore different apps. . .but there isn't funding for it. That can be frustrating sometimes because we can see the potential of where we could be going with iPads, but it's not always there financially.”

Teachers have attempted to work around the fiscal restraints levied by the limited funds available for apps by relying on free apps for their classroom use. They discovered that there are often limitations on the usage and functionality of the free versions that impact the effectiveness of the app for students. “These free apps are not all they're cracked up to be,” said Nancy. “After eight games they are done,” leaving teachers to merely say to their children, “sorry!” “You have to learn the tricks,” commented Julie, a primary teacher. She explained how she created a workaround for her students by having them use screen shots to capture the results of their online games and quizzes without having to register or pay. Though her students are often able to figure that trick out, Julie concluded “it’s little things like that that are frustrating.”

In addition to limits on how many times a student can use a free app, teachers discovered that these apps required students to submit an e-mail address for access. Many of the children primary-level did not have e-mail. Additionally, the settings on the district e-mail system restricted students from receiving messages from beyond the Bay Point network. When teachers did attempt to gain funds from district office to purchase an app, staff reported the approval process was confusing and seemingly always changing. Often building leaders were left unaware of teacher requests. Principals felt they were unable to support either the teachers or the district in making an informed decision about a request.

The teachers also reported that access to apps for students and parents at home became problematic. With the district investing heavily in technology for students to use

during the school day, teachers were unsure about the resources available to them once the children went home. As an experienced teacher who regularly communicated with parents via traditional weekly paper newsletters, Nora was concerned that some “parents don't have the tools to access that, or they don't have an email address, or they don't have a smart phone, it's hard because we're so technology based.” Felicia, a primary teacher, felt that parents were trying to be supportive, but the technology at home did not always align with what the students used in the classroom leading to confusion for families. She explained that one of her families struggled to put a classroom app onto a different tablet device. The parent, whom Felicia described as not being strong with technology, became frustrated with the process and the child was not able to use the software to extend his learning at home. One of Bay Point’s technology goals stated that the district would “support equitable access to high-quality learning technologies in the district’s schools to ensure that teachers, administrators, students, and families have equitable access to high-speed connectivity.” Julie summed up Bay Point’s progress with that objective in stating “It's not anyone's fault but if they [Bay Point parents] don't have the means, it's just what our district is. We can't provide Internet, and we can't provide iPhones and provide all that stuff.”

Environmental context and resources as an enabler. While the technical aspects of the one-to-one implementation provided Environmental barriers, the availability of professional learning for teachers was communicated by study participants as a strong Environmental enabler. The Bay Point Technology Plan stated that “courses will be provided to all district employees to ensure proper implementation of technology.” Based on the feedback from teachers and administrators, learning

opportunities for staff were varied and plentiful. Participants described a wide-range of experiences for teachers designed to expand their knowledge and usage of their specific devices. Traditional in-service learning occurred at district-wide conferences, or School Improvement Days as they were referred to in Bay Point. Melissa, a primary-level teacher with over ten years in the district, commented, “there's been a lot of PD (professional development) around the iPads as well over the last three years, which I think has been a great strength in the district.”

Even before the full-scale implementation of the one-to-one initiative, Bay Point began to phase in the usage of digital devices in classrooms. A small number of teachers from each school were selected to try out iPads in their classrooms two years before their colleagues. Jen, one of the teachers in the pilot program, suggested that their early learning was much less organized and more experiential. Melissa, who also participated in the pilot, stated “I don't think they were fully prepared for the success of it . . . it (enthusiasm for the iPads) grew enormously very quickly. Two years later the whole district had iPads.” Jen added, “in the beginning it was really just trying to feel people out, and then it just exploded with interest and excitement.” Buoyed by this enthusiasm among the staff, Bay Point offered greater access to devices and learning for teachers. The early adopters served as role models and building-level coaches, as teacher and student usage expanded.

As the district came closer to the first full year of the one-to-one adoption, Bay Point chose to turn to outside vendors to support the learning necessary to bring all the staff up to speed. Teachers who participated in these sessions, while appreciating the chance to learn about the technology, found the design and delivery of the instruction

problematic. According to Madeline, the trainings leading up to the full adoption were not fulfilling. Teachers would “go to trainings, and we get trained by people from . . . other places. That can be frustrating sometimes because we can see the potential of where we could be going with iPads,” while external trainers could not. Teachers felt that these whole-group learnings often provided a one-size fits all solution that was not differentiated to the needs of the individual staff members.

In accordance with its technology plan that called for courses “based on feedback and surveys, and . . . tailored for teachers,” Bay Point adeptly adjusted its approach to professional learning. Rather than relying exclusively on external trainers, the district turned to building-level staff and the early adopters to support teacher learning. Teachers from both focus groups noted that they appreciated the change in course and the opportunity to learn from their grade-level colleagues. The district funded the creation of on-site technology coaches to help teachers plan and deliver iPad-related lessons to their students. “If there was something I wanted I told Jan [a technology specialist] I want you to teach this,” remarked Lydia, a primary teacher, when speaking of how she utilized the coaching. The following exchange between primary teachers Madeline, Kathy, and Alexis demonstrated the teachers’ overall feeling about Bay Point’s professional learning opportunities -

Madeline: I think they relied heavily on the teachers who piloted to help the rest of us.

Kathy: They did, and that's why they ramped up the PD and they've done a really nice job ramping up the PD to make up for how quickly we've implemented it.

Madeline: I know last year, I was in Kindergarten last year. One of our K teachers was a pilot teacher. She helped the other five of us. How do we put an app on the iPad? We all sat together, and she showed us how to do it, and we all did it. . . I don't think there were too many hiccups except how do I get an app. That took me a while to figure out. Who do I contact? What is that process?

Alexis: We went to a lot of training. A lot of PD and a lot of training.

The principals also commented on the type of professional learning and how they supported their teachers in their buildings. Andrew, one of Bay Point's principals, created a small team of teachers, including some who were not in the pilot group, to help design professional learning in his building. The purpose of this leadership cadre was first to gauge and then grow his teachers' capacity with digital devices. Alan discussed how he helped to promote the "power hours" in his building, which were teacher-led after-school unstructured learning opportunities. The district also organized a summer professional learning called Digifest. Held just prior to the start of the school year, Digifest consisted of a full-day of teacher-led professional learning opportunities. Both the power hours and Digifest were referenced in all focus groups and interviews as a positive feature of Bay Point's support of teacher learning.

Social role/professional role and identity as a barrier. Like the Environmental Context and Resources, Social Role/Professional Role and Identity was a domain that appeared to serve as both a barrier and enabler in the Bay Point's technology implementation. Constructs such as professional identity, professional role, professional confidence, leadership, and organizational commitment are most closely associated with Social/Professional Role (Cane et al., 2012). In an analysis of the transcripts for this

study, the Social/Professional Role was identified when teachers or principals referenced the role of the teacher in managing the classroom experience for themselves and their students, the expectations for staff in facilitating Bay Point's implementation processes, and the attitudes of teachers toward each other during the early stages of the one-to-one initiative.

Educators' sense of efficacy during a new initiative is a critical barometer in marking the progress of a change process (Abernathy-Dyer et al., 2013). During the one-to-one implementation, Bay Point teachers and principals identified the lack of influence over their environs as a barrier. The teachers often referred to the sense of losing control over critical decisions that they normally would have made in their classrooms. Teachers lamented their perceived loss of the ability to select and manage the tools for learning in their classroom. They also identified a lack of power in governing the procedures that governed student interactions with their devices. As previously noted, the teachers felt that the selection of the iPad was made without their input or consultation. Not only did that issue come to the fore related to the resource itself, but also as it related to the teachers' role in deciding what should be used to teach their children.

Intermediate-level teachers expressed frustration in how the device limited their instruction. Ellen, an intermediate teacher, noted the constraints of the iPad for research and how the grade-level curriculum had to be altered to align to the limitations of the device. William, also an intermediate teacher, reported "It frustrates me that we can't do so much through the iPad. We have to be on the desktop to do so many things related to the iPad." Another intermediate teacher, Marie, seemed resigned to the fact that teachers held little influence over their work. She said, "they've (the district office staff) decided,

‘well we're going to pick and we'll all use the same ones for now.’ Maybe in the next coming years, it could be more of an individual choice. Who knows?”

Teachers also mentioned the lack of control they felt over classroom management directly connected to the devices. Numerous intermediate-level teachers desired enforced building-wide policies forbidding the downloading of games by students. Some staff felt as though they had the power to make such a decision within their classrooms if there was not a consistent message being communicated by the principal. Brittany summed up her colleagues’ frustration in stating, “I think the one thing is that I've felt like we never had a school wide policy on the whole game thing on the iPad and it's caused so many issues.” The inconsistency was causing conflict between parents and teachers, with her continuing, “I know teachers that have had parents coming at them because their kid can't have games and their other kid can so that's the one thing.” Ellen added that teachers had different policies, which made it challenging for her to establish her expectations for game usage in her classroom. Similarly, Nancy, who provided technical support for her colleagues from her teacher role, found it difficult to explain to children in one class why they had their games removed while their friends in another class did not.

Bay Point teachers also struggled during the initial stages of the initiative to examine their own practices or embrace the changes being put forward by colleagues who were the early adopters. Both primary and intermediate-level pilot teachers reported feeling ostracized by their fellow teachers as they embarked on the one-to-one journey. William, who participated in the pilot, was asked to describe how the interactions he had with colleagues in his school during the pilot year. He stated, “I don’t know if I can repeat it.” “I was called a lot of names,” agreed Nancy. The pilot experience, as described

by Nancy, challenged the teachers' traditional view of the classroom, considering the ever-changing technology, she explained,

We literally were paving the way, when you think of just that vision of plowing the road, we were doing that and we were making every mistake, and the classroom management was atrocious, and I often felt like what am I doing? This is awful. Everything took five times longer than if I had just used paper and pencil. It was very, very frustrating.

William added to Nancy's analogy of creating a new path in describing his experience being a teacher who used the new technology in his classroom. He stated, "You had your front runners, and I have always felt that we never get to reap the benefit of a paved road. It's always plow, plow, plow."

Social role/professional role and identity as an enabler. The Social Role/Identity domain also appeared to be an enabler for the one-to-one computer implementation at Bay Point. Whereas the pilot teachers described an experience in which they felt isolated from their peers, the teachers who were part of the later district-wide adoption reported a growing sense of collaboration among the faculty. By having a common area of focus, the technology brought staff together to share their ideas and even their lack of knowledge. Teachers reported that they were willing to ask each other questions, try new instructional techniques, and even show vulnerability to their colleagues and students. Lydia, a primary teacher, shared, "one of our K teachers was a pilot teacher. She helped the other five of us. . . . We all sat together, and she showed us how to do it [load apps onto the iPad], and we all did it." Alan, a primary-level principal, in summarizing this transition said, "I really feel I would characterize it as teachers

working with other teachers. I'm just thinking of a couple of situations where we had teachers in this process who were really opposed, in time, are now some of my strongest.”

Nora, another primary teacher, admitted, “I needed to see how is this going to help me. How is this going to make me work smarter not harder?” Once she could see the benefits of the devices, she thought differently about how she could help to support her students’ reading skills. “I finally get excited about it because I realize if there is a more efficient way to differentiate if I do have all of these electronic books at my fingertips,” Nora reflected in thinking about what helped change her approach.

Not all teachers were ready to abandon traditional books. Alexis, the 19-year primary-level veteran, was emphatic in declaring, “I told [the principal], ‘the day you tell me there's no paper in my classroom is the day I quit.’ . . . That's one of my biggest fears is that we're eventually heading towards total digital, but these are little kids.”

Conversely, Felicia felt that the iPads expanded student learning opportunities, reporting “that's been an eye opener for me, so if I don't get to every reading group they can all do their own reading group. It's not the same, but they're all reading still.” “That was a nice thing too about Razz kids and the books that are already on the iPads. I'm not going to the book room as much as I did previously. . . it's all right here digitally,” added Lydia.

The ability to differentiate their instruction with the technology was eye opening for the teachers. According to Lydia, “they're all doing different things on their iPad. They might be in a different spot. You might all start out at the same spot, but I work faster than you. . . They're doing their own thing,” “This has helped me differentiate because I have kids that can write a storybook, and then I have kids just working on

letters,” Melissa, the special education teacher replied, “so they can all be doing the same, all being on an iPad, but they're all doing something different that meets their needs.”

Teachers reported that there was more of a willingness to think differently about themselves as having to always be in control of student learning or even content experts. Madeline described what she saw occur in her grade 1 classroom, “They're more open to technology than we are. They'll try anything. . . I have some kids who are doing research during free time because they want to.” Brittany explained how she was willing to let her students leverage their expertise to teach their peers the technology,

I became very good at finding one kid who could do what I was trying to do and they saying, ‘Now you're going to go around and help people.’ Then I would kind of follow him around and watch what they were doing and just say, ‘Oh, good.

Yeah, you're doing it right, keep going.’

Nancy, who coached her colleagues in their technology skill development, noted, “every year it's getting a little bit better. You really need people who are willing to say, ‘Oh, my gosh. I've messed up.’” Brittany added, “I didn't care if I made a mistake. I didn't go in and worry about if I was perfect.” Lisa, an intermediate teacher, revealed, “fail forward kind of became our motto.”

Social influences as an enabler. The analysis of the data also revealed the Social Influences domain emerged as one of the TDF Domains that was an enabler for implementation of the evidence-based one-to-one initiative at Bay Point. Closely related to Social Role, Social Influences constructs include social norms, social support, social pressure, and modeling (Cane et al., 2012). Explicit references to the impact of collegiality, the influences colleagues had on each other’s work, or the role that a

principal might have in shaping teacher practice were identified as aligning to the Social Influences domain.

In a broad sense, the participants in the study were complimentary of the social and professional culture that had emerged in Bay Point because of the technology initiative. Teachers spoke of how they relied on each other for support as they worked through the adoption of the iPads into their classrooms. Non-pilot teachers expressed gratitude for the more experienced practitioners' willingness to share their expertise. This contrasted with the resistance pilot teachers stated that they felt from their peers early in the implementation process. Madeline, in explaining how she relied on a colleague who was in the pilot group, said, "she showed us how she manages everything. It was very helpful." Felicia, who worked in a co-teaching setting with a teacher from the pilot, shared that she often asked her co-teacher to demonstrate how she used a specific app. Felicia also receives support from her partner from the previous year, stating, "I went in to help her class so I could learn SeeSaw. I'm often calling her like, 'hey tech support, come visit.'" Per Lydia, "I think we also have each other's backs. So, if someone comes to me, and they see what I do and they don't know how to try it, we'll help them."

Both principals interviewed discussed how the cultures in their buildings, due to the positive social pressures and supports, had improved. In explaining the transformation of his building Alan said, "there was a group of people who are like, 'I hope I retire before this becomes full implementation.'" A few years after the adoption, the "old guard," as Alan referred to them as, had either moved on or embraced the technology. He observed teachers who were otherwise averse to change willing to open their doors to others and try the new approaches.

Andrew explained similar circumstances of increased collegiality in the building where he was principal. He explained that it was not uncommon for teachers to “watch a[nother] colleague teach. They don't offer criticism or anything. I just feel like when I came [two years before], that would not have happened.” Andrew added, “the fact that they are opening their doors and letting someone come in and see their works is kind of remarkable to me.”

Bay Point's students also helped to precipitate the teachers' embracing of the new technology. According to Alan, teachers in his school felt “a pressure from the children that there's a desire and a willingness and a skill that they have to be able to use technology. That's naturally kind of forcing people to embrace it.” During his interview, Andrew also commented on the positive force students have played at his building. “I can't think of one person who's resisting the iPad now,” said Andrew, “and mostly it's because their kids have an expectation they're going to be doing it.” Teachers were feeling the pressure from their colleagues, their principals, and the students to use the devices. Professionals could work within a safe and forgiving context, helping spur more usage and exploration

Bay Point stated in its documents that a key indicator of a successful implementation of a one-to-one device initiative would be the development of a positive culture in the district. The district acknowledged the value of fostering collaboration when reflecting upon the research that it engaged in before the launch of the initiative. On Bay Point's website, one page is dedicated to describing the district's multi-year implementation process from inception to actualization. Early on in this process, Bay Point leaders visited sought out model one-to-one districts from across the

United States. After a visit to a well-renowned district, Bay Point's leaders stated they, "went to see their technology integration, and left talking about their culture." Bay Point's senior leadership team at the district-level was impressed by their host district's focus on openness and sharing among colleagues in all the buildings. The collegial culture that was envisioned for Bay Point, was beginning to be actualized. Melissa, a primary-level teacher, summarized the culture in her building best in saying "people who I, quite honestly, thought were never ever going to touch the technology are using it daily and using it regularly and loving it because there's this culture of just try one new thing."

The study of Bay Point's one-to-one computer initiative revealed several barriers and enablers. An analysis of the transcripts for the focus groups of teachers and interviews with principals identified a certain of key domains from the theoretical domains framework (Cane et al., 2012) that impacted the implementation. Environmental Context and Resources and Social/Professional Role and Identity were two domains that figured prominently, both in limiting and assisting the implementation. Social Influences was determined to be a domain that aided in Bay Point's project coming to fruition.

Research question 2: results and analysis. *What actions do school leaders take to support teachers' implementation of evidence-based programs?* The second research question was designed to explore the specific leadership actions taken by the principals in Bay Point with the district's one-to-one initiative. The secondary purpose of this research question was to explore the role leadership played in producing enablers for implementation, as identified by the theoretical domains framework (TDF) (Cane et al., 2012). Coding the specific actions taken by principals during the district's first year of their computer device program to the TDF, building leaders most directly enabled the

teachers' domains of Environmental Context and Resources and Social Influences. The principals led a successful digital conversion in Bay Point's schools by building cultures of collaboration and supporting teachers with materials and training.

The principal's role in enabling the Environmental Context and Resources domain. As previously discussed, the Environmental Context domain was shown to be the most prominent of the domains, as both a barrier and enabler, in Bay Point's one-to-one device implementation. During the interviews with two of the principals, both spoke of specific actions they took to support their faculties during this process. The teachers, during the focus groups, could provide corroborating, and in some cases additional, evidence to support the leadership practices utilized by their principals in building the environment for a successful implementation.

The Environmental Context domain includes constructs such as environmental stressors, critical incidents, and person-to-environment interactions. Much of what was discussed during the focus groups and interviews related to the environmental context centered on the principal's role in establishing the organizational culture/climate. The climate in schools that was included in the study of Bay Point's one-to-one implementation seemed to be evolving because of the initiative. Teachers and principals both openly spoke about how teachers showed more interest in sharing their ideas, collaborating to improve their instruction, and eagerly seeking colleagues to observe.

Both principals spoke of the transformation in their buildings from isolated and individualized teacher behaviors to more professionally inclusive staff interactions. The two leaders talked about how they attempted to cultivate more collegiality in their buildings. Alan explained how he regularly built in time for teachers to share their latest

lessons or technology innovations during faculty meetings. He saw this sharing as serving two purposes. First, he wanted to celebrate the teacher's growth with the iPads. Second, Alan wished to stimulate conversations amongst his staff about how to better utilize the new technology in their classrooms. He worked to ensure that all the meetings he organized included a technology component, either by working off a shared Google document, producing dynamic data displays, or by having teachers share their children's work electronically. In describing his approach, Alan said "I think it's been celebrating the things that teachers are doing and really making sure that we've got as many different avenues as we do to let other teachers know what other grade levels are doing" Ultimately, for Alan, it was about ensuring that various stakeholders could contribute positively to the culture in the building. "When visitors have come to our building and said, 'Wow. You've got a really nice building,' I hope that it reflects my positive attitude," Alan added, to further describe the role he played as a leader to build the culture.

Andrew explained that he regularly attempted to utilize new technologies at his faculty meetings and with his communication methods to teachers and families. He often went to technology workshops that were also attended by staff at his school. Andrew made it a point to follow up those learning sessions by publicly applying out his new skills. He wanted teachers to see his progress. The principal wanted teachers to recognize how important it was to try new instructional approaches, even if the educators had not mastered the skill. In describing an upcoming faculty meeting, Andrew shared that he would "model inquiry," through explicitly using the technology. His plan was to showcase how some teams enhanced their data analysis using some new tools they

learned about. Unlike Alan, who was principal in his building for over ten years prior to the one-to-one initiative, Andrew was only in his third year. For Andrew, his focus was on building culture from the classroom level out, by centering his leadership on how teachers engaged their students during instructional time.

Teachers in both buildings provided evidence that supported the roles their principals took to enable the Environmental Context domain. In the school where Alan was the principal, teachers referenced his attempts at building a culture where staff felt open to learning new skills and techniques from each other. “It’s always easy to look back and think of how you would change things and how you would more strategically implement,” reflected a teacher’s in Alan’s building, “but in the beginning, it was really just trying to feel people out, and then it just exploded with interest and excitement.” Another teacher added, “they recognized that it’s a process and not everything is going to be perfect. I feel like if I can, not necessarily fail, but if I can have it not go as planned for her [the principal] then it can go that way for everyone.” Alan worked to build a culture for teachers that provided opportunities for teachers to learn from each other. Melissa recalled, “I said, ‘I need someone to teach me this and teach my class.’ He said ‘okay.’” Alan worked to provide the coverage necessary so that the teachers would open their doors to each other and learn from one another in a positive and supportive environment.

Teachers in Andrew’s school spoke of how Andrew’s leadership helped to change their instructional practices. One teacher spoke of the trepidation that staff felt before the first full year of the one-to-one implementation. She relayed how Andrew used the contents of his “welcome back” letter to staff as a platform to allay those concerns. He wanted to help teachers focus on their learning process productively. Per this teacher, the

letter said something to the effect of, “we have to move away from I don't do technology to holy crap I totally screwed that up because I tried technology.” Upon reflection, this teacher reported the impact of that message, saying “once we had permission for that I kind of went, ‘I could screw up. I could do that.’” That changed my [mindset], that shift to say ‘yeah, this totally bombed.’”

Nancy, who emerged as a leader in her building, related how Andrew often reminded her how to help teachers see the connections with the technology and instruction. Nancy shared, “for me, he's always pushing me. . . to use time embedded that we already have because we're stretched to the max.” Rather than add more time commitments for teachers, Andrew asked Nancy, ““How can you use your Professional Learning Community meetings to start organically implementing technology?”” Through Andrew’s leadership and his focus on instructional practices, the culture in the building was changing. Nancy concluded that with Andrew’s support, she shared with colleagues how her instruction has changed. She felt that her fellow teachers were more willing to “jump on board,” even those who previously were “more reluctant.”

The principal’s role in enabling the Social Influences domain. The role of the principals in Bay Point’s one-to-one implementation cultivated more open, collaborative, and instructional risk taking environments. In enabling the Environmental domain, both principals created the structures and conditions that supported the development of positive Social Influences in their schools. Constructs such as social norms, power, and modeling surface when considering the Social Influences domain. Principals from two of Bay Point’s schools developed ways to leverage the social constructs within the schools

to promote the successful implementation of the technology initiative and, ultimately, positive change.

For both principals, teachers recognized the roles their leaders played in modeling the expectations for the staff, related to technology utilization. Nora observed “I think our principal [Alan] has tried to lead by example. . . he hasn't always been successful, but he's tried.” The principal impressed the teachers with his willingness to try the new technologies. “[The modeling] has been nice as far as that leadership piece goes. More of an ‘I'm doing it too,’” Nora concluded. Julie agreed that her principal also been “trying new things.” The principal attended the trainings and communicated her willingness to learn, with Julie sharing the principal told her faculty, “I don't know everything. I'm not going to be perfect with technology all the time.” In Julie’s opinion, the flexible thinking sent the message to staff that, “you're going to mess up, we're going to mess up as a team. Everyone will mess up. You just learn from it and move on. We're all learning together, basically.”

Andrew regularly demonstrated his own learning and development for the faculty hoping that they could learn from his own technical evolution. The modeling of the building leader promoted a spirit of innovation in the school. In Brittany’s assessment of Andrew’s beliefs, “there's an expectation to use the technology but he doesn't prescribe what and how much and what it should look like and you should be like this person.” Andrew leveraged the formal observation portion of the teacher evaluation process to forward the purposeful use of computer devices. He expected teachers to design lessons to utilize technology to enhance student learning. However, teachers recognized, “there's no judgment, he just knows that you are where you are and he's happy to see that.”

Andrew acknowledged that the one-to-one implementation required him to support teachers' development with positive reinforcement and encouragement. In so doing, the teachers appreciated the philosophy Andrew has adopted. "It's the freedom of doing things without feeling judged too," Brittany shares, "I don't feel like I'm under the microscope to see if I'm using it or not."

In addition to the modeling that the principals have undertaken, they also have worked to further enable the Social Influences domain by empowering their teachers. Both school leaders acknowledged that the district was not always inclusive in providing a voice for teachers when it came to major policy and program changes. Alan observed that over his eleven years as a principal, the teachers "don't have input into the things that we [district administrators] should logically get their input from, and that's across the board." This lack of collaboration created a disconnect between the administration's vision for the district and the staff's ability to actualize that vision. Alan stated that regularly shared with central office staff that they needed to be more inclusive to determine how to move the district forward. As the one-to-one initiative began to take hold during the first year, he finally heard district leaders say, "We've got to get teachers involved."

The shift to more empowerment of the teachers was palpable. One teacher reported that she noticed an expanded role for teachers "later in the implementation, it wasn't in the early stages." She did say that she "feel[s] like they're listening more now in a way than they did in the beginning." Other teachers stated that district leadership made an increasing effort to reach out to the teachers' association, to ensure that Bay Point could count on union support for the device adoption. Based on feedback from the

teachers' union, "they [the district leadership] went to things like the power hours where the teachers are leading the PD and people identified in the buildings. They got those ideas from talking to other teachers." In speaking about how he has worked to empower his teacher, Alan suggested that he could not, "think of a person that's asked for an experience or something that they haven't gotten."

Andrew discussed how he attempted to build leadership structures within his building. He provided the teachers more of a voice with many of the decisions that impacted the school. Andrew established a leadership body consisting of grade-level teacher leaders. In addition to being a forum to discuss key topics with the iPad implementation, the teacher leader group also served as a two-way communication vehicle with the faculty. Andrew explained to the grade-level leaders the valuable role that would they play in the technology initiative. He reminded the teachers that they had, "instructional power in the building" and how he needed their assistance, "to help move this forward." There was reticence from the leaders to share openly early on. However, Andrew stated the team made progress, as the digital conversion took hold. Andrew discussed the noticeable progress made and shared, "for the first time I have new people who are part of my cabinet. I feel like they want to help create, mold, shape, and inform," their colleagues.

Andrew has also been able to empower the teacher-on-special-assignment to provide an additional communication pathway for teachers. As a principal, Andrew acknowledged he was not a "touchy, feely guy." Nancy, however, built strong bonds with her peers. Many staff members feel comfortable confiding in Nancy, despite not being comfortable enough with Andrew to expose their instructional limitations. "Nancy has

been critical,” in helping Andrew, “know exactly how people are feeling.” He did wonder why “this group of faculty is afraid to tell me if they're fearful or disagree with something.” He valued Nancy’s willingness to provide a buffer, while the teachers got to their principal better. Andrew summarized the state of his school’s implementation process. He noted a, “hum going on with people's comfort level with iPads. The attitudes around them I feel like keep getting more positive.”

While the teachers spoke openly about the role of the principals during Bay Point’s digital conversion, a review of the district’s documents did not reveal a specified role for building level leaders during the implementation. Though they lacked guidance on their responsibilities, the principals took concrete steps to support their teachers’ implementation efforts. These actions built positive cultures where teachers were willing to take risks, collaborate, and openly share knowledge. The principals were integral to Bay Point’s early successes, even if the district failed to consider the potential contributions of the local leaders.

Research question 3: results and analysis. *What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?* The third research question aimed at highlighting the connections between the factors that impact an implementation for teachers and the role school leaders play in aiding practitioners through this process. In looking specifically at the comparisons of the identified codes to similar questions posed to the teachers and principals during data collection, there were several areas where alignment emerged. As shown in Table 4.2, the analysis of the focus groups and interviews revealed that the TDF domains of Social/Professional Role and Identity and Environmental Context and Resources figured

prominently as barriers and enablers. While the TDF provided the basis for the initial constant comparison analysis (Leech & Onwuegbuzie, 2007), responding to the third research question provided the opportunity for a more inductive approach. Two themes came to light for both administrators and classroom practitioners.

The first theme, “our principal leads by example” reflected the impact that building leaders had on promoting school cultures that encouraged teacher exploration and instructional risk-taking with the computer technology. The second theme, “plow, plow, plow,” demonstrated the effort expended by building-level personnel to bring the district’s one-to-one initiative to fruition. A perception was expressed by teachers and principals that key decisions during the implementation process were often made absent of input from teachers. Not having a say left teachers and principals with the task of pushing forward an initiative that was often absent of their voice and devoid of their input.

“Our principal leads by example.” As stated in district-documents found on its website, Bay Point took a measured approach to reach its goal of one computer device for each student in the district. In exploring the role of the principals in Bay Point’s implementation of the one-to-one initiative, the teachers appreciated the specific actions principals took to ensure that the new initiative was embraced by the staff. Though the constructs of implementation science in K-12 education are still evolving, research has identified leadership as an important factor in the successful implementation of an initiative. Bertram et al. (2011) and the National Implementation Research Network identified the role of institutional leadership as one of its drivers for its implementation

model. Aarons et al. (2014) reported that leadership style influenced the successful implementation of a school-based initiative.

Teachers in both focus groups identified times where their principals, both in words and actions, recognized and appreciated the challenges teachers faced with altering their pedagogical approaches. Teachers referred to statements by their principals that were meant to lower the concern level of the practitioners as they worked to make these changes in practice. Paraphrasing her principal, a primary-level teacher stated that the building leader told the staff,

I don't know everything. I'm not going to be perfect with technology all the time. You're going to mess up, we're going to mess up as a team. Everyone will mess up. You just learn from it and move on. We're all learning together, basically.

In assessing the impact this message from her principal had on her colleagues, the teacher stated, "I think that's a good example for everyone to notice that you don't have to be perfect with the technology."

For the first year of its digital conversion, Bay Point took a measured approach with teachers in introducing the digital technologies that would be available to improve student learning (Bay Point Central School District, 2017). An intermediate-level teacher provided a specific example of how her principal allowed her to embark on a more gradual utilization of the computer devices in her classroom. She stated that the principal,

literally gave me permission at the beginning of last year because I was feeling so wrong to back off of it for a little while. He could see that it was freaking me out

so he was like, "Okay, what can we let go for a little while? The iPads are freaking you out, let's put that aside for a minute."

Study participants echoed similar examples of their principals being responsive and flexible in addressing specific teacher needs. Nancy, an intermediate teacher who was known in her building as having strong technical skills, shared that she made frequent mistakes while teaching students with the iPads. She told her colleagues that her lessons sometimes did not go as planned due to technical glitches. However, she "didn't get fired . . . didn't get yelled at [by her principal]. . .when she messed up big time," with the technology. She never feared that her professional credibility would be called into question by her principal and she hoped that her colleagues would see that her administrator, "always backed her up."

During the interviews, both principals spoke of the specific actions they took to create the culture that supported their teachers' level of exploration. Alan saw that one of his responsibilities was to serve as a "cheerleader [and] promote" the early accomplishments of the teachers. He also felt the need to act as a "model for what [the district] wants," to occur because of Bay Point's digital conversion. Alan took it upon himself to learn the new programs and apps that could be useful for his teachers. He regularly shared his learning with the staff during small-group, grade-level, and full faculty meetings. Alan created digital documents to be used during these meetings to promote collaboration. Incorporating the interactive documentation had the dual effect of teaching a useful computer-based tool to staff and creating "a living document" so meeting notes were not "just a conversation where one person records." Most importantly, in his view, he encouraged teachers to change their thinking about

technology usage during instruction. Teachers became less concerned with putting on a show for the administration and more focused on using the devices to promote their students' learning. He started to ask teachers to think about what the students, "are actually doing, whether I'm there or not."

Andrew, during his interview, provided numerous examples of his attempts to serve as a role model with the technology in the building where he is principal. Like Alan, Andrew felt it was critical that he be willing to embrace technology in his communications with the staff and parents. Andrew became principal just as the one-to-one initiative was taking hold in Bay Point. He recognized his prior experiences with computer technology were limited and created an early challenge for him. Andrew admitted that, "it was a little intimidating coming here," due to the lack of technology resources in his previous school. The district that he previously worked for "had a SMART Board in every classroom and a computer lab. That was kind of the extent of our technology."

During his first year at Bay Point, more than half of his staff were teachers participating in the iPad pilot. Ten classrooms had devices for every student and Andrew realized that he had much to learn. One of Andrew's leadership strategies was to acknowledge that he did not always, "have to know the answer." There were, "plenty of times with this initiative" that he "ask[ed] for some time to figure it out." Andrew stated he always followed up with that staff member once he discovered the answer. This tactic helped to lower some of the pressure on him as a new principal, allowing him to gain respect from the school community.

In addition to regularly using meeting time to showcase the newest programs to the teachers, Andrew has worked to empower the teacher leaders in his building to take on an active role in the implementation. In his words, he “regularly throws Nancy,” a technology guru in the building, “under the bus.” Andrew often requested Nancy to demonstrate a new app or offer to co-teach a lesson with a colleague. He used monthly meetings with the teacher leaders from every grade-level to share the latest developments in the initiative from district office. Andrew also asked the leaders to provide updates to their groups on the latest ways that the grade-levels were incorporating the computer devices into the instruction. He found the sharing beneficial for not only the other teacher leaders, but also for his own technical knowledge. As someone who “gets lost in a big PD,” Andrew preferred to learn by “watching one of the teachers doing something meaningful,” and then using that program directly himself during a meeting or in a communication.

The willingness to be both learners and doers with the technology endeared the principals of Bay Point to the teachers who participated in the study. The teachers spoke of the principals’ willingness to provide an environment that promoted instructional risk-taking with the new technology. For their part, the principals spoke of the key position that they played in Bay Point’s technology transformation. They recognized that they were charged with managing the day-to-day operations of a school building while supporting the professional needs of the faculty they were leading. Through the first year of the full one-to-one implementation, teachers and principals spoke positively of the experience. However, additional investigation of the transcripts revealed an underlying theme that, had the principals not intervened, could have derailed the implementation.

“Plow, plow, plow!” During one of the focus groups, William, a teacher who participated in the iPad pilot program at Bay Point, stated that he was feeling burned-out from his experiences being an early-adopter in his building. He acknowledged that being a trailblazer had its benefits, including having access to the newest technology and most up to date classroom materials in the school. Upon reflection, William felt that Bay Point did not do enough to continue to support him. He explained how the teachers in the pilot program were largely responsible for working through the early challenges with the one-to-one implementation. Bay Point’s successes could be attributed, in large part, to these teachers’ trials and tribulations. William, “always felt that we [the early adopters] never get to reap the benefit of a paved road.” Ultimately, he saw the work as thankless and tiresome because, for him and his colleagues, “it’s always plow, plow, plow.” Though William was characterizing difficulties specific to being an early adopter, the statement “plow, plow, plow” also captured some underlying feelings that emerged from the other study participants.

Throughout the focus groups and interviews, teachers and principals were willing to share that they considered the early stages of the one-to-one initiative to be successful. Nancy, an intermediate teacher, stated, “I think we’re fortunate in working together,” with the rest of the teachers in the group nodding in approval. In celebrating her fellow Bay Point staff members’ accomplishments, Nancy said they were a “shining example,” of, “just how much in even one year people can come.” However, teachers and administrators suggested that there was clear detachment from the decision-making processes with many aspects of this implementation. Both teachers and principals

reported that district-level administrators alone made the critical decisions for this initiative.

William's analogy of "plowing" connected more broadly to the teachers' and principals' experiences. There was a sense among building-level staff that they were left making a path without a clear sense of direction or ownership over the implementation of the one-to-one initiative. Alan lamented, "one of the concerns early on is that [district administrators] were making decisions that impact[ed] daily life in schools, and you don't have anyone who lives a daily life in a school on your committee." As teachers actualized the district office initiative, principals served as a buffer to ensure a successful process. "From a [building] leadership perspective," Andrew indicated, this "required a delicate balance of leading the vision and then managing the minutiae." For Alan, he felt his role was,

to anticipate how it's going to be communicated through the district and then through each of the buildings. I think ... I'll be speaking on behalf of the other principals. . . that's where we felt we were directed: "This is what it is. Make it happen."

Principals needed to make sense of the directives from district office and communicate a positive message to the teachers in their building.

The review of district documents for the study revealed that Bay Point's stated expectation during the first year of the implementation was that all teachers would merely utilize Schoology, a district-wide information management system. When asked about the messages teachers were sent about classroom iPad usage during the first year, Marie commented, "you were supposed to be using Schoology, that was the one mandated

program.” “Here's your iPads, use them,” Sarah said, adding, “that was what I heard. Here's your iPad, use it.” Principals received a different message.

Despite the messaging from district office to teachers to use the devices only when they were appropriate for the learning, principals were told to ensure that students were on their iPads for large portions of the school day. “You almost felt that pressure to be having teachers perform or using them,” recalled Alan. Alan remembered a few incidents where his school was supposed to host visitors from other school districts. The principal was given time schedules for the visits and the specific classrooms that were going to be visited. The students, however, were in lunch and specials during the prescribed times. Said Alan, “no one consults with the principals in terms of when might be a good time.” Additionally, the principal was told to ensure the students were visibly engaged with their devices while the visitors were in the designated classrooms. As he was told by a district administrator, “we've got to see the iPads being used.” Alan often pushed back against that directive, stating “well, no, [the teachers will] use them when it's appropriate, when it makes sense.” The teachers in Alan’s building were never made aware of district offices requirements, as Alan negotiated those situations on behalf of his teachers.

Concerns with the selection of the device and the management of the processes related to the devices were expressed during the focus group and interviews. Intermediate teachers, while pleased that all students had access to digital devices, wondered about the long-term viability of the iPad. The teachers felt that the iPad’s functionality in a school setting, beyond its use for primary-level learning games and personal entertainment, was limited. Ellen stated, “I feel like the iPad was a really bad choice.” “I think that the

biggest challenge is getting the kids to realize, you're going from a toy to an educational tool,” said Lydia, a primary-level teacher. She added that during the first year, whenever she handed the iPads out the students, “thought it was great because they were getting their toys.” The children often wondered, “what are we gonna play?” When asked if they had a role in Bay Point’s decision to select the iPad for all students, both the teachers and principals said that they did not. Intermediate teachers expressed doubts that students would change their mindsets about the devices. Lydia, a primary teacher, reported that she understood the reason for the K-12 iPad adoption was that the school district that Bay Point modeled itself after had adopted Apple products. Andrew said that early in the implementation he asked, “can we have a conversation about how this maybe unexpectedly is impacting people in my building or even me?” Alan said, “I wouldn't say we were consulted. . . it was definitely where there was more central office staff directly involved in the discussion, the talking, the saying that ‘This is how it's going to go.’” Again, Alan saw his role as the leader of the building “to make it happen,” despite the lack of involvement in the decision-making process from teachers or principals.

The analysis of Bay Point’s implementation documents provided evidence that supports the assertions from the principals and teachers that their input during the development of the implementation plan was not considered. Bay Point created several documents that outlined the district’s vision for technology, its plan for implementation, and the goals that the one-to-one initiative hoped to achieve. One document acknowledged that “there are multiple stakeholder groups in our district whose input influences the development and evolution of the district Technology Plan.” The feedback from “these groups is directed to the district Digital Conversion Team (DCT).” In a

document titled “Digital Conversion Strategy and Strategic Digital Resources”, the specific members of the DCT were detailed. Every member of the DCT, also referred to as the “district executive leadership team,” held district office positions.

Bay Point documents explicitly stated that the district sought input from its stakeholders.

The “Digital Conversion Strategy” document clarified that the DCT “has final say regarding district use and adoption of strategic digital resources.” In outlining Bay Point’s technology resources requisition process, the document stated that

Requests will be reviewed, [and] a determination made about the feasibility of adopting the strategic resource, and communicated back to the requestor. A decision to adopt this resource might necessitate forming a committee which could take months to make a selection, and will likely need to be budgeted and scheduled for implementation. Final decisions will be made by the district executive leadership team. (Bay Point Central School District, 2017, p. 11)

Thus, the ultimate authority in Bay Point rested in the hands of the decision makers in the district office.

Both principals took actions to help their teachers move beyond the frustrations created when, per Andrew, “a few people make the decisions.” Despite seemingly “plowing ahead” without a say in broader system-wide decisions, William and the other teachers could find the positive in the one-to-one device implementation. Andrew and Alan helped their staffs claim a role in bringing about positive change, with Andrew telling his teachers that they had the, “instructional power in the building.” The teachers recognized that their building leaders supported them. While their voices may have been

muted at the district-level, the teachers knew that the principals would “need them to help move this forward.”

Chapter Summary

This study examined the barriers and enablers for the implementation of evidence-based programs in K-12 schools. Focus groups of teachers and interviews of building principals from Bay Point Central School District were conducted to explore the implementation of a one-to-one computer adoption. Transcripts of the focus groups and interviews were analyzed qualitatively using the theoretical domains framework (TDF) (Cane et al., 2012) as the basis for an a priori coding process. The TDF was developed by Cane et al. (2012) to be used as a tool to build a theory-based understanding of the complex and intertwining forces that serve as barriers and enablers to implementation.

Originally designed to be used in a medical setting, the application of the TDF to education provided a different field to utilize the framework. Educational research lacks generalizable frameworks that can be used to better understand the barriers and facilitators of a school-based implementation (Durlak & Dupree, 2008). The use of the TDF for this study provided a unique lens to explore the implementation of an evidence-based program in a K-12 system. In addition to the a priori coding, an inductive process was used to capture emerging themes. An examination of documents related to the one-to-one initiative at Bay Point was conducted to triangulate the findings from the coding process.

The study focused specifically on the experiences of a diverse group of primary and intermediate level teachers and principals. The teachers varied in their years of experience, current grade-level, and school assignment within the Bay Point district.

These professionals explained their knowledge and participation in a full-scale computer device adoption. In analyzing these conversations with the TDF, three domains were found to most readily serve as determinant factors for teachers' implementation of the one-to-one computer device program: (a) Environmental Context and Resources, (b) Social/Professional Role and Identity, and (c(1)) Social Influences.

The bulk of the teachers' conversation during the focus groups centered on the computer devices, the support that the practitioners received through professional learning, and the impact of the implementation on their views of themselves as professionals. Environmental Context and Resources and Social/Professional Role and Identity were determined to serve as both barriers and facilitators of to this implementation. Teachers found the availability of state of the art technology for all students and access to professional learning helped enable the initiative in Bay Point. Conversely, they reported the lack of a purposeful teacher role in shaping the implementation in their classrooms and across the district served as a barrier to success. Social Role was identified as a facilitator for the implementation because the teachers often spoke of the positive impact their colleagues had on helping them use the new devices with their students.

School leaders supported the emergence of Environmental Context and Social Influences domains as implementation enablers. The principals served the primary role of acting as an intermediary between decisions made by district office and the use of computer devices to support instruction by the teachers. Despite a lack of building-level participation in determining the broad course of the implementation, teachers praised their principals' support of them. Principals were instrumental in ensuring that teachers

had the materials, training, and time necessary to promote student learning with the iPads. Additionally, the teachers spoke of the role principals played in creating the collaborative and supportive school cultures during the first year of the digital conversion in Bay Point.

When analyzing for alignment between the teacher and principal responses to the questions posed during the focus groups and interviews, two overriding themes emerged. First, the implementation of Bay Point's one-to-one initiative was bolstered in the eyes of the teachers by the examples set by the principals. Teachers were more apt to use the new technology with their students because their principals were willing to try the new technologies. Though the principals were not masters of the programs or devices, their actions signaled to teachers that instructional risk-taking was part of the learning and growth process necessary to bring about change.

Second, the teachers felt that principals were critical partners in their efforts to implement the iPads in Bay Point classrooms. Since district-level decisions were often not made in consultation with building-level personnel, teachers relied on the principals to find ways to make the initiative palatable. Principals worked in conjunction with their teachers to help to ensure the implementation fit the culture of the buildings and the needs of the students. Ultimately, principals were viewed as acting on behalf of the teachers and the children that they served.

The review of Bay Point's documentation for the digital conversion was revealing, both for what was included and what was not. The documents that were studied outlined Bay Point's focus on providing the material resources and professional learning necessary for teacher and student iPad usage. The documents also demonstrated the prominence of district office officials as the primary source of decision making and

direction for Bay Point's 1:1 implementation. Though the principals were integral in the eyes of the teachers in leading the digital conversion, the documents did not state a specific role for building-level leadership.

Chapter 5 will conclude the study with a discussion and interpretation of the findings detailed in Chapter 4. The results will be explored in relation to current literature from the fields of both implementation science and K-12 education. Limitations of the study will then be identified and discussed. The chapter will close with recommendations for how the findings of this study can be applied to the work of educational researchers and leaders charged with implementing initiatives in their schools.

Chapter 5: Discussion

Introduction

K-12 education lacks empirically tested models to help researchers, policy makers, and practitioners understand, develop, and lead implementation processes (Harn et al., 2013). The purpose of this study was to explore the specific barriers and enablers at work during an implementation process in a school district. The research was designed to determine if a comprehensive determinant framework such as the theoretical domains framework (TDF) (Cane et al., 2012) could be applied to an implementation process in a K-12 setting. The power of the TDF is in its ability to distinguish, through the application of theory, among distinct factors that impact practitioners during an implementation process (Cane et al., 2012). While the utilization of evidence-based programs (EBP) in schools is ultimately intended to improve student outcomes, adults are required to administer the EBP to children (Noell, 2008). School personnel such as teachers, counselors, or administrators must shift long-held approaches to successfully implement a new program (Sanetti et al., 2013). For this study, the TDF was utilized to determine those specific factors that most impacted teachers' implementation experience. The TDF was also applied in this study to determine the mediative role building principals played in the implementation of the digital conversion at the Bay Point Central School District.

The researcher utilized a qualitative methodology to understand better the experiences of teachers and principals implementing an evidence-based program in one

school district. Creswell (2014) suggests that a study intended to build meaning, particularly in a new field such as implementation science, would benefit from a qualitative design. The three research questions used to guide this inquiry were:

1. What determinant factors (barriers and enablers) impact the extent to which teachers implement evidence-based programs with their students?
2. What actions do school leaders take to support teachers' implementation of evidence-based programs?
3. What is the degree of alignment between the factors that impact teacher implementation and the actions of school leaders?

Focus groups with teachers were employed to learn about their views of Bay Point's implementation process. Teachers were also asked to reflect upon the role their principals played in facilitating the new program. Interviews with principals occurred in separate and independent sessions. The data gained from the focus groups and interviews, along with a review of Bay Point's digital conversion documents, were analyzed using the TDF. The results of this analysis formed the basis of the study findings.

Chapter 5 begins with a discussion and interpretation of the findings. Connections are made to the current literature from the fields of both implementation science and K-12 education. An explanation of the limitations of the study follows. Next, the chapter provides recommendations for the application of the findings of this study to the work of educational researchers and leaders who must plan for and actualize evidence-based programs. Finally, the chapter ends with a summary of the chapter and for the dissertation, as a whole.

Implications of the Findings

Five major findings emerged from the research. The first finding is that educators and educational leaders lack empirically tested determinant frameworks to guide the implementation of an evidence-based program in a school setting. The second finding is that the theoretical domains framework, though designed for use in health-related fields, is a determinant framework that has applicability to study implementation in an educational setting. The third and fourth findings relate directly to the application of the TDF in the study and identify specific domains that appeared to be most consequential to the progress of a school-based implementation. The third finding is that the environmental context of a school district or building plays an integral role in the successful implementation of a new initiative. The fourth finding is that teachers' professional and social identity impact the implementation of an evidence-based program in a school. Finally, the fifth finding is that the building principal is integral to the success of an implementation in a school environment. The results of this study add a unique perspective to the growing body of knowledge in the field of implementation science, for educators and educational researchers.

Finding 1: lack of frameworks. Educators and educational leaders lack empirically tested determinant frameworks to guide the implementation of an evidence-based program in a school setting. The investigation of Bay Point's one-to-one computer initiative demonstrated a convergence of the implementation science literature, the data from the focus groups and interviews, and a review of the district's documents. Neither school-based personnel nor the district's documents gave evidence of central office staff engaging in a systematic process to understand the potential barriers or enablers for the

digital conversion. Teachers and principals were positive about the iPads initiative and the support that they had received one year into to the one-to-one adoption. There existed, however, a growing dissatisfaction with the district's lack of understanding of the multitude of factors impacting their digital implementation.

The choice of the iPad as the device to be used by every student K-12 in Bay Point was a specific point of contention voiced by staff. Teachers expressed concern that the iPad did not offer robust learning opportunities, especially as the students progressed through their schooling. Primary-level teachers discussed how many of their students associated iPads with playing fun games, rather than as a tool to support the children's learning. Participants in the study stated that the district did not seek the opinion of staff as to which devices made the most sense for Bay Point's children. One teacher said that she felt the district chose the iPad because other more prestigious districts were utilizing Apple products. In her estimation, copying these progressive schools influenced Bay Point's district leaders to use iPads exclusively. Another teacher felt that the district did not take the time to survey staff because Bay Point leaders wanted their district to be the first in the area to adopt a K-12 one-to-one model.

Participants stated similar frustrations with the apparent lack of a plan to move the implementation forward beyond the first year. The investigation revealed that Bay Point was not aware of any standardized processes or measures to assess the progress of their implementation. Both principals and teachers stated that the district's first-year requirement was to have every teacher try to use iPads in their classes. There were no other known benchmarks to measure the level of success of the initiative, nor the impact of the computer device usage on student achievement. Teachers and principals were

interested in knowing what the district's eventual goals of the implementation were. They expressed a fear that without a long-term direction the sustainability of the implementation would be compromised. Overall, study participants, particularly those in leadership positions, lamented district officials' neglect of an early process to proactively identify and address potential pressures that could undermine the success of technology investment.

The finding that Bay Point lacked a stated process to identify potential determinant factors for the success of its technology initiative is consistent with the implementation science literature in K-12 education. Dorfman (2016) found that educators did not seek to understand how the intersectionality of the potential contextual determinants would impact the long-term viability of an implementation. Preliminary systems-level investigatory work is often ignored or given little attention, as the preparation of the physical materials and initial professional learning in anticipation of a program launch take up much of the focus (Stanhope & Corn, 2014). Noell et al. (2009) explained that most evidence-based programs are unsuccessful in practice because little energy is expended focusing on ameliorating the systemic complexities that could interfere with the implementation.

The literature provided school districts with little guidance for how to understand and address the many forces at play prior to and early on during the launch of a one-to-one initiative (Harper & Milman, 2016). Century et al. (2010) identified the lack of available comprehensive frameworks for schools to use to understand the various aspects of the implementation process as a barrier for school personnel. Five years later, Missett and Foster (2015) discussed how the development of theory-based implementation

frameworks for the field of education made little progress. Schools are complex and dynamic environments, so the study of the implementation of evidence-based programs requires tools that account for these various forces (Fullan, 2001).

Finding 2: the TDF has potential applicability to K-12 settings. Evidence-based instructional programs designed to improve student achievement often require teachers to change their practices (Sanetti et al., 2013). Understanding the progress of an implementation requires knowledge of the factors that serve to enable or hinder the program or process being put into place (Nilsen, 2015). However, education lacks theory-based, empirically tested determinant frameworks to use in the study of implementation in a K-12 environment. The researcher needed to look to other disciplines to find a determinant framework.

The TDF was the framework utilized to categorize and explain the determinant factors at play in the study of the implementation process at Bay Point. The TDF was designed to understand health and medical implementations, particularly when the EBP required healthcare professionals to change their methods for the treatment to work with patients. Like health care, the implementation of EBP in K-12 are usually designed for educators to alter their procedures for student outcomes to improve.

The study was intended to be a qualitative investigation of the barriers and facilitators for the implementation of an EBP at one school district. The TDF served as the primary lens for the analysis of the collected data. The fourteen domains of the TDF were used as a priori codes and deductively applied to responses from the teachers and principals during the focus groups and interview sessions. The distribution of the codes demonstrated that there was applicability with the experiences of the study participants to

the clear majority of the domains. Two domains, Environmental Context and Resources and Social/Professional Role and Identity, were most identified as barriers and facilitators. All the other domains except for Behavioral Regulation appeared through the coding process. The language of the TDF domains and their corresponding explanatory constructs would have crossover to an education setting, even if it were not designed to study how teachers and principals enact an EBP.

The use of the TDF in an educational setting is supported by the literature, particularly considering the persistent gap that exists regarding implementation research in K-12. As discussed in the first finding of the study, numerous researchers (Century et al., 2010; Fullan, 2001; Harper & Milman, 2016; Missett & Foster, 2015; Noell et al., 2009) have lamented the absence of determinant frameworks for K-12 education. Century et al. (2010) suggested that educational researchers borrow from other fields until the development of a validated, school-based framework occurred. Francis et al. (2012) saw that there were interdisciplinary opportunities with the application of the TDF. Seward et al. (2017) published the first known application of the TDF to a non-health care setting in their study of the menu options offered at childcare facilities. The TDF has shown its utility in understanding health-care related implementations and is beginning to show promise as a useful tool beyond the medical realm.

Finding 3: the environmental context impacts the implementation of a new initiative. The utilization of the theoretical domains framework provided the basis of the third and fourth findings. An analysis of the data demonstrated that two domains, Environmental Context and Resources and Social/Professional Role and Identity,

emerged as the most pertinent to the teacher and principal experiences. Among the two domains, study participants most frequently identified contextual factors as the most significant barriers and enablers to the digital conversion at Bay Point. As described by the TDF, the Environmental Context includes the materials, supplies, and support necessary to put an evidence-based program into place. Teachers and principals spoke most often about the adoption and availability of the computer devices, the management of the devices in classrooms and school buildings, and the influence of the professional learning offerings. These contextual factors served as both the barriers and enablers to the district's one-to-one implementation.

Bay Point's one-to-one initiative centered on the utilization of the iPad by all students in the district. That every student had access to a district-provided device was viewed as a significant development for Bay Point. The changing demographic of the district's student body was creating a digital divide that threatened to leave students of lesser economic means behind their peer from families with more resources. Staff discussed the seamless nature of the deployment and their satisfaction that, as Bay Point's technology plan stated, all children had access to the tools necessary for success in an increasingly digital world. While there was a consensus that all students having devices was a major success, teachers and principals questioned the appropriateness of the iPad for every child. Teachers felt that iPad usage helped some students grow academically, but cast doubt on a K-12, "one size fits all" model.

Teachers and principals repeatedly referenced the challenges with the management of the apps on the iPads. Participants in the pilot program that took place ahead of Bay Point's full iPad implementation reported that they had once had unfettered

access to purchase and try apps with their students. However, the full district-wide iPad implementation led to a more centralized app purchasing and deployment process. Teachers bristled at the restrictions placed on them, as they felt some of the district-endorsed apps were not useful in their classroom setting. Both principals reported frustration with a seemingly ever-changing app purchasing process that often left them unaware of the specific requests or needs of their teachers.

School personnel often referenced the professional learning opportunities available during the first year of the implementation. Primary-level teacher Lydia stated “we went to a lot of training. A lot of PD and a lot of training.” However, Bay Point teachers also expressed frustration with the unclear communication they received regarding the types and purposes of the specific learning opportunities. Primary-level teacher Kathy added, “when there were PDs offered I didn't know that I should take these, so I didn't. That threw me into the deep end,” once the iPads arrived in her classrooms.

The persistent identification of contextual factors by teachers and principals is consistent with implementation literature. Though participants in this study identified factors particular to the context of Bay Point, the findings offer broader implications. Fixsen et al. (2005) asserted that any discussion of implementation should connect to the local and system-level factors that directly impact the long-term viability of an evidence-based program. The Concerns-based Adoption Model (Hall & Hord, 2005) postulates that the core material and training needs of a teacher must be met before teachers fully embracing a new program or method. Roblin et al. (2012) discussed how the complex

interplay of the individual factors related to teachers and the materials within their environment would undoubtedly impact the successful implementation of a new program.

The absence of more comprehensive and coherent frameworks to study implementation has led researchers to investigate specific contextual factors. For example, the type, amount, and frequency of professional learning have been shown to impact the extent teachers change their behaviors and adopt a new program (Sanetti, et al., 2013). Fixsen et al. (2005) reported the influence of thoughtful, flexible, and job-embedded practitioner learning opportunities on effective implementations (Fixsen et al., 2005). Odom's (2009) research aligned with Lydia's experiences that teachers who had multiple opportunities to learn about a new program were more apt to apply it to their practice. Practitioners with an understanding of their professional learning options, based on the findings of Reed (2009), were more likely to enact their new knowledge in their practice. The provision of appropriate resources and ongoing professional learning for educators are impactful indicators of productive implementation in schools (Greenwood et al., 2003).

Finding 4: teacher identity impacts the implementation of an EBP in a school. The fourth finding is related to the Social/Professional Role and Identity domain from the TDF. Data that reflected teachers' sense of how they saw themselves as professionals and their function during the implementation was coded to this domain. During the focus groups and interviews, teachers and principals reported positive feelings toward the whole of Bay Point's one-to-one program. However, when delving more deeply into their discussions of how they viewed their role in the design and launch of the

digital conversion, barriers emerged. The selection of the iPad and the early course of professional development were frequently noted as decisions made without teacher input.

Bay Point teachers and principals expressed concern that the implementation was designed and conducted largely without feedback or input from building-level personnel. As practitioners with direct interaction with the students whose achievement the digital conversion was aiming to improve, building staff had hoped for an integral role in shaping the implementation at Bay Point. They reported, however, playing a limited role in setting the scope or course of the initiative. School personnel at Bay Point felt slighted by their lack of voice in perhaps the most critical aspect of the one-to-one program.

The decision to fully adopt iPads for the entire district was questioned numerous times during the focus groups and interviews. Andrew, a principal, best summarized the perceptions of district office that percolated during the interviews and focus groups in saying,

There's a core group of people who meet, and they call themselves the digital conversion team, I think, and that's central office people really. One of the concerns early on is that you are making decisions that impact daily life in schools and you don't have anyone who lives a daily life in a school on your committee.

Alan, the other principal interviewed, shared a more ominous observation as it related to the role of teachers in making key decisions in the district. He stated,

I think the thing (leaders are) not doing is tapping teachers enough, getting their input, either things that they've explored, they've found out, that they've learned about. This has kind of led to cynicism, that leads to a cynicism underground that district office is really not talking about.

Bay Point district leaders adjusted the delivery of their professional learning, based on feedback they received from staff early in the implementation process. Both teachers and principals reported that the district originally utilized large group learning sessions led by vendor representatives, who were not always practicing teachers themselves. The district, however, changed course during the first year of implementation, by providing learning led by Bay Point teachers. Teachers reported satisfaction in being asked by district leaders to reflect on the professional learning opportunities that they had access to and how the delivery could be improved. Based on this feedback, later topics were more reflective of where Bay Point staff felt they needed support and the sessions were often held within buildings and in smaller groups.

The literature identified teacher identity and a practitioner's sense of their role in an implementation process as an influencing factor in the sustainability of an evidence-based program. Buzhardt et al. (2006) found that new programs inclusive of teacher input in the design and execution of the implementation engendered more buy-in from staff members. Harn et al. (2013) did report that allowing for too much flexibility and local control over an implementation process could negatively impact the long-term viability of an evidence-based program. Superfine et al. (2015) added that a teacher role in shaping the implementation of a programmatic change should be limited to the classroom level for the initiative to be successful. The meaningful involvement of teachers, however, by showing respect for their role and knowledge participation, builds teacher efficacy and willingness to utilize a new program with her students (Abernathy-Dyer et al., 2013).

Engaging teacher expertise, through the extension of leadership opportunities during an implementation has also been shown to also be a supportive element in the

implementation process (Kaiser, 2013). The sustained utilization of an evidence-based program in schools is enhanced when teachers feel processes reflect their immediate needs and support their positionality (Frank et al., 2011). Though Hudson et al. (2015) reported a general reticence among teachers to use evidence-based programs, their participants felt more of an inclination to use an EBP when they felt district leaders respected their roles.

Finding 5: building-level leadership is critical in ensuring a successful implementation in schools. In reviewing the data from Bay Point teachers and building leaders, principal leadership is essential to ensure a successful implementation process. For the teachers who participated in this study, their principals mattered deeply in creating a positive atmosphere to take professional risks and change pedagogy. Principals in Bay Point helped to set the environmental context within the school. The building leaders routinely modeled how technology could and should be used, be it as a communication or learning tool. The teachers took notice of how principals used venues such as faculty meetings, grade-level meetings, and building newsletters to try out new technologies. The teachers appreciated how, according to Julie, principals were willing to “try new things.”

The principals demonstrated that they were not experts by regularly indicating they were still learning. This message permeated how principals expected teachers to utilize the technology in the classrooms at Bay Point. Building leaders did not use a teachers’ lack of technical skills against them. Instead, teachers noted that their principals were more concerned with the teachers and students trying a new app or program even if,

as Julie mentioned, “you were going to mess up.” Teachers felt free to try new programs without getting “throw[n] under the bus,” by their building leaders, as one teacher put it.

Teachers found power and strength from colleagues within their buildings during the one-to-one implementation at Bay Point. Both principals who participated in the study spoke of how they encouraged teacher sharing and supported opportunities for teachers to learn from each other. The educators’ collaboration helped to blunt some of their frustrations from having their voices muted at the district-level. Building leaders encouraged teachers to visit each other’s classrooms to see how Bay Point teachers used the technology. Alan and Andrew both stated that the informal observations expanded professional learning and collaboration. Nora, a primary-level teacher, felt comfortable asking for assistance and seeing her peers model a new app or teaching technique. She indicated, in reference to her colleague Julie,

I think we also use each other. We're both on the digital learning team but sometimes I'm like, “Hey Julie can you come in and do this?” I know she did it with her first-grade class last year and I didn't. . . . Or like when Pamela was doing SeeSaw. I went in to help her class out but just so I could learn how to introduce it to my class for SeeSaw. I think even we just work together. I'm often calling [Julie] like, “hey tech support, come visit.”

Intermediate teachers also spoke of the role collaboration and informal mentoring in their schools played in their development with technology. Brittany asserted,

The best PD that I had when I started wasn't a formal PD it was, "Hey, Nancy. You were talking about doing this. What did you do? Show it to me. How did you do it?" Or I'd run to Sarah and say, "Hey, this bombed. How did you do it?"

That's where I learned the most from, not going to a PD and having somebody sit and tell me, it was going to the people that were doing stuff that I was interested in.

The openness to sharing was a result of principals encouraging and supporting teachers' willingness to seek out new learning from each other.

Participants in the study noted how principals at Bay Point utilized building leaders and even student placement to promote collaboration. Principals strategically identified influential teachers to serve as formal role models and take on supporting roles for their colleagues. Alan said he, "took into account their influence, their social influence because I've got some folks who are really tech-savvy." He knew these teachers could be counted on to lead both during and after school professional learning opportunities.

The most successful professional learning opportunities mentioned by the principals and teachers were the "power hours." These loosely designed professional learning and sharing sessions took place after-school. The "power hours" were led by teachers and intended to be for teachers. The principals encouraged staff participation, both to present and attend. The following exchange between three teachers best captures the essence of the power hours:

Kathy: We've actually had pretty good turnout.

Alexis: Once again, we asked what they wanted, and we created an agenda around that so it was geared towards exactly what people wanted to learn about, so they enjoyed it.

Felicia: They like having their peers that they're comfortable with asking questions. I think even when you go to a PD with somebody else if you don't know that person you feel uncomfortable asking those questions.

The principals chose teachers well-respected among their colleagues to take on these leadership roles. Bay Point teachers demonstrated an increased willingness to seek assistance from their friends and peers.

Student placement offered another way for the principals to encourage collaboration. Early in the iPad pilot project, only a few of the classrooms had full sets of iPads. Alan made it a goal as principal to ensure that students who had the experience of having their own iPad would not be assigned to a class the next year without access to their own device. In his estimation, the students and the iPads had to,

Stay together, and that's not necessarily a prudent thing to do, but it worked. It worked, and so in the three years prior to going one-to-one, it was pretty successful. In other words, the teachers where the kids went also had iPads from year to year.

Andrew believed the success of the students that buoyed his building. Teachers noted the amount of growth their students were showing from year to year. Andrew said, "part of the momentum I think comes from kids who have teacher A in fourth grade and go to teacher F in fifth grade. Those kids from A come with an expectation that they are going to be using technology." In his estimation, the expectation of the students to use the iPads in class encouraged teachers to find out what their colleagues were doing with the devices.

As stated by Bertram et al. (2011), strong leadership is vital to ensuring that teachers use evidence-based programs in their classrooms. Building principals must be active and flexible in transforming their teachers' instructional practices to match the requirements of an EBP. The long-term success of a program depends on that leadership. The principal must also help to foster a collaborative culture among teachers in their school building. The day-to-day requirements of teaching make it a profession that can lack extended and meaningful adult interactions. Principals can work to create the conditions that allow for teacher-to-teacher collaboration (Fullan, 2001). Reed (2009) found that when teachers had to adapt and change together, a sense of camaraderie grew from an environment of sharing and collaboration. Focusing on a common goal created cohesion that supported the implementation process. Kaiser (2013) added that collaborative school cultures, led by supportive principals, were most advantageous for the implementation of new programs. Kaiser (2013) quoted a teacher who spoke effusively of the role of her principal played in establishing an open culture in the building,

I really felt so much support from the principal and assistant principal. In the past, most new initiatives were introduced during school-wide professional development days, and then we were supposed to go back to our classrooms and figure out how to do something new. At most, we had one or two training sessions on new ideas. . . . But this time, it is different. . . . The best is having time to talk to other teachers about it and figure it out. (p. 217)

The words of that teacher from Kaiser (2013) echoed the findings from teachers and principals at Bay Point. Principal-led, collaborative cultures matter in the implementation of evidence-based programs.

Limitations of the Study

This study had three notable limitations: the limited scope of the study's focus, the experiences of the participants, and the timing of the study related to the scope of the specific implementation. For this implementation study, the investigation of one implementation initiative in one suburban school district may limit the reach of the findings. Additionally, only teachers and principals who were working in one of Bay Point's primary or intermediate level buildings were asked to participate. As such, the findings may not be generalizable to implementations that span multiple districts or initiatives that involve middle or high schools.

The participants in the focus groups and interviews all self-selected to participate in either an interview or focus groups. Most participants expressed positive experiences with the computer implementation at Bay Point one year into the process, and many of them had previously been part of Bay Point's pilot project. The staff members may not have been representative of a broader pool of teachers, some of whom may not have had such a positive experience.

Lastly, the completion of the study occurred with the one-to-one digital conversion in Bay Point was still in its early stages of implementation. The system was 18 months into its project. Fixsen et al. (2005) suggested that full implementation of an evidence-based program may take up to five years. Invariably there are ebbs and flows for teachers and principals with new initiatives. Since the implementation at Bay Point

was in its early stages, it is conceivable that the participants' perceptions may change over the course of time.

Recommendations for Future Research

The findings of this study demonstrated two potential pathways for future educational research related to implementation science. The development of a determinant framework designed to study implementation in K-12 settings is the first recommendation for future research. The second recommendation is to continue to test the applicability of the theoretical domains framework to school-based implementation.

Develop a determinant framework designed to study implementation in K-12 settings. From its genesis, the study was intended to fill a persistent gap in education-related implementation science research. Century et al. (2010) stated clearly that a comprehensive implementation framework was lacking in K-12 education. Without a way to best capture the multiple forces that may impact an implementation in a school setting, researchers have attempted to isolate specific conditions that would either enable or limit an evidence-based program in schools. The findings of Frank et al. (2011), Kaiser (2013), Reed (2009) and others have proven to be valuable in the shaping of a body of knowledge around the impact of a specific variable in the implementation process. Looking at factors independently tends to oversimplify the issue. There is not one silver bullet that can miraculously bring about change in education. As Fullan (2009) noted, schools are complex ecosystems, each with their own unique cultures, history, and prejudices. It is critical that tools exist to capture the interplay of multiple forces that may impact an implementation process.

As has been previously stated, while the goals of change initiatives are often to improve student achievement outcomes, most school-based changes require adults to change their behaviors and practices (Sanetti et al., 2013). Teachers and principals are the ones who must administer new programs to students for children to improve their learning or behavior (Noell et al., 2009). To make an evidence-based program a reality in classrooms, teachers often must change their pedagogy. Future attempts at categorizing an implementation should consider the impact the program will have for the professionals as well as the children. As Fullan and Pomfret noted nearly 40 years ago, teachers are not passive purveyors of new programs (Fullan, 2009). They are active participants in the complex process to bring change to schools. The creation of a tool closely aligned to the language and nuances of schools and classrooms may prove to be even more valuable in moving implementation science forward.

Continue to test the applicability of the theoretical domains framework to school-based implementation. At the time of this study, a valid and reliable comprehensive implementation framework for educational researchers and practitioners had yet to be developed. The lack of a framework required the researcher to utilize a validated implementation framework from the medical industry. As a determinant framework (Nilsen, 2015), the TDF offered a theory-based tool to identify specific forces that either assist or detract from the implementation process (Cane et al., 2012). The TDF provided a unique perspective to look at implementation in a school setting. While the TDF could provide language to describe the barriers and enablers to the one-to-one implementation at Bay Point, the framework was not designed for an education application.

Future research should be conducted that would apply the TDF in its current designed to school-based implementation initiatives. Seward et al. (2017) demonstrated that the TDF could be used beyond the health care setting and with practitioners who provide services for children. While the skills and knowledge required to develop and deliver food options to children differ from those of school teachers and administrators, the Seward et al. (2017) findings were similar to the findings of the study. Environmental Context and Resources and Social/Professional Role and Identity were the emergent domains identified by Seward et al. (2017) and also the preeminent domains in the current study. The findings from both studies, particularly because their results align, suggest that the TDF could play an expanded role in the broader field of implementation science.

Future studies using the TDF to investigate school-based implementation should seek the perspectives of district-level leaders. This dissertation included only teachers and principals as participants. However, the actions of district office personnel at Bay Point were scrutinized by the faculty, as they had to respond to directives that came from district office. What went unexplored was how district-level leaders saw their role in the system-wide implementation of the 1:1 initiative. Exploring the perspectives of district office personnel, through the lens of the TDF, could help to understand better how systems-level staff sees their work. Additionally, this type of application of the TDF could build the literature base around this framework and further test its application to K-12 education.

Recommendations for District-level Leaders in K-12 Education

District-level leaders in K-12 education lead complex systems that often include numerous schools, each with its own culture shaped by the teachers, principals, students, and families connected to that building. The system-wide implementation of evidence-based programs in K-12 education presents opportunities and challenges for district-level leaders. The findings of this study demonstrated two actions that district-level leaders can take to better assist with the implementation and sustainability of evidence programs in schools. The first recommendation is that district-level leaders take proactive steps to identify the determinant factors that could emerge as potential barriers and enablers during an implementation process. The second recommendation is that district leaders must methodically and regularly gather feedback from key stakeholders throughout the implementation process to ensure that leadership understands and addresses emerging issues that could negatively impact the long-term viability of the implementation.

District-level leaders need proactively identify the emergent determinant factors prior to an implementation process. The purpose of any implementation is to create the conditions for long-term sustainability (Fullan, 2008). Despite needing teachers and principals to change their practices, district leaders often fail to acknowledge the need to actively address adult behavior change as part of the implementation process (Noell et al., 2009). By utilizing a theory-based tool to assess and identify strengths and weaknesses within a larger system, district leaders can better determine the areas to focus their attention on (Noell et al., 2009). In this study, the researcher utilized the TDF retrospectively to analyze the early stages of Bay Point's digital conversion. By eliciting

feedback from the interviews and focus groups, then looking at this data through the lens of TDF, specific barriers and enablers were revealed one year after the full-scale launch. In practice, district leaders should use a determinant framework such as the TDF to conduct a systems analysis before the design and launch of the implementation process.

The data and analysis from an investigation of this type would provide district leaders direction for how to move an implementation forward in a positive direction. Alexander et al. (2014) used the TDF to determine that doctors and nurses experienced significant, albeit different based on their positionality, barriers to implement an EBP. The leaders who required the use of the EBP in medical offices did not take the time to fully understand the potential pitfalls with the usage of the EBP. In the case of a school setting, district leaders must acknowledge and address the impact of the implementation of an EBP on the culture and context for which the change is expected to take place (Fixsen, 2005).

District-level leaders should assess the status of teachers and principals before charting the course of an implementation process. Without a clear understanding of the impact the change is having on the adults who must put this new program into use, any success will be fleeting (Noell et al., 2009). Data should be gathered systematically, through a variety of venues such as staff surveys, interviews, and focus groups. The feedback from the practitioners is critical in shaping the course of the implementation. Using a comprehensive determinant framework, such as the TDF, as the lens through which to view the data, the potential barriers and enablers that would impact the success of the initiative should be identified. District-level leaders, working in collaboration with building-level personnel, should then develop an implementation plan that addresses the

potential barriers and enablers. This plan must include specific goals and benchmarks that all staff should be working toward. Additionally, the tools used to assess progress must be articulated and understood by those charged with moving the project forward.

Proactively seeking feedback from building-staff does not end with the launch of the initiative. District-level leaders hoping to bring about positive and lasting results must also plan for regular check-ins with those implementing in the schools and classrooms.

District-level leaders must methodically and regularly gather feedback from key stakeholders throughout the implementation process. The famous baseball player Yogi Berra once said, “In theory, there is no difference between theory and practice. In practice there is” (Blase et al., 2011). The Bay Point teachers and principals stated that they appreciated having all the computer devices for their students and professional learning for themselves. In theory, investing heavily in the computer devices and professional learning should have been enough to ensure a successful implementation. Indeed, early indications from practitioners suggested that the launch was successful. However, as one of the building principal ominously warned, there was an underlying cynicism that was developing in the schools. While the district seemed to be responsive in adjusting its professional learning model, school personnel felt shut out of the key decisions such as the device selection and the long-term vision for the digital conversion. Teachers and principals felt like they should have had more say in factors that would directly impact their work with Bay Point’s children.

Gathering information from teachers and principals is not the ending point. Based on the conclusions that arise from the data, district leaders must be ready and willing to work with building-level staff to mitigate any potential barriers that may adversely

impact the ongoing implementation process (Durand et al., 2016). Fullan (2009) suggested that impactful change requires systems leaders to adopt active and inclusive models for implementation. An optimistic approach contrasts the path of Bay Point's district leaders who, as stated in the district's digital conversion documents, made all substantive decisions for the one-to-one adoption. As reported by Aarons and Sommerfeld (2013), effective leadership can no longer make exclusive use of the industrial-style command and control model. The deftest leaders of implementation will, "listen to others including those with whom you disagree, respect and reconcile differences, unify opposition on a higher ground, identify win-win scenarios, be hopeful and humbly confident no matter what" (Fullan, 2009, p. 109). As posited by Fullan (2009), the ideal district leaders in the 21st century must have a, "broad directional vision. . . [and] humility" (p. 109), to enact lasting change.

Recommendations for Building-level Leaders in K-12 Education

An effective implementation process demands that a principal is keenly aware of both broader methodologies to leadership and high-leverage strategic actions that improve the adoption of an evidence-based program at a local level (Aarons et al., 2014). The study of Bay Point's digital conversion demonstrated the critical importance of building-level leadership to ensuring changes occur in schools. The findings of the study provide the basis for two recommendations for actions principals should take in leading implementation initiatives at a local level. The first recommendation is that principals need to build and support collaborative school cultures among the teachers. The second recommendation is that principals must be willing to serve as a mediator between the decisions of district office and the needs of a school community.

Principals need to build and support collaborative school cultures among the teachers. The teachers that participated in the study recognized that their principals created supportive cultures. Feeling safe to experiment with their pedagogy, practitioners reported that they felt more prepared to teach in a one-to-one computer environment. Bay Point principals encouraged and supported the collaboration of staff members and modeled the type of professional risk-taking necessary to change pedagogy.

For building leaders charged with leading a district-wide implementation, the study of Bay Point provides a potential model to follow. Like what the recommendation for district-level leaders, building-level leaders would be wise to engage in a deliberate process to understand existing or potential areas of struggle posed by an implementation. Using a tool such as the TDF would help principals better understand their teachers' capacity for change, as well as their own. Alexander et al. (2014) demonstrated that, in a stratified organizational structure, such as what exists in schools, the TDF could be used to investigate the perceptions of an implementation expressed by leaders and followers. Knowing the issues on the front end of an implementation will provide principals with actionable information from which to shape launches and ongoing support in their buildings. Working through the potential areas of concern in partnership with teachers will further build positive feelings toward the change.

One specific route that Bay Point principals instinctively took during their implementation process was to create the conditions for extensive teacher-to-teacher support networks to build and grow. Likewise, as professional interaction has been shown to have positive effects on program implementation, principals must build an infrastructure that fosters collaboration among staff members. Rather than focusing on

expediency, principals should be willing to think outside of the box. White-Smith and White (2009) argue,

This kind of leadership requires principals who think beyond the assumption that their job is to make the existing school structure more effective and efficient, when they may need to reconceptualize it and change it in some fairly significant ways. (p. 277)

Principals should be willing to move away from an older, leader-centric approach to provide flexible professional learning time and space before, during, and after school.

There are some ways a principal could reformat time in their buildings to ensure time for collaboration is central to the work. Principals should build master schedules that allow grade-level teachers regularly occurring common planning time. One of the best ways to implement a program in schools is for practitioners see it in action with students. Building-level leaders can support teachers visiting colleagues' classrooms by providing competent and reliable class coverage. Visitations may require unique ways of using building-level substitute teachers, paraprofessionals, or even the administrative team to afford teachers the time necessary to see their peers teach. Principals should also consider more flexible approaches to the seat time normally reserved for faculty meetings. Rather than requiring teachers to meet all at once after school, principals could provide alternative ways for teachers to access operational announcements. Teachers could maximize their time together working through the actualization of the program implemented by recapturing time reserved for administrivia.

Principals must be willing to serve as a mediator between the decisions of district office and the needs of a school community. As demonstrated in this study,

principals play a fundamental role in bridging the gap between the directives from central office and realities of actualizing new initiatives with adults and children. Andrew and Alan, the principals in the study, were instrumental in helping teachers “plow” through the demands placed on them with the implementation decisions made at district office. Whether it was communicating expectations in a way that made sense to teachers, providing material or emotional support as staff worked through the change, or removing barriers that impeded teacher and student progress, a significant portion of Bay Point’s early successes and positive feelings with their computer adoption was due to the principals’ leadership.

Building leaders will need to find ways to ensure that in supporting their teachers, they are also ensuring the EBP from district office moves forward. Interestingly, leaders that provide flexible opportunities, including participation in curricular leadership teams, teacher-to-teacher sharing, and classroom visits, have found that these actions promulgate cultures that support district implementation efforts (Durand et al., 2016). Principal leadership matters in cultivating professional cultures that embrace change and support the utilization evidence-based program (White-Smith & White, 2009). Regardless of the plans and directives manufactured by district office personnel, the successful implementation of classroom-based initiatives requires skillful building leaders who understand their teachers’ needs and finds the best way to motivate them to embrace change (Fullan, 2001).

Conclusion

K-12 education has experienced an increase in scrutiny over the last 20 years. Stakeholder groups such as parents, policy makers, and researchers have placed growing

pressure on teachers and principals to ensure that students reach their perceived potential (O'Donnell, 2008). Research shows that evidence-based programs (EBP) can improve student learning (Whitehurst, 2009). Educational researchers and program developers have responded by producing more studies that support the use of certain instructional or systemic improvements. To address the public pressure, educators have tried EBP in their schools and classrooms (Fullan, 2007). Odom (2009) found that the promise of these programs rarely meets the reality once the EBP find their way into practice. Pfeffer and Sutton (2013) referred to this breakdown between the theoretical and the practical as the "Knowing-Doing Gap."

Researchers and educators have increasingly sought guidance from implementation science to address the persistent struggle to successfully actualize EBP in the day-to-day functioning of schools (O'Donnell, 2008). Implementation science sheds light on the pressures and processes that impact the adoption of a new program (Fixsen et al., 2005). The adjustment to investigating the inputs that impact the outcomes allows researchers and practitioners the opportunity to more effectively ensure that a program can be successful (Greenwood et al., 2003).

Berman and McLaughlin stated, "the bridge between a promising idea and the impact on students is implementation, but innovations are seldom implemented as intended" (1976, p. 349). The complex nature of schools and schooling presents challenges in producing a unified process to identify and understand the interrelated factors that determine the success of an implementation (Century et al., 2010). Without frameworks to look collectively at the many forces at play in a school-based

implementation, researchers have narrowed in on specific, individual factors to explain why programs fail in practice (Greenwood et al., 2003).

Focus is turning to identify certain variables that impact implementation, such as school context and the role of the teachers in bringing a program to life (Reed, 2009). Individual barriers to the implementation of school-wide evidence-based programs (Fagan & Mihalic, 2003; Pas & Bradshaw, 2012), challenges faced by teachers during implementation (Benner et al., 2011; Frank et al., 2011; Kaiser, 2013; Lakin & Shannon, 2015) and the pivotal role teachers play throughout implementation process (Boardman et al., 2005; Hudson et al., 2015; Kretlow & Helf, 2013) are among the topics that illustrate the challenges of the implementation process in an educational setting.

The work to investigate specific discrete barriers or enablers to the implementation of EBP has helped to move implementation science forward in K-12 education (Durand et al., 2016). However, the field is still in need of valid and reliable frameworks to comprehend and explain the complexities of implementation in school settings. Without a tool to understand schools and classrooms, the field looked to other industries for models that may have applicability (Century et al., 2010). Disciplines such as healthcare, business, and technology are further along in the production of more general frameworks to understand the implementation process in their industries.

The study was designed to utilize an empirically tested determinant model from the medical field to understand the barriers and facilitators of an implementation in education. The research questions were intended to investigate the experiences of teachers and principals during a school-based implementation. The theoretical domains framework (Cane et al., 2012) is a theory-based determinant framework developed to

understand implementation in a healthcare setting. The framework distilled 33 behavior change theories into 14 domains representing the potential forces that either help or hurt the process of putting an EBP into place in medical settings (Cane et al., 2012). The TDF was used in the study to better understand the implementation of a specific implementation process in a school district in upstate New York. The dissertation addressed the lack of determinant frameworks developed for education by applying the TDF to a school-based implementation. This unique application of the TDF and the findings that resulted should encourage the pursuit of implementation science in education, knowing that determinant frameworks can be used successfully in understanding implementation in schools.

An investigation of the implementation of a one-to-one computer device initiative in an upstate New York school district provided an opportune context to conduct this study. After one year of the full-scale implementation of their digital conversion, Bay Point Central School District teachers and principals were interested in sharing their experiences. A qualitative design was employed for the investigation (Creswell, 2014), utilizing focus groups of teachers and interviews with principals. The study design included a review of Bay Point's documents to triangulate the data from the meetings with the teachers and principals. A constant comparison analysis was conducted with the data from the transcripts of the two focus groups and two interviews (Leech & Onwuegbuzie, 2007). A priori codes were created, with the fourteen domains of the TDF serving as the categories (Cane et al., 2012). The directed approach provided a framework to extend the TDF beyond its current application in health sciences to the field of K-12 education (Hsieh & Shannon, 2005).

In analyzing the transcripts with the TDF domains serving as a priori codes, two domains were found to most readily serve as determinant factors for teachers' implementation of the one-to-one computer device program at Bay Point: (a) Environmental Context and Resources, and (b) Social/Professional Role and Identity. Teachers focused much of their attention during the focus groups discussing computer devices that were issued, the professional learning opportunities they were provided, and how the one-to-one initiative required them to think differently about their role as professionals in their classrooms. Environmental Context and Resources and Social/Professional Role and Identity were determined to serve as both barriers and facilitators during this implementation. Teachers embraced the proliferation of computer technology for their students and technology-focused professional learning for themselves. Teachers did, however, express frustration with how they felt left out of the decision-making process during the formative and preliminary stages of the implementation. The one-to-one initiative did help bring about more teacher collaboration, which staff found to be a facilitator to their Social Role.

The data analysis process determined principals were of critical importance to the early successes the digital conversion at Bay Point. Their direct efforts helped promote the emergence of the Environmental Context and Social Role domains as implementation enablers. Building leaders often found themselves negotiating between the requirements of district office and the needs of their teachers. Teachers praised their principals' efforts, noting that building administrators were integral in teachers having the material support, targeted professional learning, and collaborative approaches necessary for a successful launch.

Two prevailing themes surfaced when the specific teacher responses were analyzed for their alignment to the actions of the principals. Teachers valued how their leaders modeled technology usage in their daily practices. That principals were willing to try the new technologies a try despite their lack of expertise, sent the message that trying out new approaches was integral to Bay Point's progress forward. Additionally, classroom practitioners found the administrators in their schools to be indispensable to the implementation of the iPads in Bay Point classrooms. Teachers were reliant on their local leaders to ameliorate the pressures and directives that came from district office. Principals and teachers formed a critical partnership to ensure that the one-to-one initiative could reach its fullest potential for the ultimate benefit Bay Point's students

Several recommendations have emerged from the findings of the study. Educational researchers can and should work to understand better the interaction of the various determinant factors that impact implementation in schools. Schools are intricately woven environments requiring improvement processes that recognize the complexity of these systems. The silo mentality of exploring individual implementation determinant factors exacerbates the research-to-practice gap (O'Donnell, 2008). Implementation science researchers focusing on education must bring these independent variables together to develop an integrated model for improving practice in schools. In the absence of a valid and reliable model unique to K-12, this study demonstrated that a model from another discipline could be applied to education. The TDF (Cane et al., 2012) exposed the implicit and explicit barriers and enablers that emerged from Bay Point's one-to-one computer implementation. Borrowing from disciplines such as medicine, technology, and

business, could be an important next step to move implementation research in education forward.

K-12 leadership, both at the district and building levels, must also be cognizant of the complexities that exist in schools and classrooms when bringing a new program to bear in schools. District-level leaders must seek to first identify potential barriers and enablers to an implementation. Addressing the barriers proactively should be a key part of a collaboratively created implementation plan. The plan should state the expected goals of the implementation. Progress made toward the goals must be measured objectively, with specific benchmarks identified to track the impact the evidence-based program is having in schools and classrooms.

Additionally, district leaders should pay attention to process and practices that they have in place that support the inclusion of diverse and even divergent voices. At the heart of program implementation in schools is the change of practice among classroom practitioners. Formalized structures, including regular communication and feedback loops with teachers, must be essential elements of any implementation design. As Fullan and Pomfret reported over four decades ago (Fullan, 2009), teachers do not blithely apply new programs to their classrooms. Therefore, teachers should have an active and substantive role in the decision-making apparatus throughout all stages of an implementation. Principals must also understand that the success of an implementation often hinges on the extent to which they engage their teachers in local leadership. Additionally, principals can both encourage and facilitate collaboration between colleagues to support evidence-based program implementation.

The proliferation and utilization of evidence-based programs to support and improve student learning outcomes provide exciting opportunities for the field of education. Educational researchers and educators are still struggling to find the best ways to have the promise of the programs meet the results of the practice. The study was an attempt to better understand the complexities of change in a school setting through an in-depth investigation of an implementation process. The application of a medical model to a K-12 environment represented a unique way to fill a gap in the literature related to the lack of valid and reliable implementation determinant frameworks.

Though this study focused on implementation in a K-12 setting, there are lessons to be learned for executive leaders operating beyond an education environment. The National Implementation Research Network identified leadership as one of the three vital components in driving an implementation initiative at any organization (Bertram et al., 2014), regardless of the field. The study demonstrated the valuable role strong, visionary leadership plays in moving forward major systems changes. However, the findings also indicated that leaders needed to be inclusive of key stakeholder considerations. Front-line practitioners need to feel that their perspectives are valued and influential for them to be willing to change their practices (Aarons et al., 2014). Executive leaders should also be cognizant of the local concerns and needs that arise when a system-wide implementation is put into place (White-Smith & White, 2009). Lastly, executive leaders need to understand that lasting change can take up to five years to be realized (Fixsen et al., 2005). Therefore, implementations require collaboratively developed long-term plans to outline the path of the initiative and provide benchmarks to mark the progress along the way (Bertram et al., 2011). Ultimately, change within organizations is a difficult process.

Executive Leaders that appreciate the complexity of moving systems, while maintaining an appreciation for the diversity of stakeholders, will be better able to bring about successful implementations (Aarons et al., 2012).

Continued research is needed to understand better and close the chasm between research and application in K-12 systems. In the meantime, district leaders and school principals should be sure that they understand the context of their culture and the forces that may help or hinder implementation in their settings. Changes in pedagogy require teacher buy-in produced through the active partnership of practitioners and administrators. Ultimately the study echoes Fullan's (2008) conclusion that, "Implementation remains a concept of enormous value, if for no other reason than that it is a constant reminder of how much more needs to be done" (p. 122). In fact, while much more must be accomplished to improve the implementation of evidence-based programs schools, the findings of this study may provide a potential pathway to move the work forward.

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doi:10.1080/1554480X.2014.955499

Appendix A

IRB Approval from Saint John Fisher College



January 9, 2017

File No: 3640-11176-10

Terrance McCarthy
St. John Fisher College

Dear Mr. McCarthy:

Thank you for submitting your research proposal to the Institutional Review Board.

I am pleased to inform you that the Board has approved your Expedited Review project, "A qualitative study of the Implementation of an Evidence Based Program in a K-12 Setting."

Following federal guidelines, research related records should be maintained in a secure area for three years following the completion of the project at which time they may be destroyed.

Should you have any questions about this process or your responsibilities, please contact me at irb@sjfc.edu.

Sincerely,

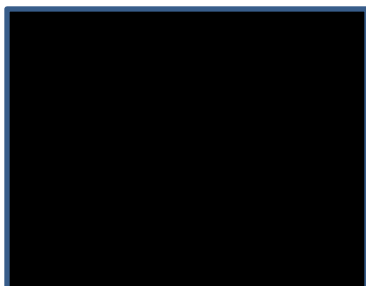
Eileen Lynd-Balta

Eileen Lynd-Balta, Ph.D.
Chair, Institutional Review Board

ELB: jdr

Appendix B

Approval from Bay Point Central School District



Susan K. Allen
Superintendent of Schools

Mary E. Grow
*Assistant Superintendent for
Instruction*
(585) 339-1250
Mary_Grow@eastiron.monroe.edu

**BAY POINT CENTRAL SCHOOL DISTRICT
ADMINISTRATIVE OFFICES**

**600 PARDEE ROAD
ROCHESTER, NY 14609
(585) 339-1200 • FAX (585) 288-0713
<http://www.eastiron.org>**

October 7, 2016

Dear Terrance,

We are happy to collaborate with you and St. John Fisher College on the study of the barriers and facilitators to the implementation of an evidence-based program in a K-12 setting.

The purpose of this e-mail is to verify that you have the preliminary permission of the Bay Point Central School District to collect data from some of our K-5 teachers and administrators. We understand that this will require you to meet the teachers in focus groups and to interview the administrators individually. The district will work with you to develop a process to identify Bay Point staff to participate in this study.

The participation of Bay Point Central School District in this study is contingent upon your study being approved by the Institutional Review Board at St. John Fisher College.

We look forward to working with you on this study,

Sincerely,

[REDACTED]

[REDACTED]

"BUILDING A FUTURE, ONE STUDENT AT A TIME"

Appendix C

E-mail to Interested Teachers

Dear _____,

Thank you for your interest in participating in a research study focusing on the implementation of the digital conversion and one-to-one computer initiative at Bay Point Central School District. This study is designed to gain a better understanding of the factors that impact the implementation of new programs in schools. The focus groups will be an opportunity for you to share your experiences as a teacher with Bay Point's technology implementation during this last school year. The purpose of this study is to inform school systems on how to improve the implementation process.

The focus group will take place on DATE TBD at START TIME TBD and will be held at LOCATION TBD. The focus groups will last approximately 60 minutes. If you do participate, you will be provided light refreshments and receive a small monetary gift card as a token of appreciation for your time.

I have attached an "Informed Consent" document. To participate in the focus group, you will need to read and sign this document. You can e-mail this form back to me or bring it with you to the focus group on the DATE TBD.

If you are interested in participating in this study and/or have questions, please feel free to contact me via cell phone (585-794-0406) or e-mail (tmm05921@sjfc.edu). I appreciate your consideration and look forward to the opportunity of meeting with you in the future.

Sincerely,

Terry McCarthy

Educational Doctoral Candidate, Executive Leadership

St. John Fisher College, Rochester, NY

Appendix D

Informed Consent for Teachers Participating in a Focus Group

St. John Fisher College

INFORMED CONSENT FORM

Title of Study: A Qualitative Study of the Implementation of an Evidence-Based Program in a K-12 Setting

Name(s) of researcher(s): Terrance McCarthy
Phone for further information: 585-794-0406

Faculty Supervisor: Dr. Marie Cianca

Purpose of Study: The purpose of this study is to explore the factors that impact the implementation of an evidence-based program in a K-12 school setting.

Place of study: Bay Point Central School District

Length of participation: One focus group session lasting approximately 60 minutes.

Risks and benefits: The expected risks and benefits of this study are explained below.

Minimal risk exists, as the probability of and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during routine tests. Participants will be audio-recorded during interviews. There are no additional anticipated emotional or physical risks associated with participating in this study. By participating in this study, participants will contribute to study results, which will add to the current body of research on the implementation of new programs in K-12 education.

Method for protecting confidentiality/privacy: All consent is voluntary. Pseudonyms will be assigned to all participants. Participants name and identifying information will remain confidential and will not appear in transcripts, analysis, or the final study. Written transcripts will be stored in an office in a locked cabinet accessible only to the researcher for a period of three years after the successful defense of the dissertation and then shredded. When not in use, the audio and electronic files of the data, as well as interview transcriptions, will be secured on a password protected hard drive in an office and will be placed in the same cabinet with access only to the researcher for a period of three years after the successful defense of the dissertation and then destroyed.

Your rights: As a research participant, you have the right to:

1. Have the purpose of the study, and the expected risks and benefits fully explained to you before you choose to participate.
2. Withdraw from participation at any time without penalty.
3. Refuse to answer a particular question without penalty.
4. Be informed of appropriate alternative procedures or courses of treatment, if any, that may be advantageous to you.
5. Be informed of the results of the study.

I have read the above, received a copy of this form, and I agree to participate in the above named study.

Print Name (Participant) Signature Date

Print Name (Investigator) Signature Date

If you have any further questions regarding this study, please contact the researcher above. If you experience emotional or physical discomfort due to participation in this study, please contact the Health and Wellness Center at 585-385-8280 for appropriate referrals.

The Institutional Review Board (IRB) of St. John Fisher College has reviewed this project. For any concerns regarding this study and/or if you experience any physical or emotional discomfort, you can contact Jill Rathbun by phone at 585-385-8012 or by email at irb@sjfc.edu.

Appendix E

E-mail to Interested Administrators

Dear _____,

Thank you for your interest in participating in a research study focusing on the implementation of the digital conversion and one-to-one computer initiative at Bay Point Central School District. This study is designed to gain a better understanding of the factors that impact the implementation of new programs in schools. The interview will be an opportunity for you to share your experiences as an administrator leading Bay Point's technology implementation during this last school year. The purpose of this study is to inform school systems on how to improve the implementation process.

The interview will last approximately 60 minutes. We will work together to identify a date, time, and location that is most convenient for you. If you do participate, you will receive a small monetary gift card as a token of appreciation for your time.

I have attached an "Informed Consent" document. To participate in the focus group, you will need to read and sign this document. You can e-mail this form back to me or bring it with you to the focus group on the DATE TBD.

If you are interested in participating in this study and/or have questions, please feel free to contact me via cell phone (585-794-0406) or e-mail (tmm05921@sjfc.edu). I appreciate your consideration and look forward to the opportunity of meeting with you in the future.

Sincerely,

Terry McCarthy
Educational Doctoral Candidate, Executive Leadership
St. John Fisher College, Rochester, NY

Appendix F

Informed Consent for Administrators Participating in an Interview

St. John Fisher College

INFORMED CONSENT FORM

Title of Study: A Qualitative Study of the Implementation of an Evidence-Based Program in a K-12 Setting

Name(s) of researcher(s): Terrance McCarthy
Phone for further information: 585-794-0406

Faculty Supervisor: Dr. Marie Cianca

Purpose of Study: The purpose of this study is to explore the factors that impact the implementation of an evidence-based program in a K-12 school setting.

Place of study: Bay Point Central School District

Length of participation: One interview session lasting approximately 60 minutes.

Risks and benefits: The expected risks and benefits of this study are explained below.

Minimal risk exists, as the probability of and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during routine tests. Participants will be audio-recorded during interviews. There are no additional anticipated emotional or physical risks associated with participating in this study. By participating in this study, participants will contribute to study results, which will add to the current body of research on the implementation of new programs in K-12 education.

Method for protecting confidentiality/privacy: All consent is voluntary. Pseudonyms will be assigned to all participants. Participants name and identifying information will remain confidential and will not appear in transcripts, analysis, or the final study. Written transcripts will be stored in an office in a locked cabinet accessible only to the researcher for a period of three years after the successful defense of the dissertation and then shredded. When not in use, the audio and electronic files of the data, as well as interview transcriptions, will be secured on a password protected hard drive in an office and will be placed in the same cabinet with access only to the researcher for a period of three years after the successful defense of the dissertation and then destroyed.

Your rights: As a research participant, you have the right to:

1. Have the purpose of the study, and the expected risks and benefits fully explained to you before you choose to participate.
2. Withdraw from participation at any time without penalty.
3. Refuse to answer a particular question without penalty.
4. Be informed of appropriate alternative procedures or courses of treatment, if any, that may be advantageous to you.
5. Be informed of the results of the study.

I have read the above, received a copy of this form, and I agree to participate in the above named study.

Print Name (Participant) Signature Date

Print Name (Investigator) Signature Date

If you have any further questions regarding this study, please contact the researcher above. If you experience emotional or physical discomfort due to participation in this study, please contact the Health and Wellness Center at 585-385-8280 for appropriate referrals.

The Institutional Review Board (IRB) of St. John Fisher College has reviewed this project. For any concerns regarding this study and/or if you experience any physical or emotional discomfort, you can contact Jill Rathbun by phone at 585-385-8012 or by email at irb@sjfc.edu.

Appendix G

Teacher Focus Group Protocol

Introduction:

Thank you for agreeing to participate in this focus group today. The purpose of this focus group is to learn more about your experiences with Bay Point's digital conversion and one-to-one computer device initiative. I have prepared a number of questions that I will pose to the whole group as a way to stimulate discussion. Depending on the flow of the conversation I may pose a follow-up question to the entire group or a particular individual. Overall the focus group should last approximately 60 minutes.

As a reminder of the information in the Informed Consent form that you signed, I want to reiterate that the responses shared today will remain confidential. I will not use your names and will avoid reporting information that could be linked back to you personally. This session will be digitally recorded. The recording and notes related to this focus group will be stored securely and then destroyed three years after this study has been completed.

I do ask that out of respect for your colleagues, and to ensure a healthy dialogue, that we would agree to keep our conversation today to the confines of this room.

Are there any questions before we begin?

Focus Group Questions:

1. Talk about your use of computers for instruction prior to the one-to-one initiative at Bay Point.
 - a. How was computer technology used in your instruction?
 - b. Were you looking forward to this initiative?
 - c. Did you feel like you were prepared to start?
 - d. What were your biggest concerns?
 - e. What were your goals?
2. Let's talk about the implementation process
 - a. How was the plan shared with you?
 - b. Were you involved with the planning?
 - c. How were the goals communicated to you and your colleagues?
 - d. What were the expectations for your computer use during the school year?
3. Tell me about the how the district supported you in the development of your use of computer technology in your instruction as part of this initiative.
 - a. Potential follow-up focus areas

- i. Materials, trainings
 - ii. Job-embedded professional learning
 - iii. Coaching
 - iv. Culture of inquiry
4. In what ways did you and your colleagues support each other during the first year of the one-to-one initiative?
5. Talk about the various ways you felt supported by your building administrator during the first year of the one-to-one program.
 - a. Potential follow-up focus areas
 - i. How administrator supported with materials and training
 - ii. Types of professional learning opportunities
 - iii. Faculty meetings, grade-level meetings
 - iv. Pressure/Expectations/flexibility
6. Is there anything else you would like to share about Bay Point's one-to-one implementation after the first year?

Appendix H

Administrator Interview Protocol

Introduction:

Thank you for agreeing to participate in this interview today. The purpose of this interview is to learn more about your experiences as a building leader with Bay Point's digital conversion and one-to-one computer device initiative. I have prepared a number of questions that I will pose as a way to stimulate discussion. Depending on the flow of the conversation I may pose follow-up questions. Overall the interview should last approximately 60 minutes.

As a reminder to the information in the Informed Consent form that you signed, I wanted to reiterate that the responses shared today will remain confidential. I will not use your names and will avoid reporting information that could be linked back to you personally. This session will be digitally recorded. The recording and notes related to this focus group will be stored securely and then destroyed three years after this study has been completed.

I do ask that out of respect for your colleagues, and to ensure a healthy dialogue, that you would agree to keep our conversation today to the confines of this room.

Are there any questions before we begin?

Interview Questions:

1. Talk about what it was like in your building regarding instructional technology use prior to the one-to-one initiative at Bay Point.
 - a. How frequently were computer utilized during instruction?
 - b. Were teachers looking forward to this initiative?
 - c. Did they appear like they were prepared to start?
 - d. What were their biggest concerns?
2. Let's talk about the implementation process
 - a. How was the plan shared with you and your teachers?
 - b. Were you and your teachers involved with the planning?
 - c. How were the goals communicated to you and your colleagues?
 - d. What were your expectations for teachers' computer use during the school year?
3. Tell me about the how the district supported your teachers in the development of their use of computer technology as part of this initiative.

- a. Potential follow-up focus areas
 - i. Materials, trainings
 - ii. Job-embedded professional learning
 - iii. Coaching
 - iv. Culture of inquiry

- 4. How do you think the culture of your building assisted with or detracted from the success of the one-to-one initiative during the first year?
 - a. Potential follow-up focus areas
 - i. specific leadership actions to support the culture

- 5. Describe the role you played in supporting your teachers during the first year of the one-to-one program.
 - a. Potential follow-up focus areas
 - i. How you supported with materials and training
 - b. Types of professional learning opportunities you provided
 - c. Faculty meetings, grade-level meetings
 - d. Pressure/expectations/flexibility

- 6. Is there anything else you would like to share regarding Bay Point's one-to-one implementation after the first year?

Appendix I

Alignment of Research Questions and Theoretical Domains Framework to Focus

Group Questions

Research Question	Theoretical Domains Framework	Focus Group Questions
RQ1 RQ3	Knowledge Skills Beliefs about Capabilities Environmental Context Optimism Goals Emotion	<ol style="list-style-type: none"> 1. Talk about your use of computers for instruction prior to the one-to-one initiative at Bay Point. <ol style="list-style-type: none"> a. How was computer technology used in your instruction? b. Were you looking forward to this initiative? c. Did you feel like they were prepared to start? d. What were your biggest concerns? e. What were your goals?
RQ2 RQ3	Optimism Memory, Attention, and Decision Making Intentions Goals Behavioral Regulation	<ol style="list-style-type: none"> 2. Let's talk about the implementation process <ol style="list-style-type: none"> e. How was the plan shared with you? f. Were you involved with the planning? g. How were the goals communicated to you and your colleagues? h. What were the expectations for your computer use during the school year?
RQ2 RQ3	Knowledge Skills Reinforcement Environmental Context	<ol style="list-style-type: none"> 3. Tell me about the how the district supported you in the development of your use of computer technology in your instruction as part of this initiative. <ol style="list-style-type: none"> a. Potential follow-up focus areas <ol style="list-style-type: none"> i. Materials, trainings ii. Job-embedded professional learning iii. Coaching iv. Culture of inquiry

RQ1	Environmental Context Social Influences Social/Professional Role and Identity Behavioral Regulation	4. In what ways did you and your colleagues support each other during the first year of the one-to-one initiative?
RQ2 RQ3	Reinforcement Goals Behavioral Regulation Beliefs about Consequences	5. Talk about the various ways you felt supported by your building administrator during the first year of the one-to-one program. <ol style="list-style-type: none"> a. Potential follow-up focus areas <ol style="list-style-type: none"> i. How administrator supported with materials and training ii. Types of professional learning opportunities iii. Faculty meetings, grade-level meetings iv. Pressure/Expectations/flexibility

Appendix J

Alignment of Research Questions and Theoretical Domains Framework to

Interview Questions

Research Question	Theoretical Domains Framework	Interview Question
RQ1 RQ3	Skills Beliefs about Capabilities Environmental Context Optimism Goals Emotions	1. Talk about what it was like in your building regarding instructional technology use prior to the one-to-one initiative at Bay Point. <ol style="list-style-type: none"> a. Were teachers looking forward to this initiative? b. Did they appear like they were prepared to start? c. What were their biggest concerns?
RQ2 RQ3	Optimism Memory, Attention, and Decision Making Intentions Goals Behavioral Regulation	2. Let's talk about the implementation process <ol style="list-style-type: none"> a. How was the plan shared with you and your teachers? b. Were you and your teachers involved with the planning? c. How were the goals communicated to you and your colleagues? d. What were your expectations for teachers' computer use during the school year?
RQ2	Knowledge Skills Reinforcement Environmental Context	3. Tell me about the how the district supported your teachers in the development of their use of computer technology as part of this initiative. <ol style="list-style-type: none"> a. Potential follow-up focus areas <ol style="list-style-type: none"> i. Materials, trainings ii. Job-embedded professional learning iii. Coaching iv. Culture of inquiry

RQ2	Environmental Context Social Influences Social/Professional Role and Identity Behavioral Regulation	4. How do you think the culture of your building assisted with or detracted from the success of the one-to-one initiative during the first year? <ul style="list-style-type: none"> a. Potential follow-up focus areas <ul style="list-style-type: none"> i. specific leadership actions to support the culture
RQ2 RQ3	Reinforcement Goals Behavioral Regulation Beliefs about Consequences	5. Describe the role you played in supporting your teachers during the first year of the one-to-one program. <ul style="list-style-type: none"> a. Potential follow-up focus areas <ul style="list-style-type: none"> i. How you supported with materials and training b. Types of professional learning opportunities you provided c. Faculty meetings, grade-level meetings d. Pressure/expectations/flexibility

Appendix K

The Theoretical Domains Framework

Domain	Constructs
1. Knowledge	Knowledge Procedural knowledge Knowledge of task environment
2. Skills	Skills Skills development Competence Ability Interpersonal Skills Practice Skill assessment
3. Social/Professional Role and Identity	Professional Identity Professional role Social Identity Identity Professional boundaries Professional confidence Group identity Leadership Organizational commitment
4. Beliefs about Capabilities	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence
5. Optimism	Optimism Pessimism Unrealistic optimism Identity
6. Beliefs about Consequences	Beliefs

		<ul style="list-style-type: none"> Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents
7.	Reinforcement	<ul style="list-style-type: none"> Rewards Punishment Consequents Reinforcement Contingencies Sanctions
8.	Intentions	<ul style="list-style-type: none"> Stability of intentions Stages of change model Transtheoretical model and stages of change
9.	Goals	<ul style="list-style-type: none"> Goals (distal/ proximal) Goal priority Goal/target setting Goals (autonomous/controlled) Action planning Implementation intention
10.	Memory, Attention and Decision Processes	<ul style="list-style-type: none"> Memory Attention Attention control Decision making Cognitive overload/tiredness
11.	Environmental Context and Resources	<ul style="list-style-type: none"> Environmental stressors Resources/material resources Organizational culture/climate Salient events / critical incidents Person x environment interaction Barriers and facilitators
12.	Social influences	<ul style="list-style-type: none"> Social pressure Social norms Group conformity Social comparisons Group norms Social support Power

Intergroup conflict
Alienation
Group identity
Modeling

13. Emotion

Fear
Anxiety
Affect
Stress
Depression
Positive/negative affect
Burn-out

14. Behavioral Regulation

Self-monitoring
Breaking habit
Action planning

Cane, O'Connor, & Michie, 2012