

Summer 8-19-2019

## Correlation Study Between School Administrators' Technology Leadership Preparation and Technology Integration

Jaime Villarreal  
Concordia University - Portland, [jvillarreal13306@gmail.com](mailto:jvillarreal13306@gmail.com)

Follow this and additional works at: [https://digitalcommons.csp.edu/cup\\_commons\\_grad\\_edd](https://digitalcommons.csp.edu/cup_commons_grad_edd)



Part of the [Educational Leadership Commons](#), and the [Educational Technology Commons](#)

---

### Recommended Citation

Villarreal, J. (2019). *Correlation Study Between School Administrators' Technology Leadership Preparation and Technology Integration* (Thesis, Concordia University, St. Paul). Retrieved from [https://digitalcommons.csp.edu/cup\\_commons\\_grad\\_edd/285](https://digitalcommons.csp.edu/cup_commons_grad_edd/285)

This Dissertation is brought to you for free and open access by the Concordia University Portland Graduate Research at DigitalCommons@CSP. It has been accepted for inclusion in CUP Ed.D. Dissertations by an authorized administrator of DigitalCommons@CSP. For more information, please contact [digitalcommons@csp.edu](mailto:digitalcommons@csp.edu).

Summer 8-19-2019

# Correlation Study Between School Administrators' Technology Leadership Preparation and Technology Integration

Jaime Villarreal

*Concordia University - Portland*

Follow this and additional works at: <https://commons.cu-portland.edu/edudissertations>



Part of the [Educational Leadership Commons](#), and the [Educational Technology Commons](#)

---

## CU Commons Citation

Villarreal, Jaime, "Correlation Study Between School Administrators' Technology Leadership Preparation and Technology Integration" (2019). *Ed.D. Dissertations*. 300.

<https://commons.cu-portland.edu/edudissertations/300>

This Open Access Dissertation is brought to you for free and open access by the Graduate Theses & Dissertations at CU Commons. It has been accepted for inclusion in Ed.D. Dissertations by an authorized administrator of CU Commons. For more information, please contact [libraryadmin@cu-portland.edu](mailto:libraryadmin@cu-portland.edu).

Concordia University–Portland

College of Education

Doctorate of Education Program

WE, THE UNDERSIGNED MEMBERS OF THE DISSERTATION COMMITTEE  
CERTIFY THAT WE HAVE READ AND APPROVE THE DISSERTATION OF

Jaime Villarreal

CANDIDATE FOR THE DEGREE OF DOCTOR OF EDUCATION

Jillian Skelton, Ed.D., Faculty Chair Dissertation Committee

Dion Jones, Ph.D., Content Specialist

Dana Shelton, Ed.D., Content Reader

Correlation Study Between School Administrators' Technology Leadership Preparation and  
Technology Integration

Jaime Villarreal  
Concordia University–Portland  
College of Education

Dissertation submitted to the Faculty of the College of Education  
in partial fulfillment of the requirements for the degree of  
Doctor of Education in  
Educational Leadership

Jillian Skelton, Ed.D., Faculty Chair Dissertation Committee

Dion Jones, Ph.D., Content Specialist

Dana Shelton, Ed.D., Content Reader

Concordia University–Portland

2019

## **Abstract**

Technology in the classroom takes many innovative and creative forms and inevitably many different roles. Since the turn of the century educational technology is perceived as possessing an exceeding potential to change the delivery of instruction but more significantly the student learning process. Strategies to implement the use of technology in the classroom continue to evolve with results ranging from effective use of technology that enhances learning to poor use of technology that has no effect on student learning. Past studies focused on teacher roles in technology implementation generated significant data that continues to guide new integration strategies without significant results. This study focuses on a gap in research where the target group to analyze is school administrators, from both elementary and secondary grade levels, within the context of their role in the implementation process of educational technology. Quantitative data collected through a survey questionnaire was analyzed for a correlation between technology implementation and school leaders' technology preparation. The analysis also considered their outlook towards educational technology within the process of implementation. The results of that data analysis found a strong relationship between technology implementation in schools and the school leaders' outlook or perception of technology in the classroom.

*Keywords:* creative, educational technology, innovative, instruction, integration strategies, technology, technology implementation

## **Dedication**

I dedicate this doctoral study to my wife, Lupita and our daughter Jasmine for their support, prayers, and continued encouragement. I could not have completed this doctoral journey without their inspiration and their sacrifice as they continued to endure through my absence while I was away writing or studying. I love you both so much and thank God for your love and care.

I want to give special thanks to my mother and father for their support and guidance. Thanks, dad, for teaching me the value of hard work and dedication. Thanks, mom, for being a role model and inspiration in my life of which continues to give me strength as I remember your smile and words of encouragement.

To all my family and friends, thank you for your words of encouragement when I needed it the most.

Thank you, my Lord, Jesus Christ for giving me the strength, grace, wisdom, and love to reach this milestone in my life. Thank you for believing in me when I did not feel capable to finish this journey. I dedicate this accomplishment to Your Honor and Glory.

## **Acknowledgements**

I would like to acknowledge Dr. Jillian Skelton for her exceeding continued support throughout my dissertation completion journey. Without her wisdom and guidance, I would not have continued in the doctoral program or contemplated the fulfillment of this achievement. Thank you for going above and beyond your duties to assist me demonstrating genuine care for my personal circumstances as I progressed in this journey.

## Table of Contents

Abstract .....	ii
Dedication .....	iii
Acknowledgements .....	iv
List of Tables .....	ix
List of Figures .....	x
Chapter 1: Introduction .....	1
Background .....	4
Context and History .....	5
Conceptual Framework .....	7
Statement of the Problem .....	8
Purpose of Study .....	9
Research Questions .....	10
Significance of the Study .....	11
Definition of Terms .....	12
Assumptions .....	13
Limitations and Delimitations .....	14
Summary .....	15
Chapter 2: Literature Review .....	16
Subjective Interest .....	16
Introduction .....	18
Technology Integration .....	20
Conceptual Framework .....	21



Review of Research Literature and Methodological Literature.....	23
Principals’ technology leadership role. ....	23
Technology integration structure. ....	25
Teachers’ technology integration role.....	26
Technology integration factors.....	27
Technology integration outlook. ....	28
Technology integration proficiency. ....	30
Technology integration planning. ....	32
Technology integration apprehensions. ....	32
Technology integration training.....	34
Integration challenges. ....	35
Review of Methodological Issues .....	38
Synthesis of Research Findings .....	39
Critique of Previous Research .....	46
Summary .....	48
Chapter 3: Methodology .....	51
Research Questions .....	52
Variables .....	53
Purpose and Design of the Study .....	55
Target Population.....	58
Sample.....	58
Instrument .....	59
Data Collection .....	61
Data Analysis Procedures .....	61

Limitations and Delimitations of Research Design .....	63
Internal and External Validity.....	65
Expected Findings.....	66
Ethical Issues .....	67
Summary .....	68
Chapter 4: Data Analysis and Results.....	71
Description of the Sample.....	72
Descriptive Statistics.....	73
Inferential Statistics .....	77
Detailed Analysis .....	81
Summary of Results.....	83
Summary .....	84
Chapter 5: Discussion and Conclusion .....	86
Summary of Results.....	86
Discussion of the Results .....	88
Discussion of Results in Relation to the Literature .....	91
Limitations .....	96
Implications and Recommendations .....	97
Conclusion .....	100
Appendix A: Questionnaire .....	107
Appendix B: Consent Form .....	111
Appendix C: District Invitation Letter.....	112
Appendix D: Participant Invitation Letter .....	113

Appendix E: District 1 Permission Letter .....	114
Appendix F: District 2 Permission Letter .....	115
Appendix G: Survey Author Permission Email.....	116
Appendix H: Survey Author Permission Email to Publish Survey .....	117
Appendix I: Statement of Original Work.....	118
Appendix J: IRB Research Study and Consent Letter Approval .....	120

## List of Tables

Table 1. <i>Descriptive Statistics</i> .....	73
Table 2. <i>Spearman's rho Correlation Coefficients</i> .....	80

## List of Figures

Figure 1. <i>The distribution of overall scores for the NETS-A.</i> .....	82
---	----

## **Chapter 1: Introduction**

At the beginning of the 21st century, new instructional technologies created a need for effective and efficient implementation strategies. Instructional technologies consist of any type of tool or resources that support instruction in the classroom. Tools can consist of a pencil, chalk, whiteboard, calculator or any other instructional instrument used for learning. Resources could include electricity or more recently internet or instructional software. New technologies captivated the attention of school leaders as students' exposure to technology impacts their method and style of learning. Implementing technology into today's classrooms is a challenge for school leader's that proves to be more involved than only acquiring new technologies for students and teachers. School leaders within their role of technology leaders entails more in-depth participation in the implementation of technology in the classroom. Technology leadership can include using technology for administrative purposes modeling the value and importance of technology use in education. In an in-depth participation technology leadership entails specific practices that provide guidance, support and resources to educators in the process of implementation. Educators became implementers of new instructional technologies that became available creating a need for involved technology leadership that provides professional development and reforms in existing instructional practices. Government and school administration leaders believed that an essential part of changing the education system that would improve instruction and student learning included the provision of innovative technology to educators and students (Berrett, Murphy, & Sullivan, 2012).

Unfortunately, providing a classroom with instructional technologies does not guarantee that their implementation will be efficient and at the expectation level of education reform leaders. For example, more computers and internet access in the classroom did not generate

change and improvements in learning as expected. Technology did increase the efficiency of existing instructional practices but did not create new and innovative methods in learning (Holbrook, May, Albers, Dooley, & Flint, 2012). In a nationwide survey conducted a decade after the turn of the century revealed a minor increase in the use of technology that focused more improving existing tasks into practices driven by new technology. The expected change in teaching with new technology-based projects and assignments did not occur (Means, 2010). A disconnect appears to exist between new technology and technology integration in the classroom. Undoubtedly, new technology devices that make current practices more efficient have improved some instructional preparation tasks. Nevertheless, technology integration possesses a valuable to potential to impact student learning if effective planning, guidance, and support is provided. Means (2010) explained that technology implementation is done by a limited number of teachers that take a self-motivated approach to try different strategies to enhance their teaching methods with technology. Teachers that take initiative and an innovative approach to technology integration are isolated cases and not a general or broadly increasing movement in schools (Means, 2010).

Technology continues to appear in the forefront of many schools with different levels of integration practices that have some or no effect in student learning. Since the last decade of the 19th century to the first decade of the 20th century, Means (2010) explained that research demonstrates how past implementation recommendations developed from studies in technology integration made by different researchers relate diverse integration strategies to technology use in the classroom. Technology utilization implemented within a school's vision and curriculum was a recommendation made based on research. Classrooms will reflect more technology integration if implementation strategies are included and executed according to a school's vision and

curriculum. Technology integration through school leadership guidance and support showed a correlation to effective technology integration in the classroom. Recommendations also included the provision of focused teacher training that is designed to integrate technology that is student-centered. Correlation was found between training and technology use in the classroom with a link to student learning resulting from technology integration. Studies also recommended technology integration with the focus on teacher training based on implementation of educational software and development of innovative strategies. Correlation was found between implementation training and technology use in the classroom and links were found to improved student performance. Continuous teacher trainings rather than one-time training correlated to effective technology integration with enhanced student learning. Training that engaged educators in the development of technology driven instructional methods correlated with successful technology implementation. The accessibility of computers with internet capability, according to research, demonstrated an increase in technology use in the classroom and enhanced student learning. The provision of adequate technological support in conjunction with teacher collaboration as part of the integration process correlated to increased technology use in the classroom and enhanced student learning (Means, 2010).

Critical factors in the implementation of technology include the infrastructure of school systems, the preparation of teachers, and support resources. The key determinant, however, is on the technology role of school administrators and their ability to lead the change process required by new technology-driven teaching practices. Past research studies revealed that the bulk of the implementation focus was placed on teachers rather than on school administrators (Brockmeier, Sermon, & Hope, 2005). Consequently, more research is currently needed that will analyze the



preparation of school administrators as technology leaders as they influence the technology implementation process (Machado & Chung, 2015).

## **Background**

In my experience, as an educator, the integration of technology into the classroom provides both a vital opportunity to improve learning and a set of new challenges to overcome. Students, teachers, and school leaders become captivated by the unlimited possibilities that innovative technology provides in transforming the learning environment. On the surface, it appears to be an easy task to acquire and implement new technologies into existing learning methods. The process of successful technology implementation is significantly more complex and demanding as recent research studies have demonstrated. In a study by Webster (2017) several beliefs related to technology integration were analyzed. The results demonstrated that technology related assumptions play a key role in how school leaders choose to direct integration initiatives. A common assumption followed by school leaders is that technology provision by itself will inevitably produce effective integration of technology in the classroom (Webster, 2017). Consequently, it is very common that decisions made by school leaders are limited in their understanding of the key factors that produce effective use of technology in schools.

Berrett et al. (2012) explained that a critical factor in the effective implementation of technology requires for school leaders to address the provision of quality assistance for educators that are engaged in the integration of technology. Teachers that believe that new technology will improve learning will depend on a continued support service from their school administrators during the utilization of new hardware and software in the integration process (Berrett et al., 2012). Federal policies and initiatives such as the No Child Left Behind Act (NCLB) and the Enhancing Education Through Technology (EETT) project demanded that integration of

technology become essential in the evolution of education structures (Berrett et al., 2012).

Consequently, a need for more research in the field of technology integration, school leadership, and infrastructures became inevitable.

### **Context and History**

Technology use in the classroom continues to take different forms and roles in its impact on delivery of instruction and the overall learning process. From using technology as a method of duplicating practice worksheets, to school library resources that are available digitally, to how student presentations are developed and delivered, technology integration is a vital component of teaching practices (Norton & Wiburg, 2003). Technology continues to become a teaching tool with a high level of potential that is sought after by school leaders, teachers, and students. For more than five decades a technology movement captivated the attention of a learning society that witnessed evolving methods of news delivery through radio transmission to televised media, and now to computer based technologies. More than taking a replacement type role, educational technology is becoming an instrument of change that are inevitable changing the teaching and learning methodologies (Norton & Wiburg, 2003). Educational technology as an instrument of change will therefore require school leaders and teachers to become agents of change to direct its impact in the field of education. The phase of technology implementation that requires significant planning and involvement is the process of aligning technology to meet specific instructional needs. Consequently, successful technology integration occurs when technology utilization enhances learning by creating an innovative student-centered environment in which new skills and knowledge are acquired.

Technology integration models according to past studies reveal certain misconceptions that hinder effective implementation models. The assumption that the provision of more

technology to school will inevitable enhance instructional practices and student performance is not support according to studies (Inan & Lowther, 2010). The trend in past implementation initiatives tend to begin with enthusiasm resulting from the list of promises displayed at the introduction of technology to teachers which eventually dissipates as technological hurdles develop during integration. Eventually, new technologies which appear to help improve instruction create technological challenges which, if not addressed with appropriate support from administration will lead to technologies stored away and left unused (Berrett et al., 2012). Consequently, as directives trickle down to educators initially from federal and state government entities, school leadership and administrators must carry the technology implementation policies and develop appropriate integration models. School leaders and administrators are a key aspect in developing a strategic approach on how to lead and support educators in the implementation process of instructional technology (Berrett et al., 2012).

In a study conducted in 2000 using quantitative data collected with a survey questionnaire, the National Center for Education Statistics (NCES) found that approximately one-fourth of 1,674 participating educators acknowledged having the preparation to implement technology effectively in the classroom (Inan and Lowther, 2010). A decade after that study a national report reveals that only one-fifth of states have mandates in place where technology preparation and testing is required to be involved in trainings related to technology integration (Inan & Lowther, 2010). Though technology is being introduced nationwide at different levels, the accountability measures to ensure that training and positive outlooks are utilized towards integration in the classroom do not exist at a significant percentage level.

## **Conceptual Framework**

The framework of research in the field of technology leadership and integration tends to focus on specific technology standards developed since the turn of the century (Anderson & Dexter, 2005). The technology standards used to evaluate school administrators' role in technology integration are known as NETS-A standards and include the following categories:

1. Leadership and Vision
2. Learning and Teaching
3. Productivity and Professional Practice
4. Support, Management, and Operations
5. Assessment and Evaluation
6. Social, Legal, and Ethical Issues (Anderson & Dexter, 2005).

These standards address vital aspects of technology leadership concerning school leaders' perspectives in the integration process of new technologies in the classroom (Anderson & Dexter, 2005). Though the established technology standards are fundamental in the integration of technology, a review of new research provides insight into what standards need further development, modification, or inclusion. Research studies by Berrett et al. (2012) and Machado and Chung (2015) focused on school leaders' technology proficiency and leadership traits to determine their level of impact on the successful integration of technology. One study assessed the technology proficiency of school leaders based on knowledge and perception of their leadership role in the technology integration process (Berrett et al., 2012). The second study also addresses how the leader perceives their leadership role and includes an assessment of their attitudes toward the technology integration process (Machado & Chung, 2015). The inquiries made in the study by Machado and Chung (2015) included the following:

1. What are the school administrators' perceptions of technology as a critical factor in improved student performance in the classroom?
2. Do school administrators approve the initiatives that support educators during the technology integration process?
3. Do school administrators consider the need for technology facilitators to assist teachers as a priority?

The focus of these two studies illustrate the main components of the conceptual framework this study analyzed in relation to school leadership and successful technology integration.

Technology leadership preparation, based on research, is assumed to be a vital factor in successful technology integration in schools. Technology preparation on research conducted in the area of integration centered on teachers as the primary contributor to the successful implementation process. Machado and Chung (2015) acknowledged a gap in research where the focus is on the school administrators' technology preparation in relation to implementation. This study focuses on how technology preparation and technology perceptions possessed by school leaders, affect technology implementation in the classroom.

### **Statement of the Problem**

This study shows an analysis of how prepared school administrators are to implement technology in schools effectively. It is not known if there is a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools. Within the concept of preparation, this study analyzes specific leadership elements that direct a school administrators' perspective of technology integration in schools. According to Machado and Chung (2015), technology's promise to deliver improved learning occurred if and only if its implementation is effective and efficient. Machado and Chung (2015)

stated, “Any tool is fruitless without proper integration” (p. 1). Their research revealed that the role of school administrators in the implementation model selected is the determining factor that this study intends to investigate further (Machado & Chung, 2015).

### **Purpose of Study**

The purpose of this quantitative correlational study is to determine if there is a significant relationship between school administrators’ training in technology leadership and the successful implementation of technology in schools. The technology integration process is more than acquiring technology hardware and software for teacher and student use. Technology leadership training of school leaders as well as their perception of technology implementation are factors that are considered in this study within the technology integration process. According to past research technology integration consists of leading indicators that range from setting a technology budget to providing on-hand technology support for teachers (Machado & Chung, 2015). The focus of this quantitative study is to further understand the correlation between administrators’ technology leadership skills and successful technology implementation practices.

Past research done on teachers integrating technology in the classroom reveals that the perception of technology plays a crucial role in its practical implementation (Inan & Lowther, 2010). This revelation leads research to consider the perception factor to school leaders as a critical component within their technology preparation and proficiency. Within the relationship between leadership and technology integration, the effective administration of reforms in existing instructional practices is also a determining factor (Berrett et al., 2012). Inevitably change is a significant challenge within a school system that attempts to implement new instructional technologies. Modifications required by technology integration are not limited to enhancing instructional practices on the part of the teacher but mostly become student-focused

improving the learning dynamics in the classroom. Consequently, a gap in research studies is the intent to investigate what specific leadership attributes within the context of technology integration need further development for school administrators to be more prosperous (Machado & Chung, 2015).

## **Research Questions**

The first research question investigated in this study includes the following:

R<sub>1</sub>: What is the relationship between school administrators' training in technology leadership and the successful implementation of technology in schools?

The hypothesis statements considered for the first research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

The second research question investigated in this study includes the following:

R<sub>2</sub>: What is the relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools?

The hypothesis statements considered for the second research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

## **Significance of the Study**

The primary benefit of this study is to gain more insight into the significance of technology leadership preparation in respect to its influence on the technology implementation process at schools. In a study on the challenges faced by teachers during the technology implementation, administrative support was the second highest influencing factor after professional development (Inan & Lowther, 2010). Inan and Lowther (2010) explained that technology integration in schools divides into three main components that include technology for planning, for teaching, and learning. Technology integration that only focuses on the planning and delivery of instruction are teacher-centered while technology use by students to learn by using it to explore and learn is student-centered (Machado & Chung, 2015). Consequently, past research focuses on the role of teachers and students in the implementation process and need to study the role of administrators in integration now exists (Brockmeier et al., 2005).

Understanding technology leadership aspects of school administration produced valuable knowledge and insight necessary to improve their perception, understanding, and approach to technology integration. Past studies stand firm in acknowledging that school leadership plays a crucial role in technology integration but do not provide clear findings on what aspects of technology preparation can be improved (Berrett et al., 2012). According to research by Machado & Chung (2015), their findings demonstrated that a high percentage of school administrators firmly believe and value the need for technology integration, the need for more continued training, and the need for technological coaching support for teachers. Nevertheless, results also demonstrated that actions taken by the same school administrators revealed that technology integration support was significantly (Machado & Chung, 2015). Therefore, the question is why there a gap exists between school administrators' beliefs and actions in the field



of technology integration knowing that its successful implementation produced improved student performance.

### **Definition of Terms**

**Instructional technology.** The use of multimedia devices in the classroom to improve the quality of instruction and the level of learning in the school (Gujjar, Choudhry, & Page, 2008).

**Leadership.** A compilation of character traits demonstrated by a person of influence exercising the role of a leader within the framework of a business or institution (Sugar & Holloman, 2009).

**School technology leadership.** Leadership defined as having the following technology NETS-A standards:

1. Leadership and Vision. The development of a common set of ideas for technology utilization and make certain that the necessary tools, guidance and environment is set up execute established goals (ISTE, 2002).
2. Learning and Teaching. The development of a learning atmosphere that is collaborative, rigorous, and has diverse teaching methods that are student-centered (ISTE, 2002).
3. Productivity and Professional Practice. Leadership practices that show teachers how to effectively use technology and implement efficient communication components between school leaders, teachers, students and parents (ISTE, 2002).
4. Support, Management, and Operations. Leadership practices that focus on the provision of guidance on how to utilize technology to manage and operate a school

including the budgeting of finances to support the technology implementation process (ISTE, 2002).

5. **Assessment and Evaluation.** Leadership practices where technology is utilized measure student learning and assess if school standards of accountability are met accordingly (ISTE, 2002).
6. **Social, Legal, and Ethical Issues.** Leadership practices that focus creating mindfulness of the correct use of technology, the accessibility of technology, and the legal and ethical rules related to technology use (ISTE, 2002).

**Servant leadership.** This is the type of leadership that centers on leading through the provision of service to others by meeting their needs to support the overall efforts of meeting specific organizational goals (Northouse, 2013).

**Student-centered.** The current guidance and leadership focused on providing students with the necessary support in the process of adjusting to new methods of learning that promote academic progress (Sugar & Holloman, 2009).

**Technology implementation or integration.** The process of successfully adapting new instructional technologies into the existing curriculum improving both instruction and learning in the classroom (Berrett et al., 2012).

**Technology Professional Development.** Training in which school leaders engage in experiential learning activities that promote knowledge acquisition of new technologies and their application (Howell, Reames, & Andrzejewski, 2014).

## **Assumptions**

The expectations in this study that provide validity to its findings include the following:

1. Participating school administrators will offer their perspectives, opinions, and beliefs in the completion of the survey questionnaire.
2. Participating school administrators are familiar with instructional technologies that teachers are expected to implement in the classroom.
3. The implementation of educational technology is a critical, innovative factor in the improvement of teaching and learning in the classroom.

### **Limitations and Delimitations**

The limitations foreseen in this study that may affect the research structure consists of the availability of participants and their disposition to complete a survey. Participants of this study are school administrators, considerably bounded by busy administrative duties and meetings. In similar studies with comparable samples sizes the participation results were about one-fifth of the total surveys sent out (Machado & Chung, 2015). Participation in the study was not controlled and primarily depended on providing clear and inviting information to school administrators of the participating school district. The timing of the survey administration also contributed to the level of participation. During the academic school year state assessments are administered during specific periods and include a total shut down of daily instructional events.

This study is delimited to two public school districts in Texas. School districts invited to participate include K–12 grade levels. Participants in this study includes school administrators which were invited, via e-mail delivery, to participate in completing a 64-question survey. School administrators included principals and assistant principals of participating school districts. The survey questionnaire was developed and shared through the online resource Qualtrics. The design of the survey analyzes the diverse aspects of leadership qualities within the context of managing the technology implementation process of a school. The survey utilized is

designed based on the STCP-NETS-A questionnaire developed by Mark Weber which assessed the type and level of involvement of school administrators in technology implementation practices (Draper, 2013; Weber, 2006). The four categories assessed by the survey include the usage of educational technology, the amount of technology preparation acquired, school administrator's perception towards technology implementation, and characteristics related to the infrastructure of technology implementation. These delimitations were the parameters by which this study is designed to investigate correlations between school administrators' technology training and outlook towards technology and the implementation of technology in the classroom.

### **Summary**

This study aims at using quantitative data from school administrators to understand and identify the key leading indicators that effectively support the technology implementation in the classroom. The correlative analysis of leadership preparation and the effective use of educational technology in the classroom provides new knowledge beneficial to current and future use of technologies for learning. This research attempts to magnify and addressing the contrast between acquiring and using technology for learning in the classroom (Machado & Chung, 2015). Consequently, findings facilitated the necessary transition of many schools from being passive to active users of educational technology to improve instruction and develop innovative lifelong learners. The following chapters provide a perspective on technology integration and technology leadership based on past research, a clear explanation of the methodology to be utilized, the analysis of collected data, and overall results and conclusions.

## **Chapter 2: Literature Review**

Technology in schools created new methods of learning for students as well as new challenges for educators and school leaders. Inevitably more technological resources meant that schools could change traditional forms of instruction into advanced forms of collecting, delivering, and presenting information as part of the learning process in the classroom (Norton & Wiburg, 2003). Herman (as cited by Brockmeier et al., 2005) stated, “Technology would provide new instructional options for students, which would be a means for achieving dramatic transformations in curricula and instructional processes” (p. 45). The purpose of this quantitative correlational study is to determine if there is a significant relationship between school administrators’ training in technology leadership and the successful implementation of technology in schools.

### **Subjective Interest**

In 21 years of educator experience, my challenge continues to be a constant pursuit of discovering new and innovative teaching strategies that engage students in their learning process. Though the foundation of instruction is an unchanging commitment to share knowledge through methods that share explicit and tacit knowledge, the inevitable change challenge lies in the system of learning that 21st century learners require. There are teaching practices that will always be vital to building a learning environment such as strong interpersonal skills that are necessary for developing a rapport with students and a sound curriculum that addresses all learning objectives. In contemplation of these two aspects of instruction is that technology integration must be led strategically to improve the learning experience for students without compromising the foundation of teaching.

In my career journey, my decision to obtain a master's degree in educational technology stemmed from the desire to learn new instructional methods that utilized technology to reinforce existing teaching practices. Within graduate studies, knowledge learned included the use of collaborative technologies such as web 2.0 tools which provide the means for expanding student learning experiences and making learning more student-centered. Consequently, implementation of new technologies into existing instructional practices successfully engaged students in learning with technology that was relevant and compatible to their style of learning. Inquiring about what technology was available at our school campus led to the discovery that newly acquired technological resources were without implementation. The process of investigating the integration process revealed that some technologies were used temporarily and then stored away while other devices and software resources continued to be unused in the classroom. Machado and Chung (2015) stated, "Putting technology in the classrooms gives teachers the tools of the 21st century; however, the energy is only potential waiting to become kinetic upon integration" (p. 43). The potential was evident that our campus could develop into a leader in the use of instructional technology if only the integration process would improve. Based on conversations with teachers, regarding technology integration, revealed that a significant amount of technology resources remains without usage as a result of improper training or support. Machado and Chung (2015) stated, "Any tool is fruitless without proper integration" (p. 43). Change in the instructional process will only occur if the changes develop throughout an organizational structure that is directly involved in the integration process of educational technology.

Therefore, the central focus of this research is to analyze the role of the school administrator as it relates to the integration process of new technologies into classroom instruction. Within the job description of the school principals, there must be specific practices

that influence the integration process of instructional technology. The focus of this study is to understand the technology role of school principals better and identify the essential traits and skills that they must possess to lead teachers throughout the implementation process of educational technology.

## **Introduction**

The research literature revealed diverse responses to the technology integration challenges presented to school leaders in different parts of the world. Research studies focused on various perspectives of technology integration, its effects on school structures and the causes of its failures and successes in the classroom environment. A common factor that influenced all the aspects of technology integration is the technology role of the school principal. The primary issue of technology integration that must address by school principals is leading teachers in the process of change. Though educational technology offers significant promise in support of enhanced student learning, integration risks are challenging to ignore. Norton and Wiburg (2003) stated, “This leads to accelerated change and uncertainty while simultaneously opening up a wide range of possibilities” (p. 4).

In the process of collaborating with technology integration initiatives at the high school level, I witnessed how a considerable amount of new technology resources utilized inappropriately in the classroom. The technology was becoming merely a new fad in which initially new instructional gadgets were used by teachers and students driven by its novelty but without changing the learning structure. Gura and Percy (as cited by Leonard & Leonard, 2006) stated,

The large quantities of underused computer equipment in schools may be at least to some extent a consequence of teacher' misconception that it is difficult to master, will rob them

of valuable time, and will actually harm students by exposing them to inappropriate information and materials. (p. 215)

Technology usage continued until trouble in its operation was encountered resulting in discontinued use and permanent storage. Other technology was not utilized to its full potential and became replacement tools that did not enhance the learning process whatsoever.

Consequently, technology integration has now become an area in need of research to analyze how the process, its participants, and leaders are more useful in developing change methods that enhance learning.

In the 1990s teachers were perceived to be the key contributors to the integration of educational technology without considering the vital participation of the school principal in the overall process (Brockmeier et al., 2005). The integration process requires more than supplementing instruction with technological gadgets but a change in the instructional planning, preparation, and application. School principals had to become leaders of change. Fullan (2011) stated, “The effective change leader actively participates as a learner in helping the organization improve” (p. 5). The role of the principal in the process of leading technology integration initiatives requires engaged participation in which difficulties and needs are experienced and resolved in collaboration with teachers in the forefront.

This chapter demonstrates key concepts related to technology integration in the classroom which involve aspects of technology leadership and preparation. Technology integration is described in relation to its primary functionality in the process of engaging effectively in their learning experience in the classroom. The conceptual framework of this study is developed through an analysis of the components of educational technology as they relate to challenges found in studies regarding implementation strategies. Consequently, the review of



literature that is discussed in this chapter highlights specific factors of technology implementation and technology leadership with insight contributed from past research. Reviews include the role of teachers and school leaders within the integration structure that is used in school settings attempting to infuse technology into the learning process. Research also demonstrates how technology leadership training and outlook towards technology possessed by school leaders and teachers has an impact to the effectiveness of integration.

Another major aspect of technology integration is how decision-making skills of school leaders influence the planning and professional development provided to educators. Studies demonstrate that the approaches taken by school leaders to address the challenges experienced by teachers using technology is vital to the continued use of technology in the classroom. Teachers in the process of integrating technology experience a need for support and guidance to confront apprehensions towards technology which entail technology leadership support from school administrators. Technology integration research reviews shared are synthesized and critiqued in this chapter to demonstrate where studies led technology integration initiatives and where this and future studies will target research.

### **Technology Integration**

The concept of technology integration consists of the process of utilizing tools of information and communication technology (ICT) for classroom instruction (Reid, 2002). According to Reid (2002), the integration of instructional technology includes tools, “such as internet applications, CD-ROMS, video technology, and various computer attachments and software programs has caused many changes in society” (para. 4). Technology integration increases the number of information resources available as well as the available methods to collaborate and network with other students across the world in related topics. Reid (2002)

explained that the internet brings information, data images, and even computer software into the classroom from places otherwise impossible to reach, and it does this almost instantly (para. 5). For example, implementation of a networking feature into one of my geometry lessons in which a NASA engineer discussed how proportion applications in the real-world through an interactive video conference from our classroom. The impact of the video conference was exceedingly interesting and relevant to students as they learn how specific geometry concepts apply in the NASA operations. Norton and Wiburg (2003) stated, “The act of communicating engages students in the symbolization of understandings gleaned from information” (p. 174). Effective technology integration does not place the focus on the technology but instead utilized technologies with an emphasis on completing an assignment or task (Norton & Wiburg, 2003).

### **Conceptual Framework**

Technology integration into the 21st century classroom has developed diverse challenges in reforming instructional strategies through appropriate utilization of new and innovative technologies. Technologies ranging from wireless interactive calculators to Smartboards are requiring for teachers to be trained and led a process of technology implementation to improve learning in the classroom. The research inquiry addressed considers the issue of “Why new instructional technologies have not been successfully integrated causing a significant improvement in the quality of instruction and learning in today’s instructional setting?” Machado and Chung (2015) stated, “Any tool is fruitless without proper integration” (p. 43).

Within the structure of technology integration in the classroom, there are several key factors in play to produce the desired outcome. Though infrastructure and professional development are areas of research, the driving force is the role of the school principal as a technology leader. Anderson and Dexter (as cited by Anthony & Patravani, 2014) stated,

“Technology leadership is an emerging role that has been found to have a greater impact on schools' educational uses of technology than access to equipment and technological infrastructure” (p. 8). Past research demonstrates that a school principal's knowledge and experience in educational technology will impact the effectiveness of its implementation (Machado & Chung, 2015).

The needs that must be addressed by school principals include motivation, preparation, and continuous support of teachers involved in the implementation of technology. Machado and Chung (2015) explained that studies revealed an existing relationship between a teacher's performance in the process of technology integration and the support provided by principals. Principals provide the vision and direction of all school-related initiatives that should develop motivation and support of teachers and staff to invest effort and willingness to reach a specific goal or outcome. Machado and Chung (2015) stated, “If principals are to establish funds for technology tools, create a technology integration vision, and push for adequate professional development of teachers, they must believe that proper technology integration boosts student achievement” (p. 44). Similarly, school principals must address the aspect of providing teachers with appropriate training and follow-up support that will facilitate the integration process.

Overall, the focus of this research study is to analyze the specific aspects of the school principal as a technology leader that influence the successful integration of new technologies in the classroom. Past research has revealed that school principals are a vital factor in the success of all school-related initiatives. Consequently, the purpose of this study is not limited to the discover a correlative relationship, but study it and find specific leadership traits that school principals need to change or explore to improve technology integration.

## **Review of Research Literature and Methodological Literature**

The review of literature process included a targeted search of articles that provided relevant, reliable, and credible information on the topic of technology integration and leadership. The search libraries included educational databases such as ERIC (ProQuest), Education Database (Proquest), and Dissertations & Theses Global (ProQuest) which provide through Concordia University online library resources. Keywords utilized were technology integration, technology leadership, instructional and educational technology, and school leadership. Research articles and dissertations on past studies provide valuable insight their research study findings and methodology approach. Lafont (2011) developed a dissertation with the same topic of interest which offered valuable insight on what aspects of technology leadership and integration have significant research and what issues have not been addressed or studied.

**Principals' technology leadership role.** The review of the literature on this research topic provided valuable information regarding the different aspects of technology integration and its dependency on the role of the school principal as a technology leader. A portion of the literature reviewed focused on the specific functions of the school principal that have a direct effect on the successful integration of technology in the classroom. Brockmeier et al. (2005) stated, "What principals do to facilitate the integration of computer technology in the teaching and learning process is a crucial variable" (p. 46). The role of the principal involves more than providing funding to purchase technology and assigning it to teachers expecting for it to be used to its maximum potential and changing the learning structure in the classroom. Hope and Stakenas (as cited by Brockmeier et al., 2005) recommended, "three primary roles for principals: role model, instructional leader, and visionary" (p. 46). In one case study by Anthony and Patravani (2014), a case narrative demonstrates how school leaders that are distant from the

integration process become ineffective leaders providing weak support in the proper utilization of new instructional technologies. Surveys administered to teachers in the case study revealed different integration issues that included inadequate professional development that was irrelevant to using technology within the curriculum (Anthony & Patravani, 2014). Second, surveys showed an increasing amount of time wrongfully invested in computer activities that did not support the school curricula (Anthony & Patravani, 2014). Third, a common feeling of discomfort among teachers in which their level of expertise on technology was below the students' level of experience and knowledge of its functionality (Anthony & Patravani, 2014). Without proper leadership in technology integration teachers feel ill-prepared to use it effectively to enhance learning and improve student academic performance. Machado and Chung (2015) stated, "Any tool is fruitless without proper integration" (p. 43).

Anderson and Dexter (2005) conducted a research analysis on data collected in 1998 within a study by Becker and Anderson (as cited by Anderson & Dexter, 2005) titled Teaching, Learning, and Computing (TLC). The data collected originated from a survey administered to a sample of 898 public, private, and parochial schools (Anderson & Dexter, 2005). The information provided acquired from the TLC survey included results from school principals and technology coordinators (Anderson & Dexter, 2005). Though 898 schools received surveys, only 655 of the 898 schools responded with information related to technology integration in the classroom and the impact of the school principal's technology role. The samples of schools used in the study included only those that used high-level educational technologies and those that were currently participating in some educational restructuring project (Anderson & Dexter, 2005). In this study data analysis focused on specific technology leadership indicators which are directly related to the standards provided by the National Educational Technology Standards for

Administrators (NETS-A) as described by Anderson and Dexter (2005). The key finding in this study demonstrated that the school principal's technology role is essential to the effectiveness of technology integration (Anderson & Dexter, 2005). Anderson and Dexter (2005) stated, “The school's overall technology leadership score had a higher correlation with each technology outcome indicator than did all the infrastructure indicators with each technology outcome” (p. 70). Technology integration, in this research study by Anderson and Dexter (2005), demonstrates how the technology leadership role of school principals has a direct effect on the successful use of technology use in the classroom. There are specific technology leadership practices that need further research to better understand how technology leadership influence technology integration practices.

**Technology integration structure.** In the process of understanding the relationship between school leaders' technology preparation and outlook of technology implementation it is important to understand the overall concept of integration in schools. Liu, Ritzhaupt, Dawson, and Barron (2017) completed a research study in which technology integration was analyzed in relation to levels or pathways with pedagogy as a primary focus. Liu et al. (2017) found that, according to studies, the use of technology in the classroom has diverse results ranging from effective use in the classroom to limited use of technology due to unaddressed apprehensions or curriculum limitations. The study performed by Liu et al. (2017) focused on identifying and analyzing specific factors that affect integration models with diverse levels of proficiency and experience. Variables assessed include a teacher's profile composed of technology experience, education level, educator experience and gender. A school's profile was also assessed based on perceptions toward technology support and accessibility. The context of the learning environment was also assessed based on student grade level and students serviced per classroom.

The described variables were correlated to teacher confidence levels, level of comfortability in using technology, and in due course technology implementation in the classroom (Liu, Ritzhaupt, Dawson, & Barron, 2017). Ertmer (as cited by Liu et al., 2017) defined technology implementation as a procedure where, “technology adds value to the curriculum not by affecting quantitative changes (doing more of the same in less time) but by facilitating qualitative ones (accomplishing more authentic and complex goals.” Definitions of technology integration continue to evolve but are consistent in emphasizing the potential technology possess in reinforcing learning in the classroom without compromising foundational learning principles. Liu et al. (2017) opted to assign a more targeted definition of technology integration that focuses on functionality technology can provide to classrooms by strengthening the diverse types of pedagogy.

**Teachers’ technology integration role.** In the study by Liu et al. (2017) teachers were analyzed according to specific traits that were identified in previous studies as key factors the influence technology integration in the classroom. The specific traits included proficiency levels of teaching with technology, education level, educator experience, and gender. In the process of reviewing past studies Liu et al. (2017) found that in relating each trait there were several correlations respect to technology integration. More experience in teaching with technology and a higher level of education resulted in more effective integration in the classroom. A negative correlation was discovered in some studies that related educator experience with technology integration. According to data analysis teachers with more teaching experience were more reluctant to integrate technology in comparison to teachers with fewer years of experience. It is evident that introducing change to experienced teachers can be a significant challenge to school leaders if integration planning does not consider their perceptions and concerns. Gender has also

demonstrated a correlation in some studies where male teachers have demonstrated a higher level of disposition to integrate technology in comparison to female teachers (Liu et al., 2017). Along with teacher traits, Liu et al. (2017) explained that the level of ease and assurance, within the context of using technology, were analyzed as part of the predictors that determine effective technology integration practices.

**Technology integration factors.** Studies also have demonstrated that the factors related to the schools' technology infrastructure and the class size and grade level are key determinant to integration (Liu et al., 2017). A significant amount of studies demonstrated that the quantity and quality of technology support provided by schools is a primary predictor of effective technology use in the classroom. Some studies found a negative correlation as class size and grade level were compared to integration practices. Smaller class sizes tend to be more practical to implement technology according to studies reviewed (Liu et al., 2017).

In the study developed by Liu et al. (2017) the participants included 1,235 teachers from K–12 Grades which were obtained from 336 schools in 41 school districts from the state of Florida. The teachers that participated were part of a cohort of teachers involved in a grant-funded initiative that targeted the integration of technology into disciplines that included math and science. Through the use of a survey questionnaire teachers provided data in relation to variables being analyzed. The type of dependent variables used as predictors were of the endogenous type assessing teacher's assurance and ease levels, the teacher utilization of technology, and the teacher's implementation of technology in the classroom. The results of the study demonstrated a positive correlation between the amount of teacher use of technology and the amount of technology assistance provided by the school campus. Inversely, there was a negative correlation found between the years of educator experience and the amount of



technology integration that occurred in the classroom. Variables related to the classroom size, grade level, and technology infrastructure demonstrated a positive correlation to technology implementation (Liu et al., 2017). The results demonstrated important relationships that support previous studies but also contribute new insights of the invaluable knowledge that helps create a more defined pathway towards technology implementation.

The study findings, previously mentioned, support the theories of past research implying that extensive experience in teaching with technology has a positive effect on the overall integration process. Liu et al. (2007) recommended that teacher technology use must be intentional and carefully planned to create enough opportunities for teachers to be involved as part of a school wide initiative. Likewise, technology training should be part of the school technology vision in which teachers and school leaders increase their understanding and experience of technology use in education. Technology accessibility is another key predictor that positively affects technology use in the classroom. Nevertheless, accessibility must be a component of an overall strategic plan of integration and not the sole determining factor as demonstrated in previous research studies and confirmed by Liu et al.'s (2017) findings. In conjunction to accessibility data shows that the provision of technology professionals that are available to teachers is a key factor in successful integration practices. The model utilized by Liu et al. (2017) to better understand the demands and key elements of technology integration practices generated vital insight to guide integration strategies developed by school leaders.

**Technology integration outlook.** Technology leadership in schools, based on past research, is driven through ideas and perceptions of how and what technology should be within its potential to enhance learning. In a study conducted with technology directors and specialists, an analysis of qualitative data demonstrated essential norms that affect technology

implementation (Webster, 2017). One research question assessed the philosophical assumptions of technology within the participants' outlook of technology used from pre-school through high school. The result of this inquiry revealed that technology perceived as a tool that will inevitably cause a change in learning in a positive form (Webster, 2017). The second research questions assessed the assumption's level of impact on decisions made by school leaders concerning instructional technologies. The result of the inquiry revealed that curriculum and academic goals are the primary force of technology use in the classroom (Webster, 2017). The third inquiry made in the research study assessed whether the philosophical view impacts the decision-making process by technology leaders that technology causes an inevitable change in education. Webster (2017) explained that the investigation revealed that technology leaders tend to assume that technology will produce positive change regardless of how implementation occurs. This study is evidence of the benefits generated if assumptions made by technology leaders during implementation are assessed to develop effective integration strategies.

In conjunction to the consideration of school leaders' technology integration assumptions the issue of understanding how to assist educators in utilizing technology continues to evolve. In a study that analyzed the challenges encountered by experienced teachers, four areas of importance were evident in providing effective support to teachers in the process of infusing technology into their instructional methodology (Cox, 2013). The four areas of importance that researchers identified consisted of developing a technology plan, tending to teachers' technology apprehensions, assessing the teachers' level of technology proficiency, and establishing a platform where feedback and collaboration connects teachers and administrators. In the process of reviewing findings from technology integration studies Cox (2013) found that technology plans must consider if the outcomes foreseen are creating more challenges than benefits for

teachers that already have a set method of delivering instruction. Leading change initiatives that include technology integration carry a significant responsibility of making informed decisions that will support new and experienced educators.

Studies also demonstrated the benefits of focusing implementation strategies on the teacher's outlook and approach to technology. Liu and Szabo (as cited by Cox, 2013) stated that according to their research findings within a 4-year time period teachers demonstrated a changed perception towards technology as a result of received continued support that effectively addressed their areas of concern. The key element to the successful change of perception was found to be related to how teachers' concerns were being identified and addressed. If the concerns were from an experienced teacher they were addressed differently in comparison to how concerns of new teachers were satisfied (Cox, 2013).

**Technology integration proficiency.** The research study by Cox (2013) consisted of analyzing three experienced teachers that had taught for more than 10 years and were involved in the integration of technology in their classroom. The target research inquiry focused on the teachers' experience in the implementation of technology in their schools located in the west part of Canada. The first research question asked about the teachers' accomplishments and trials as they utilized technology in their classroom. The second questions asked teachers to share on what were the key elements in their accomplishments and trials as they attempted to infuse technology into their instructional methodology. According to the results of the study both experienced and new teachers demonstrated a similar attempt to integrate technology in their classroom to the best of their abilities.

Teachers also shared paralleled experiences in which accomplishments and trials were similar regardless of their different years of teaching experience. The data analysis demonstrated

that their key elements that played a role in the process of integration technology are related to either personal or professional experiences in technology. In sharing their personal experiences with technology the three educators discussed how their family, schooling, and college experiences contributed to the development of their initial perception of technology use. Some of the challenging experiences discussed consisted of issues with time limitations, technological difficulties, and social pressures that drove their technology proficiency construct.

In the professional aspect, teachers shared how access to technology resources, professional development and pressures from governing entities affected their outlook of technology in the classroom. Resources provided by schools were not consistent with the technology skills and knowledge provided to educators. Consequently, a significant amount of disappointment was experienced by teachers during technology integration practices. Similarly, professional development that was provided was not effective in addressing the different levels of technology proficiency possessed by teachers. Training that fails to address specific needs of teachers attempting to implement technology was a common experience shared by the participating teachers. Another common experience that created challenges for teachers using technology is the pressure presented by federal, state, and local district in the implementation of standards and initiatives that required curriculum and instruction compliance by all teachers (Cox, 2013). Due to the innovative movements that developed across the country government imposed guidelines that demanded technology integration created negative challenges that hindered teachers' perceptions of the integration process. Nevertheless, participating teachers did agree that the provision of technology trainings, as part of the innovative initiatives imposed by the government, were beneficial and the key factor to their improvement in technology use. Consequently, the study provided a guide to what effective technology implementation practices

must possess to support teachers in the process of embedding technology into their classroom instruction (Cox, 2013).

**Technology integration planning.** The aspect of planning in the field of technology implementation is a challenge that school leaders confront as technology is made available to their schools. Cox (2013) found that in research studies a gap exists between technology planning and what needs to be addressed for teachers to feel confident in using technology in their instruction. Despite the development of technology plans that targeted curriculum goals and objectives, plans demonstrated a lack of consideration the pedagogy related to the diverse instruction styles of teachers. Cox (2013) observed that research studies where planning was focused on pedagogy used in classrooms the resulting effect was that technology was more readily used in teaching. Planning tended to be more effective when emphasize was appropriately placed on promoting technology as a necessary teaching component with more potential than prior methodologies. The concept of technology integration possessing excessive trials and failures was lessened as part of the technology plan developed. Planning also created a sense of preparedness in which teachers felt confident of their integration abilities and the resources available to them. In Cox's (2013) study participants discussed that on frequent attempts their technology implementation efforts for interrupted when resources and support was not available to them. One participant discussed how some school districts dependent exceeding on consultant training that does not address existing pedagogical needs causing software and or hardware technologies to go unused (Cox, 2013).

**Technology integration apprehensions.** In addition to pedagogy sensitive planning the approach to responding to educators' apprehensions in relation to technology implementation is of vital importance as discovered by researchers Liu and Szabo (as cited by Cox, 2013). The

analysis of teacher apprehensions in the process of integration revealed seven distinct concerns that affected teachers. Through the administration of a survey, the seven areas of concern shared by teachers included, “awareness, information, personal, management, consequences, collaboration, and refocusing” (Cox, 2013, p. 214). The study demonstrated different levels of apprehensions developed through years of technology experience in which significant challenges were encountered. The areas with the highest levels of concern was the amount of information acquired in relation to what is necessary to successfully implement technology; the concern of change or impact in how their teaching practices; and the responsibility of executing innovative practices using technology that are more effective than previous methods.

Cox (2013) acknowledged that according to studies made there was a high potential in providing teachers with necessary information and support that will provide them with the means necessary to be successful in their integration practices. Consequently, it is of vital importance for school leaders to acknowledge the perceptions and thoughts that teachers reflect on in order to develop key strategies to lead efforts to use technology in the classroom. Study results demonstrate that if teachers believe that the benefits outweigh the challenges of using technology by producing higher level learning experience then their approach will be more persistent and committed (Cox, 2013).

Consideration of a teacher’s concerns toward technology integration is related to having a valid understanding of the different technology proficiency levels among teachers. Liu and Szabo (as cited by Cox, 2013) described technology users as, “inexperienced, experienced, and renewing.” There was a correlation found in the study made by Liu and Szabo that relates teacher technology proficiency levels to the type of apprehensions that are experienced while integration technology. Despite how much experience educators might have in using technology

for personal or social practices the amount of exposure to technology within their pedagogy is significantly different. In Cox's (2013) study one participant shared how technology played a major role in her social and recreational time but was the opposite in the classroom. The participant discussed that her outlook towards technology in the classroom was minimal and preferred that students learned with traditional methods and instruments. Webster (2017) discussed how school leaders tend to develop technology assumptions that play a major role in their decision as they develop integration plans and strategies. Some assumptions that correlate with Cox (2013) findings is the issue of understanding teachers' concerns and levels of technology experience. Consequently, interpreting data correctly in relation to teacher technology proficiency is vital to better understand where teachers are in respect to where technology leaders want them to be.

**Technology integration training.** In the study, Cox (2013) discovered that collaborative support and technology training designed around different levels of technology proficiencies was significantly effective in the process of technology integration. A collaborative support and training environment allows educators to opportunity to give and receive one-to-one insight that guides training through the individualized needs of teachers as technology is infused into their instruction (Cox, 2013). Teachers grouped strategically based on their strengths and needs in technology implementation creates a mutually beneficial learning environment where concerns are readily shared and addressed.

Cox's (2013) study demonstrated how technology can be implemented more effectively if it is part of a long-term initiative where technology becomes a vital tool in reaching a higher level and more in-depth learning experience. The key element found in this study is the importance of not making technology the focus but a contributing factor in developing

innovative and student-centered learning. A gap in research was also discovered in this study recommending that further research be made on technology integration that considers the contextual elements in its integration design and application. Building technology integration structures that can adapt to the individualized needs of educators and school leaders is an innovative strategy of optimal potential based on studies recently completed.

**Integration challenges.** Harrell and Bynum (2018) discussed several factors that previous studies demonstrated continue to affect technology integration initiatives. Despite technology becoming a major influence to the lives of individuals from early age to adulthood the impact of educational technology continues to be a challenge in the process of developing its instructional purpose. In this document created by Harrell and Bynum (2018) factors are reviewed in an effort to reflect and understand how to improve integration efforts in order to better prepare students for higher learning and the development of a profession. The discussion takes two reflective paths consisting of internal and external elements that have a direct relation to technology implementation strategies. External elements consist of inadequate technology infrastructure, low-quality technology, limited technology resources, proper technology training. Internal elements consist of teacher low self-confidence and outlook towards the use of technology in the classroom. The existing problem that research in technology integration continues to address gaps between teacher pedagogy and the technological innovation that exists in most careers.

Instructional methods that fail to adapt to the 21st century learning styles is what generate a need for more research in the field of technology integration. Inadequate technology infrastructures in schools is a key factor that is negatively affecting implementation by not providing the necessary means to successfully utilize technology in the classroom (Harrell &



Bynum, 2018). Decisions made by school leaders need to be better informed and aware of the existing infrastructure and the necessary resources to facilitate proper functionality as teachers use it to reinforce their curriculum and instruction. Issues that must be investigated first include the accessibility of internet, the appropriate networking devices to facilitate collaborative learning, and the necessary management resources.

Low-quality technology is another key element that affects proper integration of technology. If technology does not meet the needs of students in respect to technological demands that facilitate optimal use in learning activities such as the use of computer labs or mobile devices to increase accessibility. Lack of computer labs or accessibility can create obstacles that may become excuses utilized by teachers or school leaders to cease the use of a technology tool. Harrell and Bynum (2018) mention that school funding can become a contributing factor in decreasing technology integration efforts if the necessary resources are not budgeted in order to support technology implementation. Some schools have developed effective technology plans where lacking resources is overcome through innovative means such as the Bring Your Own Device (BYOD) initiative enabling more students to access the internet if labs are not available (Harrell & Bynum, 2018).

Limited and ineffective technology training is another element that significantly contributes to poor technology integration. Cox (2013) discussed how technology integration initiative must include effective training and support that address all apprehensions experienced by teachers using technology in the classroom. Effective technology training should not be limited to consultant information sessions that broadly address concerns leaving teacher to survive on their own during implementation. Cox (2013) through research discovered that the most effective professional development for technology integration is through collaborative

learning sessions where teachers are share their skills and strengths related to using technology as part of their pedagogy. Harrell and Bynum (n.d.) discussed that teacher low-self-confidence towards technology is a factor that affects the continued use of technology in schools. According to studies if teachers do not feel capable of integrating technology in their lessons their determination will lessen based on that feeling. The initial thoughts towards feeling confident of their integration abilities must stem from an intrinsic belief that technology's potential of improving student learning is worth the effort and determination. Teachers and school leaders that are convinced of the value of technology integration will strive above and beyond to infuse technology into their lessons to improve the quality of learning. Conversely, if teachers do not believe that technology can improve learning in their classroom their efforts will be limited or non-existent (Harrell & Bynum, 2018).

Teachers' outlook toward technology is also mentioned as a key contributor to the ineffective implementation of technology. Harrell and Bynum (n.d.) found that studies in technology integration continuously demonstrate that the outlook towards technology affects how teachers make decisions related to integration practices. If teachers perceive that using technology is too time consuming and expect to have excessive delays during instruction due to technological setbacks, their disposition to implement will be lost. The perceptions towards technology can either acknowledge that integration will require strategic preparation that is worth fulfilling due to its instructional potential or be dominated by negative expectations that lead to passive and ineffective attempts of implementation. The review of studies completed by Harrell and Bynum (n.d.) create a comprehensive review of the multidimensional aspects that technology integration requires in order to deliver on its potential to improve student learning.

The condition that needs to be met by teachers and school leaders in order to see positive results in technology use is to have effective implementation leadership and a plan of action to meet expected challenges or setbacks. Consequently, teachers will become more confident and convinced that technology integration is a doable endeavor with a promising reward for both students and teachers as learning becomes more innovative and student-centered (Harrell & Bynum, 2018). School leaders can build on the knowledge and correlations found in studies made on educational technology to initiate a proper response to existing apprehensions and misconceptions that hinder its integration practices.

### **Review of Methodological Issues**

The methodological issues that studies on technology implementation demonstrated consist of the selection of quantitative or qualitative methods of collecting data. The quantitative method that is consistently used in researching technology implementation factors include the use of survey questionnaires. Surveys are more practical to administer and make accessible to participants. Qualitative methods require more observations and interviews that can provide more detailed data and insight at the cost of limited participation due to time availability constraints. Past studies share insight on limitations confronted in the process of collecting data in a quantitative or qualitative study.

In a study made in 2014 invitations were sent to 200 principals to participate in a study related to technology integration that utilized both quantitative and qualitative methods. Surveys were emailed to principals of which only 42 accepted to participate representing a 21% response rate (Machado & Chung, 2015). Considering that a larger sample of principals were invited to participate and that accessibility of the questionnaire was readily accessible via email the acceptance rate was under 25%. Along with surveys emailed interview questions were sent out

with the intent of gaining an in-depth understanding of technology integration factors related to school administrators. The results of the study provided valuable information that highlighted key factors that strengthen technology implementation but also revealed a need for further research focused on school administrators' role in technology. Methodologies used in researching technology implementation, whether quantitative or qualitative in design, will both endure limitations related to time constraints and accessibility of participants due to the significant duties assigned to administrators and teachers. It is very difficult during a school year to have a high participation response percentage from teachers or administrators. Consequently, researchers must strategically design data collection methods that will provide insightful data from a significant amount of participants.

### **Synthesis of Research Findings**

Research findings reviewed revealed significant insight into the different aspects of the relationship between school principal leadership and technology integration. The standard variables measured in the various studies consisted of evaluating the quality of infrastructure possessed by schools, the effectiveness of their support structure, the leadership approach used by school leaders, and teacher willingness throughout the process of technology integration. Though some research analysis focuses on previous data of both qualitative and quantitative type their findings were equally relevant and supportive in comparison to research-based data.

In the study by Anderson and Dexter (2005) focus was on specific technology leadership indicators which are directly related to the NETS-A standards. The results demonstrated that the school principal's technology role is a determining factor of technology integration (Anderson & Dexter, 2005). Anderson and Dexter (2005) explained that there was a strong correlation between specific leadership practices that had a positive impact on the integration process of

technology. Though the study by Anderson and Dexter (2005) links the school principals' role to the effectiveness of technology integration, the research must also address the causes of the disintegration of what seemed a promising technology initiative for learning.

Liu et al. (2017) conducted a study using a unique approach that assessed different factors in relation to their impact on technology integration. Through analysis of studies previously conducted Liu et al. (2017) found that the contextual understanding of the principal elements of technology implementation valuable insight could be acquired to guide future integration initiatives. This study discussed the diverse definitions that were assigned to technology integration and further developed its meaning based on its purpose and qualitative contribution to curriculum and instruction (Liu et al., 2017). Within the context of teacher traits, a positive correlation was found between teachers' technology experience and technology integration. A negative correlation was found between teaching experience and integration of technology, demonstrating that teachers with a set method of instruction may show less disposition to attempt integrating technology into their pedagogy. Significant findings of this study confirmed previous studies that concluded that more technology experience matched with technology support and training directly affects the effective use of technology in the classroom. The contextual factors that were correlated were the primary contributors in developing teacher assurance and ease which, according to Liu et al. (2017), facilitate the successful use of technology in the classroom.

Cox (2013) conducted a study in which technology integration was researched through four specific areas that affect implementation practices. The four areas included development of a technology plan, responding to teacher apprehensions of technology, assessing teachers' technology skills, and creating a collaborative network among teachers guided by their strengths

and experience in technology. Planning as described by Cox (2013) targets the teachers' pedagogy style and make integration practices relevant and adaptable to teachers. This concept is a vital insight that school leaders can obtain and use in the process of development effective technology integration plans that teachers can embrace and use as a platform to build new technology experience. The area of addressing teacher apprehension of technology is presented by Cox (2013) as meeting the needs and concerns that hinder integration efforts. When teachers have their concerns addressed they become able to overcome technological obstacles and reach levels of accomplishment that will further their desire to use more technology in the classroom. School leaders would significantly benefit in acknowledging that technological misconceptions lessened through intentional acts support that address information needs or concerns experienced by teachers.

The area of assessing the teachers' technology skills is important according to Cox (2013) in the context of knowing how diverse abilities of technology use can affect integration practices. This finding demonstrates that though school leaders may view teachers' technology abilities through the use of technology for personal and social purposes, the connection to classroom use of technology is different. The study also relates collaborative training and networking among teachers with diverse skill abilities in technology as a vital predictor for technology use in the classroom (Cox, 2013). This concept provides key insight for school leaders in creating technology integration initiatives that make use of the talent and skill possessed by some of their teachers to promote a collaborative support for teachers struggling to implement technology in their instruction. This study provided a framework of key elements that school leaders can use as a map to guide their integration strategies and resources as technology continue to connect learning to innovative practices.

Brockmeier et al. (2005) conducted a study in which the focus was to understand the link between school principals' leadership role and the integration of technology in the classroom. Brockmeier et al. (2005) stated, "Although teachers were identified early on as catalysts to achieve the promise of technology in education, overlooked in the process was that attaining the promise depended on principals" (p. 46). Teachers are undoubtedly a key part of the integration of new technologies in the classroom but are only as successful as their support system developed and led by their school leader. This philosophy resonates with my experience as a teacher in which technology integration was a key initiative that failed to have a significant impact on changing the learning dynamics in the classroom. Integration of technology in our campus was more teacher lead with minimal principal engagement in the process. Brockmeier et al. (2005) stated, "As instructional leaders, principals facilitate teachers' integration of computer technology in the teaching and learning process" (p. 46). Consequently, the school principals' views, attitude, experience, and preparation for technology integration of essential determining factors in the provision of necessary leadership and support for teachers in the forefront of implementation (Brockmeier et al., 2005).

According to Brockmeier et al. (2005), school principals from all levels in Florida were selected as part of a stratified random sample and administered a Computer Technology Survey (CTS) (Brockmeier et al., 2005). From a mailing of five-hundred questionnaires that were sent out a total of 268 were filled and analyzed (Brockmeier et al., 2005). First, the study demonstrated that school principals acknowledge their link to the successful implementation of instructional technologies and their need for more professional development for themselves to assist teachers (Brockmeier et al., 2005). Second, the results showed that school principals felt inadequate in their level of expertise to be effective leaders in technology and were willing to

pursue training rather than abandon teacher with the total burden of implementation (Brockmeier et al., 2005). Last, the study outcome demonstrated that school principals desire to become more fluent in their use of technology for administrative purposes with the intent to enhance their overall level of expertise in technology applications (Brockmeier et al., 2005).

Attaran and VanLaar (2001) reviewed the significant barriers that school administrators encounter in the process of developing and managing the effective use of technology in the classroom. The primary challenges in the United States in technology integration, as stated by the Secretary of Education during the Clinton Administration, include student access to a computer, connected classrooms, networking, educational software integration and teacher training (Attaran & VanLaar, 2001). Attaran and VanLaar (2001) categorized technology use in schools as either structural or instructional. The fundamental application includes administrative processes that enhance using new technologies to communicate and network more efficiently. Consequently, the research demonstrates how technology used to enhance administrative practices can create more resource time utilized for instructional initiatives and student servicing (Attaran & VanLaar, 2001). Tasks such as record management significantly improve through new technologies and highly beneficial in administering school campuses that are rapidly growing according to data analyzed by Attaran and VanLaar (2001). Second, the instructional aspect of implementing technology includes the provision of engaged collaboration, student-centered learning, and immediate assessing of understanding (Attaran & VanLaar, 2001). Research demonstrated that instructional technology-enhanced curriculum activities, student presentations, collaborative learning, and an extensive networking system that supports active online dialogues among students and teachers (Attaran & VanLaar, 2001).



School administrators also face challenges in how technology support personnel are utilized with their technology implementation plan. Plans of technology integration will in some form describe or define how district technology professionals will provide support to educators as they implement technology in the classroom. In a recent study school administrators were surveyed concerning their perception of how district technology professionals are or should be participating in the schools' efforts to integrate technology (Murphy, Allred, & Brescia, 2018). The study also included inquiries that assess what specific practices provided by technology professionals they perceived as highest in level of importance to the technology implementation process. The study included a total of 33 school administrators from both elementary and secondary schools located in the Midwestern region of the United States. The primary focus of the study was to assess the disconnect between what school administrators perceived should be the appropriate role of technology support personnel and what role was in reality being performed in the process of assisting teachers to implement technology (Murphy, Allred, & Brescia, 2018). In preparation for the study Murphy et al. (2018) discovered that according to past research role expectations had consistently been clearly defined for many educational positions except for technology professionals assigned to provide support to technology implementation initiatives. Consequently, technology personnel would carry out practices that were perceived as necessary or priority to school administrators. Technology professionals would participate more on providing assistance with hardware connections or configurations than on practices that would integrate technology in curriculum and instruction (Murphy, Allred, & Brescia, 2018). Researchers have found that standards developed by the State Educational Technology Directors Association (SETDA) in 2006 were not being implemented in the United States as intended. Historically, technology professionals have not been successfully utilized for

implementation purposes due to the lack clarity and definition of their role in successfully integrating technology in the classroom (Murphy, Allred, & Brescia, 2018).

In conjunction to unspecified objectives assigned to technology personnel within school district implementation initiatives the other key element that determines how technology professionals participate in implementation is the role of school administrators. The role of school administrators is vital in generating the job description and expectations assigned to technology professional on their campus. School administrators' technology role is also a key disconnect between what should occur in the implementation of technology and what actually occurs in respect to the role of technology professionals in the implementation process.

According to the standards set by the National Policy Board for Educational Administration successful school leaders are expected to "Promote the effective use of technology in the service of teaching and learning" (as cited by Murphy et al., 2018). Nevertheless, school leader's perceptions and priorities of educational technology continue to determine what practices will be the primary focus of technology professionals on their campus. Murphy et al. (2018) explains that past research shows that depending on how expectations of technology professionals are developed and the technology priorities and practices are set by school leaders will determine if technology implementation is effective. The negative alternative is that technology personnel will be more focused on assisting the connection of printers rather than supporting the effective integration of technology into curriculum and instruction.

The results of the study showed a significant disconnect between what school administrators perceived as idyllic completion of specific tasks and what actually was fulfilled by technology professionals on their campus. School administrators considered actual performance by technology professionals significantly lower in comparison to what their

performance should be. Consequently, the study also showed that a primary focus of school administrators in directing technology professionals is the task of maintaining effective communication between teachers, administrators, and technology support personnel (Murphy et al., 2018). The gaps found in research demonstrate a need to assess specific school administrators' perceptions in regards to practice that involve technological support that effectively embeds technology with the school's curriculum (Murphy et al., 2018)

### **Critique of Previous Research**

The research studies reviewed provided different perspectives and conclusions on the analysis of both qualitative and quantitative data. Anderson and Dexter (2005) utilized a previous study that surveyed principals, technology coordinators, and teachers obtaining data related to technology leadership and integration. The conclusions of the research analysis specifically focus on the collected survey data from principals and technology coordinators (Anderson & Dexter, 2005). The data samples, according to Anderson and Dexter (2005), were from two types of schools which included schools with the significant use of advanced technologies and schools that were engaged in restructuring initiatives. The overall structure of the research by Anderson and Dexter (2005) identifies essential indicators of technology leadership that distinguish practices exercised in schools that effectively implement technology from those that are not effective. The evidence presented by researchers Anderson and Dexter (2005) provided data-based conjectures in the aspect of internet use, the level of technology integration, and the technology utilization by students in the classroom. The research findings that were most significant to my topic of interest analyzed the principals' role of leadership in technology integration. Anderson and Dexter (2005) stated, "Technology leadership had a significant and positive correlation with each of the dependent variables, and in each case technology leadership

was the independent variable with the largest correlation with the technology outcome indicator” (p. 70). The study revealed that technology leadership has a more significant impact on technology integration indicators in comparison to the infrastructural resourcefulness possessed by schools (Anderson & Dexter, 2005).

Liu et al. (2017) conducted a study that focused on teacher practices that impacted the implementation of technology. The study searched for correlations between variables the included teacher experience, technology proficiency, technology support provision, gender, and the successful integration of technology in the classroom. The key relationship that data revealed was the level of disposition to implement technology into classroom instruction. The factors the demonstrated a positive effect on implementation included, male teachers with minimal teacher experience but high level of technology proficiency. The negative factors included female teachers with extensive years of teaching experience that had a preferred method of instruction. The findings of the study generated predictors that help understand whether educational technology will be effectively implemented by educators.

Research study conducted by Cox (2013) showed a relationship between key practices utilized by school leaders to implement technology and the effective use of technology in the classroom. The practices included the development of a technology implementation plan and leadership actions that influenced how teacher were trained in technology use and the provision of adequate technology support. These actions, taken by school leaders, decreased teacher apprehensions toward technology use in the classroom. The study findings showed how infusing collaboration and networking among teachers will allow more experienced and less experienced teachers the capability to share their knowledge and insights with the process of technology implementation (Cox, 2013).

The research study completed by Brockmeier et al. (2005) revealed significant insight in the link between school leadership and technology implementation. This study was designed in response to reviewing past studies that only focused on teacher influence on technology implementation and did not address the role of school leadership in the process. The rationale of the researchers in conducting the study was based on the acknowledgement that though teachers are a key component in the integration of technology it cannot reach its potential without effective technology leadership actions from school administrators. The findings of the study showed that school leaders feel inadequately trained to lead technology implementation practices. School leaders requested more training in educational technology to become proficient in specific skills that will enable them to better support teachers in using technology effectively in their classrooms. This type of study directly correlates with the information presented in this study in which school leadership is studied in relation to how successfully technology practices are conducted to by teachers and students as a result of their support (Brockmeier et al., 2005).

### **Summary**

The challenges developed by new instructional technologies impacted the role of the school principal within the context of leading the implementation of technology with the intent to enhance instruction to meet the need of the 21st century learners. New educational technologies required new infrastructures, more professional development, and leaders that would provide support and guidance in the instructional change processes. Teaching mathematics for more than 20 years with knowledge acquired within my graduate courses in the field of educational technology is the foundation of my keen interest in studying its implementation and the principals' role in the process.

The review process of previous research included the identification of unique practices applied in the process of implementing new technologies into the classroom. Brockmeier et al. (2005) explained that initial perceptions about the critical factors in successfully integrating new technologies include the teacher role primarily. Based on the research study it was concluded that teachers' success in utilizing instructional technology relied significantly on the support of the school principal (Brockmeier et al., 2005). Consequently, the research literature reviewed continued to provide similar results in which school leaders are the primary contributor to the effective integration of instructional technologies in comparison to other aspects such as infrastructure and accessibility of resources (Anderson & Dexter, 2005). Research conducted by Cox (2013) and Liu et al. (2017) provided insight regarding key factors in the design and execution of integration models that school leaders can use to guide their technology leadership initiatives. Cox (2013) explained that integration plans developed by school leaders must be aware of the distinct pedagogy that teachers possess in the delivery of instruction. The purpose of using technology in the classroom is not to highlight technology but instead adapt to teaching styles and reinforce concepts being taught.

Another element of high impact towards integration is the response that school leaders and technology professionals have in treating apprehensions that teachers feel towards technology. Successfully supporting teachers in their fears or misconceptions towards technology in the classroom can develop self-confidence and motivation as teachers are convinced of the value of technology in the improvement of student learning (Cox, 2013). School leadership, according to studies, can significantly benefit of knowing the diverse levels of technology proficiency possessed by teachers to create productive trainings that are relevant to teachers' technological needs. Consequently, trainings will become more collaborative and

efficient as experienced teachers team up to share their skills to assist others in their implementation practices (Cox, 2013; Liu et al., 2017).

Overall, research demonstrates that technology integration is a collaborative effort that demands appropriate leadership to guide the instructional change process. More research is needed to identify the specific areas of reformation within the duties of a school principal that directly impact technology integration. The focus is to collect relevant data that targets key practices of school principals that consistently affect the successful use of technological devices in the classroom. The review of studies conducted on technology integration create pathways to lead new research by identifying gaps in research and providing new insights in the field of technology integration. The review of literature, consequently, demonstrated significant findings and correlations between diverse predictors that high light important elements that school leaders must acknowledge in their practices to lead technology implementation in schools.

### **Chapter 3: Methodology**

In the transitioning phase from 20th to 21st century instructional models, educational technology is used by educators to demonstrated improvements on teaching methods but failed to cause significant changes in the dynamics of student learning. There seems to be some disconnect between the development of new instructional technology and practical initiatives that guide their implementation in the classroom. The focus is not merely to introduce more technologies but to improve student learning by strategically innovating instructional methods. Means (2010) explained, based on a nationwide study that between 2005 and 2007 more technology entered the classroom without demonstrating a significant change in the development of technology-driven lessons. New technology devices, software, and websites enhanced teaching strategies impacted student performance significantly in comparison to traditional learning practices (Means, 2010). According to Means (2010), conventional learning methods lacked innovation and creativity perceived by technological visionaries in education.

Towards the end of the 20th-century, technology generated promising hopes for innovative methods of instruction placing students at the center of their learning experience using new educational technologies (Brockmeier et al., 2005). Consequently, schools invested more in the acquisition of new technologies and the development of the required infrastructures to enable their functioning. The rapid increase in educational technology provision to schools in the United States is evident during 1992 to 1998 in which seven billion dollars were spent to double the availability of computers per student (Anderson & Becker, 2001). The potential of educational technology was undoubtedly acknowledged and acted upon through extensive investment of financial resources to acquire new technologies. In this movement to increase instructional technologies in the classroom, the primary focus of implementation relied solely on



teacher-led practices that failed to recognize the vital contribution of principals in the process (Brockmeier et al., 2005). According to Whitehead, Jensen, and Boschee (2003) implementation of new technologies did not produce the pursued academic improvements in student performance.

Consequently, in studying implementation models, school principals were found to be critical factors in the successful integration of technology in the classroom (Whitehead et al., 2003). Hope and Stakenas (1999) explained that school administrators must exercise three major leadership roles in the integration process of new technologies. Administrators must become role models on technology utilization in their administrative duties, facilitators in the use of technology as a teaching and learning tool, and as visionaries that promote changes in learning structure to expand instruction through technology skill development (Brockmeier et al., 2005). Due to limited research that evaluates the quantity and quality of technology leadership preparation possessed by school principals, it is hard to have a clearly defined understanding of the impact level that their contribution could affect technology integration (Brockmeier et al., 2005). This lapse in research is what this study proposes to analyze to determine the extent of technology leadership preparation possessed by school administrators which directly affects the successfulness of technology implementation.

### **Research Questions**

The first research question investigated in this study includes the following:

R<sub>1</sub>: What is the relationship between school administrators' training in technology leadership and the successful implementation of technology in schools?

The hypothesis statements considered for the first research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

The second research question investigated in this study includes the following:

R<sub>2</sub>: What is the relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools?

The hypothesis statements considered for the second research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

## **Variables**

This study used specific predictors and criterion variables to assess certain aspects of school technology leadership that reveal amount of training, and the use of technology. Variables were also selected to assess specific practices that show a leader's outlook of educational technology. The methods that demonstrate the level of proficiency within their strategies include the amount technology leadership training obtained through professional development and the frequency of utilizing technology. These variables include:

1. Technology Training: The number of hours of technology training acquired as part of school leadership professional development.

2. Technology Use: The frequency of using technology as part of the technology implementation leadership process.

The variables include specific practices that school administrators apply within their leadership strategies to implement instructional technologies. These set of variables include specific indicators that demonstrate the school leaders' outlook of educational technology in relation to effective implementation of new technologies in the classroom. These indicators are part of the NETS-A standards used to evaluate school administrators' role in technology integration (Anderson & Dexter, 2005). The variables include:

1. Leadership and Vision: The development of a common set of ideas for technology utilization and make certain that the necessary tools, guidance and environment is set up execute established goals (ISTE, 2002).
2. Learning and Teaching: The development of a learning atmosphere that is collaborative, rigorous, and has diverse teaching methods that are student-centered (ISTE, 2002).
3. Productivity and Professional Practice: Leadership practices that show teachers how to effectively use technology and implement efficient communication components between school leaders, teachers, students and parents (ISTE, 2002).
4. Support, Management, and Operations: Leadership practices that focus on the provision of guidance on how to utilize technology to manage and operate a school including the budgeting of finances to support the technology implementation process (ISTE, 2002).

5. Assessment and Evaluation: Leadership practices where technology is utilized measure student learning and assess if school standards of accountability are met accordingly (ISTE, 2002).
6. Social, Legal, and Ethical Issues: Leadership practices that focus creating mindfulness of the correct use of technology, the accessibility of technology, and the legal and ethical rules related to technology use (ISTE, 2002).

### **Purpose and Design of the Study**

The goal of this quantitative, correlation study is to better understand the relationship between school administrators' preparation in technology leadership and efficient technology implementation in schools of southern United States. The key determining factor in the optimization of technology integration efforts depends significantly on the school administrators' involvement and preparation as a technology leader (Brockmeier et al., 2005). Consequently, the level of participation and training, of school leaders, in educational technology plays a key role in how teachers embrace new technology-driven lessons as current traditional methods are changed or modified. In a quantitative study developed by Brockmeier et al. (2005) with school administrators from elementary, middle, and high schools in the results revealed sound expertise lacked in school administrators' ownership of skills and abilities. Berrett et al. (2012) explained that school administrators' perception of their leadership position, their communication style concerning teachers is of vital importance for successful integration. According to Hope and Stakenas (1999), school principals primarily lead by example, provide instructional guidance, and are idealists in expanding educational strategies. The focus of this study is to assess specific traits of school principals within their leadership skills and practices that have a direct impact on the process of leading teachers effectively in technology integration. Studies show that

technology will improve student academic performance with appropriate implementation methods utilized by faculty and supported by school principals (Means, 2010).

The correlation design utilized in this quantitative study shows the relationship levels of specific leadership indicators and technology integration practices. Adams and Lawrence (2014) explained that a correlation design would provide more information on the hypothesis tested than only describing the relationship between set variables. Consequently, if this study appropriately develops meaningful data, the findings possess a significant potential to be applied to similar populations characterized by the study's sample (Adams & Lawrence, 2014). A correlative approach will provide a higher external validity in assessing specific actions and attitudes that impact individual circumstances in technology integration not manipulated (Adams & Lawrence, 2014). Though past research provides insight on various aspects of technology leadership and integration, this study aims at evaluating specific behaviors and practices that have a significant influence on its process (Brockmeier et al., 2005). Adams and Lawrence (2014) explained that correlational studies aid in our comprehension of social issues and theories that facilitate the interpretation of other research frameworks. This study design focused on constructing new research discoveries in conjunction with prior findings as reviewed in the literature of past studies.

A significant amount of research has focused on relating teacher and student roles in the successful implementation of technology in the classroom without considering the principal's role as a critical determining factor (Machado & Chung, 2015). In a research study, Machado and Chung (2015) concluded that "More research is necessary on the role of and the effect the principal has on technology integration since they are responsible for organizing and enforcing the school vision and plan" (p. 51). A quantitative study will provide a broad perspective of

school principals concerning their preparation and vision projection in the implementation process of new instructional technologies. Berrett et al. (2012) stated, “It is recommended that future research in the area of integrating technology synthesize perspectives and data from all of the stakeholders, such as administrators, mentors, teachers, and students” (p. 216). Consequently, the accessibility of teachers, administrators, and students could be difficult during school year activities and time constraints, a quantitative study would be more practical and feasible in collecting data. Patten and Bruce (2007) recommend that when limits exist in the accessibility of prospective participants for extended interviews or monitoring, quantitative type research would be most appropriate.

The correlation study design involved a quantitative data collection process in the form of a questionnaire developed and administered to school administrators. Adams and Lawrence (2014) stated, “Regardless of the variables we are studying in research, we most often rely on quantitative measures because of the ease of understanding and analyzing numerical data” (p. 79). Using quantitative data analysis, the purpose of this study is to understand the relationship between involvement leadership practices and teacher technology integration effectiveness. The questionnaires addressed issues that reveal the amount, type, and quality of leadership practices utilized by school administrators in leading technology implementation initiatives.

Understanding which leadership indicators are most effective in leading teachers through technology integration narrowed existing gaps that hinder proper development of technology-based instruction (Means, 2010). The null hypothesis in the study is that there is no correlation between the technology leadership application of specific practices and the manifestation of indicators that the effective use of technology in the classroom is taking place. The alternative hypothesis is that the implementation of technology leadership practices has a direct effect on the

fulfillment of specific objectives that portray the effective use of instructional technology in the classroom.

### **Target Population**

The population accessed for this study included school administrators from all K–12 grades in a public school in Texas. The school district is composed of 35 elementary schools, 10 middle schools, and seven high schools. There are approximately 200 campus administrators that support and lead a total of 3,200 school teachers.

### **Sample**

This study includes the extensive sampling of school principals and assistant principals of the 55 preschools thru 12-grade public schools. Approximately 205 campus administrators received an invitation to participate in a survey questionnaire via e-mail. The survey inquired on specific indicators that measure any correlation between technology leadership skills of administrators and the successful implementation of instructional technology. According to Howell et al. (2014) data collected online is both effective and efficient due to its capability of generating high amounts of information in a limited amount of time, as is the case in this research. The sample required according to a G-power analysis is of 132 participants based on linear multiple regression analysis. The multiple regression analysis was run using a *t*-test power analysis of A priori type. The input parameters were the following:

- Tail(s) = Two
- Effect size  $f^2 = 0.10$
- $\alpha$  err prob = 0.05
- Power ( $1 - \beta$  err prob) = 0.95
- Number of predictors = 5

The number of predictors includes the specific technology leadership practices applied, and objectives met in the integration of technology in the classroom. The output parameters are the following:

- Noncentrality parameter  $\delta = 3.6331804$
- Critical  $t = 1.9789706$
- Df = 126
- Total sample size = 132
- Actual power = 0.9500550

### **Instrument**

This research utilized a 64-question survey instrument to collect data (see Appendix A). The data collection instrument is a survey developed by Mark Weber using question models from the Survey of Technology Competencies and Proficiency to the National Educational Technology Standards for Administrators (STCP-NETS\*A) questionnaire instrument (Weber, 2006). Permission to use (see Appendix G) and publish (see Appendix H) the survey was acquired from Weber.

The survey (see Appendix A) consists of four sections that assess elements related to the research questions of this study. Section I evaluates the amount of usage of educational computer-based programs throughout the school year (ISTE, 2002). Section II assesses school administrator participants' amount and type of technology preparation. Section III utilizes Likert-type questions to analyze school administrators' perceptions regarding six specific aspects of technology leadership according to the definitions developed by the National Education Technology Standards for Administrators, (NETS\*A) organization (ISTE, 2002). Section IV of



the survey analyzes the location, financial expenditures, campus demographics, and socio-economic position of the participants' school setting.

The survey instrument (see Appendix A) provides data in relation to specific predictors and criterion variables that assess certain aspects of school technology leadership. School leaders participating in this study provided responses that linked to the different variables correlated in the study. The responses to the survey instrument reveal the school leader's amount of training and use of technology in relation to technology implementation. These variables include:

1. Technology Training: The number of hours of technology training acquired as part of school leadership professional development.
2. Technology Use: The frequency of using technology as part of the technology implementation leadership process.

Responses also reveal the level of utilization of specific practices that show a leader's outlook of educational technology. These set of variables include specific indicators that demonstrate the school leaders' outlook of educational technology in relation to effective implementation of new technologies in the classroom. These indicators are part of the NETS-A standards used to evaluate school administrators' role in technology integration (Anderson & Dexter, 2005). The variables include:

1. Leadership and Vision
2. Learning and Teaching
3. Productivity and Professional Practice
4. Support, Management, and Operations
5. Assessment and Evaluation
6. Social, Legal, and Ethical Issues

## **Data Collection**

In this correlational study, the data collection process consisted of a survey (see Appendix A) delivered via email to all school administrators in both school districts. Approximately 200 surveys were emailed to school administrators to collect data concerning technology integration and their role as technology leaders. The survey consisted of 64 questions of both Likert scale type questions and yes or no questions.

In a recent study by Machado and Chung (2015), a similar study with a phenomenological focus, the authors utilized a mixture of quantitative and qualitative methods to collect data. The research questions analyzed in the study addressed the issue of the principal's perception of the importance of technology integration, their view of the instructors' new challenges in technology implementation, and whether they believed coaching and mentoring was an option to assist teachers in the integration process (Machado & Chung, 2015). Machado and Chung (2015) sent out surveys to all school administrators listed in each of four participating school district websites. In this research, the survey goes out to all school administrators of both participating school districts. The result of the data collection procedures utilized by Machado and Chung (2015) generated a response rate of 21% in which only 42 principals out of 200 emails completed the survey. The results of the data analysis revealed that more research is necessary to investigate the relationship between the school administrators' role and their influence on technology implementation as part of their duty to manage and execute the school's overall mission.

## **Data Analysis Procedures**

The data analysis process consisted in the use of the Cochran-Armitage test of a trend (Cochran-Armitage test for a trend in SPSS Statistics | Laerd Statistics Premium, n.d.). The

Cochran-Armitage test assessed data for a linear relationship between an ordinal predictor variable and a dichotomous criterion variable. The ordinal predictor variable focused on the school administrator technology skills with the utilization of 5-point Likert scale questions. The justification of utilizing ordinal instead of an interval predictor variable is based on how the ordinals scale values are designed to measure the participants' outlook of technology. When ordinal scale values are used for data analysis values can be distinguished according how responses are related to their order not the numerical significance (Göb, Mccollin, & Ramalhoto, 2007). In contrast to using ordinal variables, interval variables are based on sizes or amounts rather than order (Göb et al., 2007). The dichotomous criterion variable concentrated on the effectiveness level of technology integration processes assessed through yes or no inquiries.

In a similar study, Machado and Chung (2015) used two variables in their data analysis which consisted of demographics and opinions. The demographics focused on assessing the participants' gender, age, and education level and technology framework at their school site (Machado & Chung, 2015). The second variable assessed the opinions or perspectives of the participants concerning technology integration (Machado & Chung, 2015).

The data analysis of survey responses collected evaluates technology leadership indicators that aid in the measuring the proficiency level of school administrators. The assessment administered through Likert-type questions provide insight into specific practices implemented and the frequency of their use. The questions that focus on integration evaluate the fulfillment of objectives which indicate the effective and efficient use of instructional technologies.

## **Limitations and Delimitations of Research Design**

The limitations that had a direct impact on the research design relate to the accessibility of participants and their willingness to participate in the study. A thorough explanation of the purpose of the study was provided to the participants invited to complete the survey questionnaire (see Appendix A). Whether teachers participate or not, in this study, was not under my control. In a similar research study, out of 200 school administrators invited to participate, only 42 completed the survey demonstrating the participation of 21% (Machado & Chung, 2015). I expect a similar result if accessibility and persuasiveness to participate are not adequate.

The boundaries set in this study relate to the sampling and the instrument used to collect data. The sample of participants includes all school principals and assistant principals of K–12 grade public schools of both school districts. The survey questionnaire addressed critical indicators of effective technology leadership that provide vital support for educators in the integration process. In a research study by Liu, Ritzhaupt, and Cavanaugh (2013) the purpose included the analysis of school teachers' perceptions of school administrators' leadership of technology integration processes. To encourage the continued study of technology leadership, Liu et al. (2013) opted to use a data collection instrument that possessed both reliability and validity (Hall & George, 1999). The data collection instrument created by Hall and George (1999) is the Change Facilitator Style Questionnaire (CFSQ) which was used in the study to demonstrate its construct validity within its assessment of administrative support of teachers in the process of integrating new technologies into the classroom. The technology leadership perceptions evaluated in the study focused on the formal and informal assistance, the development of trust, the level of competence, the daily procedures and overall goal and organization of integration initiatives (Liu et al., 2013). In a similar method, this research study

evaluated technology leadership indicators using a 5-point Likert scale and yes or no questions to measure school administrators' involvement and effectiveness in leading technology implementation changes and adaptations.

The delimitations in this study, as a result of the quantitative method design used, consisted of accessibility and timing. The participating districts implement different policies in the use of school district email systems to distribute research surveys. Consequently, for the small school district the online survey information had to be delivered via postal service which is creates time constraints in the data collection process. School administrators could not complete the online survey until the information was delivered to their office thru postal service. In some cases mail is not immediately processed on each campus which may increase amount of time before survey data is processed. The larger school district allowed email delivery which expedited the data collection process.

In addition to the delimitation related to the delivery of the survey questionnaire, the timing of the study created a significant challenge in acquiring participation of school leaders. School administrators are consistently occupied with numerous duties throughout each time period during the school year creating difficulty in acquiring a significant number of participants available for the study. The results of this study showed that the accessibility of the survey was not a significant factor in comparison to the timing of the survey conflicting with the busy schedules of school administrators. There was only a 2% difference in the amount of participation between the two participating school districts. The administration the survey, more than the method of the study, was the most affected by the discussed delimitations.

## **Internal and External Validity**

The survey questionnaire designed for this study was developed and used for a research study by Mark Weber titled Survey of Technology Competencies and Proficiency to the National Educational Technology Standards for Administrators (STCP-NETS\*A) (Weber, 2006). This study utilizes a 64-question survey instrument to collect data from participating school administrators (see Appendix A). The survey used, with the permission of Weber, was previously used to a study relating computer utilization and technology leadership. The study provided valid and reliable results that highlighted specific practices of technology implementation as a result of effective technology leadership in schools (Weber, 2006).

The development of the survey (STCP-NETS\*A) used in this study consisted of a compilation of questions that were integrated from a survey instrument designed Ury (2003). Hall and George (1999) stated, “A reliable and valid measurement of leadership style or change facilitator style needs to be utilized to understand and guide the technology integration innovation” (p. 587). The questionnaire items from Ury’s instrument were analyzed for internal validity and reliability through the utilization of the Spearman rho and Cronbach Alpha tests (Weber, 2006). The results of the tests were positive, showing internal validity and reliability. The items used focused on assessing computer usage in part II generated a correlation value higher than 30 recommended by the Spearman rho test (Weber, 2006). The items for the remaining parts of the survey generated Cronbach Alpha values of 0.83 and 0.91 respectively revealing a strong level of reliability and internal validity (Weber, 2006).

The survey consisted of four sections that assess elements related to the research questions of this study. Section I evaluated the amount of usage of educational computer-based programs throughout the school year (ISTE, 2002). The responses to these questions assessing

usage consist of daily, weekly, monthly, seldom or never. Section II assesses school administrator participants' amount and type of technology training. The responses to these questions assessing amount of training, acquired by school administrators, consist of 0, 1–12, 13–25, 26–50, and 50 or more hours. Section III utilized Likert-type questions to analyze school administrators' perceptions regarding six specific aspects of technology leadership according to the definitions developed by the National Education Technology Standards for Administrators, (NETS\*A) organization (ISTE, 2002). The possible responses to this section includes strongly disagree, disagree, agree, and strongly agree. Section IV of the survey analyzed the school administrators' views on technology issues within the context of location, financial expenditures, campus demographics, ethical use, implications to society, and legal aspects. The possible responses to this section includes strongly disagree, disagree, agree, and strongly agree. Questions from each section evaluate specific practices and perceptions that address the research questions of this study.

### **Expected Findings**

The results expected include a high correlation between school administrator technology leadership and the effectiveness of technology implementation in the classroom. Liu et al. (2013) discovered that a field in need of research included the relationship between school leadership roles in the process of implementing innovative initiatives within existing school systems. Consequently, in this study, more than confirm a correlation between leadership and integration practices the intent is to find new determining elements in the data that assisted in the development of new integration strategies. The critical determinant that appears in past studies establishes school leadership practices in technology integration affects how educators react to new technologies that change their instructional approach (Liu et al., 2013).

## **Ethical Issues**

In this correlational study, IRB approval was acquired from the school districts participating (see Appendices E and F) and from Concordia University–Portland before any type of research was conducted (see Appendix J). Confidentiality assurance was explained to school district officials and participants in the invitation letter (see Appendices C and D) and consent letter (see Appendix B) they received. Consent letter and invitation letter explained that their participation on the survey would be kept anonymous and their responses would not be linked to their name or any other identifying information. The informed consent form, which did not require participants' signature, was approved by the IRB committee (see Appendix J). Data collected was stored securely in the Qualtrics online survey database, which is an approved online resource utilized by Concordia University–Portland doctoral students. Data and demographic information throughout the research study process and discussion was de-identified to maintain anonymity and confidentiality.

The primary risks, in this study, do not involve the type of experiments or variables used to relate but instead the interpretation of data. The research instrument utilized is a survey that assesses school administrators' perspectives and attitudes about technology leadership preparation and implementation effectiveness (see Appendix A). The variables selected do not place participants in any danger or produce adverse effects in their physical, social, emotional or political status. The interpretation of data, however, could be misinterpreted and lead the public to misunderstand the results to imply causation rather than a correlation of variables. Adams and Lawrence (2014) explained that it is our duty as researchers to utilize clarity in the interpretation of data, especially in the event of a high correlation result, to assist readers in understanding the difference between correlation and causation in our study.



## Summary

The methodology approach of this study intends to address the relationship between the technology leadership preparation of school administrators and the integration of instructional technologies. Within a correlation study between technology leadership preparation and technology implementation, a quantitative data analysis provides valuable insight to understanding their relationship better. The 21st century approach created an overwhelming influx of new technologies into the classroom creating a significant amount of frustration on educators (Berrett et al., 2012). New instructional technologies that were expected to improve learning in the classroom have fallen short of expectations due to a deficient system of integration that fails to address the necessary guidance, support, and skills to facilitate their implementation (Berrett et al., 2012). Berrett et al. (2012) explained that technology integration that not appropriately led would allow conflicts with infrastructure, curriculum adaptations, and technological support to become the primary cause of resistance by educators to continue their implementation. Consequently, studying the relationship between technology leadership proficiency and technology integration provides more insight into how to address and develop new technology implementation practices.

The specific objectives of this study involve identifying important leading indicators that correlate to effective technology integration practices. Berrett et al. (2012) discussed how school leaders' views of instructional technology and their interpersonal relationships with teachers play a significant role in providing valuable support in their efforts to integrate technology into their teaching practices. A focus on specific leadership indicators is what makes this research study design a significant contribution to knowledge obtained from past studies. According to Machado and Chung (2015), more research is necessary for the field of study that relates school

leadership to successful technology use in the classroom. There are more studies on the role of teachers than on the role of school leaders in the field of technology integration (Machado & Chung, 2015).

The target population of this study includes all school administrators of both, school districts from both elementary and secondary levels. Technology, in this district, is embedded at all grade levels as an innovative initiative to implement new technologies that better prepare 21st century learners. Acquiring data from school administrators involved in leading technology implementation at any level or capacity is vital to the data analysis process.

The data collection instrument includes both Likert scale and yes or no questions within the design of a survey questionnaire. The development of the survey utilized the online resource Qualtrics.com which allows for practical accessibility and analysis of data. Providing online access to research survey increases the likelihood of voluntary participation and efficient collection of data in a short amount of time (Howell et al., 2014). Processing and analyzing the type of data collected via the survey facilitated the identification of the primary leadership practices that influence the leadership efforts of technology integration. The Cochran-Armitage assessment identifies any linear relationship of technology leadership preparation of school administrators and the effective implementation of technology. The focus of analyzing this relationship is to identify practices used, the frequency of use, and perceptions of their use of implementation objectives met. The limitation that is most impacting, to this study, is the willingness of school administrators, to participate in completing the survey. Past studies reveal limited participation from school administrators as was the case in a similar study by Machado and Chung (2015) which had only a 21% return on their emailed surveys.

The expected results demonstrated how specific leadership traits are consistently related to the successful integration of technology in the classroom. According to past studies, of similar design and focus, there is a correlation between the type of leadership practices used and how teachers perform in the integration process (Liu et al., 2013). The ethical issues that are expected to arise are not in the collection of data but in the interpretation of data in which biases can occur if results are unclear in their explanation. Participants are made aware of the confidentiality of their responses. Participation was voluntary and therefore, placed the burden of increasing involvement on the clear explanation of the purpose and focus of the study.

The analysis of correlative data of technology leadership proficiency of school administrators and technology implementation effectiveness provides insight that is vital to current integration practices. Technology implementation efforts continue to occur every day with positive and negative results that provide essential information that if appropriately analyzed could improve new methods of integration. The following chapters provide current data and analysis of responses base on experiences in leading the integration of instructional technology at all grade levels.

## **Chapter 4: Data Analysis and Results**

The purpose of this study was to further investigate the relationship between the school administrators' technology leadership preparation and technology implementation in the classroom. Past research focused on relating the role of the teacher, the student, and the overall school systems vision on technology without considering specifically the role of the school administrator in the overall process. The correlation research design utilized in this study focuses on specific technology practices and perceptions that school administrators possess that impact technology use in the classroom. The research design utilizes a survey to generate quantitative data that is analyzed for relationships between school leadership use and perceptions of technology implementation in the classroom. This chapter reveals the results of the data collected as well as its statistical analysis in relation to the research questions of this study.

The survey instrument, designed and delivered through Qualtrics, analyzes specific technology proficiency areas of school administrators that address the following research questions:

The first research question investigated in this study includes the following:

R<sub>1</sub>: What is the relationship between school administrators' training in technology leadership and the successful implementation of technology in schools?

The second research question investigated in this study includes the following:

R<sub>2</sub>: What is the relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools?

The following predictor variables assessed within the NETS-A instrument provide a focused analysis on specific aspects of the school leaders' technology implementation role. They include:

1. Leadership and vision
2. Learning and teaching
3. Proficiency and practice
4. Support, management, operations
5. Assessment and evaluation
6. Social, legal, and ethics aspects

The predictor variables provide a specific assessment of each leadership indicator that contributes to the school leaders' outlook of technology as it relates to its implementation in schools.

### **Description of the Sample**

The predictor variables in the study included all principals and assistant principals from preschool through twelfth grade levels. Delimitations experienced in the study included limitations in the delivery process and selecting an appropriate time during the school year to administer the survey. Due to the timing of the study and the district calendar events there was an interference with professional development time and state exam administration dates, the research study proposal was not approved by the school district superintendent. Due to this occurrence, I approached two other school districts that could approve the research study proposal. Consequently, a modification request was submitted to the IRB committee to include two other school districts of which an approval was acquired.

The population accessed for this study includes school administrators from all K–12 grades in two public schools in Texas. The smaller school district is composed of approximately 35 schools consisting of elementary, middle, and high school level. There are approximately 70 campus administrators that support and lead a total of about 1,200 school teachers. The larger

school district participating is composed of about 50 schools consisting of elementary, middle, and high school level. Extensive sampling of school principals and assistant principals included 30 preschools thru 12-grade public schools in the smaller district and approximately 50 of the larger district. Approximately 210 campus administrators, 70 from one district and 140 from the other, received an invitation to participate in a survey questionnaire via e-mail. The target sample used in this study is not the initial sample presented in the research proposal. Out of 70 school administrators invited to participate from the smaller district only 21 participated. Out of 210 campus administrators from the larger district invited to participate only 67 participated. Initially the district selected as the target sample in the proposal did not approve the request to allow the administration of the survey questionnaire to its school administrators. The overall participation response in this study was 31% of the total school leaders invited to participate. In a similar study with a sample of 800 invited participants there was a 27.5% response (Weber, 2006).

### **Descriptive Statistics**

Table 1 below illustrates the descriptive statistics of the results according to their category based on the design of the survey instrument (see Appendix A).

Table 1

#### *Descriptive Statistics*

	<i>M</i>	<i>SD</i>	<i>n</i>
Tech Use	3.92	0.49	81
Training Hours	1.85	0.79	80
Leadership and Vision	2.81	0.63	75
Learning and Teaching	2.99	0.59	76
Proficiency and Practice	3.26	0.52	76
Support, Management, and Operations	2.90	0.49	76
Assessment and Evaluations	3.06	0.45	76
Social, Legal, and Ethics	3.08	0.47	76

The use of technology had a mean score at 3.92 and was significantly higher than the mean related to school leader technology training with a mean score of 1.85. The amount or level of technology training that school leaders possess does not determine their level of usage. According to descriptive statistics analysis the key influential factor of technology use is the school leadership's perceptions of technology and its implementation. Consequently, the responses related to the predictor variables that assessed school administrators' approach and outlook towards technology implementation had means that ranged from 2.81 to 3.26. Responses focused on leadership vision in relation to technology implementation had a mean score of 2.81. Responses that focused on using technology to learn and teach has a mean score of 2.99. Responses that focused school leaders' technology proficiency and practice had a mean score of 3.26. Technology proficiency and practice generated the highest mean score in comparison to the other leadership indicators related to school leaders' outlook of technology. Nevertheless, this proficiency and practice variable is related more to technology use for operations rather than instruction. Responses that affirmed that school leaders provided adequate technology support during implementation had a mean score of 2.90. The provision of adequate technology support variable is aligned closer to what this study is analyzing in terms of technology implementation. School leaders that have a strong and positive outlook towards technology use in the classroom allocated the necessary resources to ensure that its utilization is progressing. Responses that indicated that school leaders used technology as part of evaluating teachers and meeting implementation standards had a mean score of 3.06. Though responses to legal issues and ethics had a mean score of 3.08 there was no significant correlation to technology implementation practices.

In survey question number 32 school leaders were asked about their involvement in the district process of creating a vision with clear goals of how to implement the use of technology in schools (Weber, 2006). Data shows that more than half (65.3%) of school leaders responded as having been part of the technology implementation vision development. In survey question number 33 school leaders were asked if they developed a research-based plan that improves technology integration, is collaborative, and parallels the district strategic blueprint (Weber, 2006). Data shows that more than half (68%) of school leaders responded as having developed a research-based technology advancement plan that corresponds to the district initiatives. In survey question number 34 inquirers school leaders regarding whether they promote technology implementation among teachers through their use of technology. Data shows that most school leaders (86.7%) encourage technology integration among teachers through their effective utilization of technologies in their daily practices. In question 35 school leaders were asked if they cooperated with teachers in the use of technology to assess and modify learning in the classroom. Data shows that most (84%) school leaders facilitated teachers in developing technology-based assessments that measure student performance and is used to enhance instruction. In question 36 school leaders were asked if they designed, developed, and participated in collaborative trainings involving technology integration in the classroom. Data shows that most (81.3%) school leaders impacted teaching and learning through their engaged approach in the development and participation of technology integration preparation trainings. In question 37 school administrators were asked about their use of technology for administrative purposes regarding staff and student data. Data shows that most (96%) school administrators utilize technology to manage record access of student and teacher data. In question 38 school administrators were asked if they used technology to communicate and collaborate with their



counterparts and other professionals in their field. Data shows that most (92%) school administrators acknowledge their use of technology to communicate and network with other professionals in education. Question 39 asks school administrators if they provide staff with adequate training that facilitates collaboration of resources and work. Data shows that most (84.4%) of school administrators agreed that staff development is provided to teachers to collaborate and share their instructional resources. Question 40 inquires whether school leaders assign funding to initiatives that focus on the advancement of technology integration. Data shows that more than half (65%) of school leader participants agreed to have assigned funding to technology integration strategies. Question 41 inquires whether school administrators are encouraging technology integration in schools through the provision of adequate support assistance. Most administrators (88%) agreed that they promote technology integration by providing necessary technology support to teachers in the classroom. Question 42 asks school leaders if they utilized technology to analyze student data in a manner that affects student learning and performance. Most administrators (93.5%) agreed that their use of technology to process and utilize school data to enhance learning also encourages the use of technology in the classroom. Question 43 asks school administrators whether their evaluation procedures towards educators assess standards related towards technology integration and their development of trainings. Most school administrators (85.7%) agreed that their evaluation process of educators ensures that integration requirements are met and provide a guide towards the development of professional trainings. Question 44 school administrators are asked if their evaluation of teachers includes the effective use of technology for learning and delivering instruction. Almost all school administrators (93.5%) agreed that their evaluation practices of teachers include measures that assess whether they use technology to learn and teach in the classroom. Question 45 asks school

leaders if they secured and allocated technology resources with the intent to provide support for teachers' in meeting students' needs in the classroom. Most administrators (75%) agreed that their initiatives to implement technology included the provision of technology support systems to help teachers use technologies in teaching. Question 46 asks school leaders if they implement and monitor school policies and procedures related to appropriate use, security, and copyright standards in their implementation initiatives. Most administrators (85%) agreed that their implementation efforts include the practice and supervision of acceptable use policies as established by federal, state, and district regulations. Question 47 asks school leaders if they participate in the development of technology infrastructures promote safety for personnel and the environment. Most administrators (70%) agreed that they are engaged in the implementation of technology safeguards that protect school staff the environment in their use to enhance student learning.

### **Inferential Statistics**

The analysis developed from the data collected using the STCP-NETS\*A questionnaire instrument (Weber, 2006) reveals relationships of diverse magnitudes between school administrators' technology integration outlook and technology implementation success in the classroom.

The first research question investigated in this study includes the following:

R<sub>1</sub>: What is the relationship between school administrators' training in technology leadership and the successful implementation of technology in schools?

The hypothesis statements considered for the first research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools.

The second research question investigated in this study includes the following:

R<sub>2</sub>: What is the relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools?

The hypothesis statements considered for the second research question includes the following:

H<sub>0</sub>: There is not a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

The following explains the results obtained from analyzing the data collected from the survey administered to school administrators. The data was analyzed for correlation using Spearman's rho with a 1-tailed test to determine the *p*-value of significance.

The first research question focuses on relating school administrators' technology preparation to the effective implementation of specific practices within the technology integration process. The response choices related to technology usage consisted of daily, weekly, monthly, seldom, or never used. The first set of 13 questions assessed the school administrators' level of technology use or implementation of technology. Questions in this set include skills such as utilization of a printer, spreadsheets, websites, emails, internet tools, electronic presentations, graphic editing tools, file management, and basic computer operations. The next set of questions,

14 to 27, assesses the proficiency level, of administrators, in relation to their training. Their responses to these questions consisted of five levels that ranged from zero hours of training to 50 or more hours. These questions assess the amount of technology training acquired by school leaders from different types of settings such as campus or district professional workshops or university preparation programs. The data analysis demonstrated no significant correlation between the school administrators' training and their implementation of specific practices that support technology use in the classroom. The correlation between the two variables was not significant, ( $r = 0.08$ ,  $p = 0.25$ ). The hypothesis stating that there is a relationship between the school administrators' level of training and technology implementation is not supported.

The second research question focuses on relating the school leaders' outlook or views on technology and its effective implementation. The school leaders' outlook consists of specific leadership indicators that impact perceptions, of technology implementation, were individually assessed in the questionnaire. The indicators included:

1. Leadership and vision, addressed in questions 32, 33, 34
2. Learning and teaching, addressed in questions 35, 36
3. Proficiency and practice, addressed in questions 37, 38
4. Support, management, and operations, addressed in questions 39, 40, 41
5. Assessment and evaluation, addressed in questions 42, 43, 44
6. Social, legal, and ethics aspects, addressed in questions 45, 46, 47

The hypothesis of this research question is that there is a correlation between the school administrators' outlook towards technology and its effective implementation in schools. This hypothesis was supported with a correlation ratio of  $r = 0.28^{**}$  and an alpha value of significance of  $p < 0.01$ .

Table 2 below illustrates the correlation coefficient of the different variables correlated in respect to technology use, school leader technology training, and school leader perceptions divided into predictor variables. The subscale with the highest mean was related to responses that assessed the school leaders' proficiency and practice of technology within implementation processes.

Table 2

*Spearman's rho Correlation Coefficients*

		Tng_ Hrs	Tech Use	NETSA _Overall	I_ LDR_ VIS	II_ Learn_ Teach	II_ PPF	IV_ Sup p	V_ Asses s Eva	VI_ Legal_ Ethics
Tng_ Hrs	<i>r</i>	1.000	-.021	.197*	.169	.130	.085	.024	.334*	.194*
	<i>p</i> - <i>val</i>	.	.428	.043	.074	.132	.233	.419	.002	.047
	<i>N</i>	80	80	77	75	76	76	76	76	76
Tech_ Use	<i>r</i>	-.021	1.000	.281**	.277**	.317**	.205*	.256*	.239*	.196*
	<i>p</i> - <i>val</i>	.428	.	.007	.008	.003	.038	.013	.019	.045
	<i>N</i>	80	81	77	75	76	76	76	76	76
NETS A_ Overall	<i>r</i>	.197*	.281**	1.000	.791**	.688**	.519**	.706**	.703*	.793**
	<i>p</i> - <i>val</i>	.043	.007	.	.000	.000	.000	.000	.000	.000
	<i>N</i>	77	77	77	75	76	76	76	76	76
I_LDR _VIS	<i>r</i>	.169	.277**	.791**	1.000	.572**	.198*	.542**	.504*	.519**
	<i>p</i> - <i>val</i>	.074	.008	.000	.	.000	.044	.000	.000	.000
	<i>N</i>	75	75	75	75	75	75	75	75	75
II_ Learn_ Teach	<i>r</i>	.130	.317**	.688**	.572**	1.000	.390**	.383**	.548*	.491**

Table 2 (continued)

*Spearman's rho Correlation Coefficients*

		Tng_ Hrs	Tech Use	NETSA _ Overall	I_ LDR_ VIS	II_ Learn_ Teach	II_ PPF	IV_ Sup p	V_ Asses s Eva	VI_ Legal_ Ethics
III_ PPF	<i>p</i> -val	.132	.003	.000	.000	.	.000	.000	.000	.000
	<i>N</i>	76	76	76	75	76	76	76	76	76
	<i>r</i>	.085	.205*	.519**	.198*	.390**	1.00 0	.355 **	.365* *	.449**
IV_ Sup p	<i>p</i> -val	.233	.038	.000	.044	.000	.	.001	.001	.000
	<i>N</i>	76	76	76	75	76	76	76	76	76
	<i>r</i>	.024	.256*	.706**	.542* *	.383**	.355 ** 0	1.00 0	.344**	.544**
V_ Asse ssEval	<i>p</i> -val	.419	.013	.000	.000	.000	.001	.	.001	.000
	<i>N</i>	76	76	76	75	76	76	76	76	76
	<i>r</i>	.334* *	.239*	.703**	.504* *	.548**	.365 **	.344 **	1.000	.661**
VI_ Leg al_ Ethi cs	<i>p</i> -val	.002	.019	.000	.000	.000	.001	.001	.	.000
	<i>N</i>	76	76	76	75	76	76	76	76	76
	<i>r</i>	.194* *	.196* *	.793**	.519* *	.491**	.449 **	.544 **	.661**	1.000
	<i>p</i> -val	.047	.045	.000	.000	.000	.000	.000	.000	.
	<i>N</i>	76	76	76	75	76	76	76	76	76
	*. Correlation is significant at the 0.05 level (1-tailed).									
	**. Correlation is significant at the 0.01 level (1-tailed).									

**Detailed Analysis**

The NETS-A survey (see Appendix A) measured a principals' approach/outlook to the use of technology in the classroom with 6 different predictor variables. These predictor variables address the following question:

Are all these predictor variables related to classroom implementation of technology?

H<sub>0</sub>: There is not a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

H<sub>A</sub>: There is a significant relationship between school administrators' outlook toward educational technology and the successful implementation of technology in schools.

The distribution of scores for the NETS-A is normally distributed (see figure below). As a result, we use the parametric statistics to test our hypotheses. The mean of the responses is 2.86; the standard deviation is 0.447 out of 77 participations.

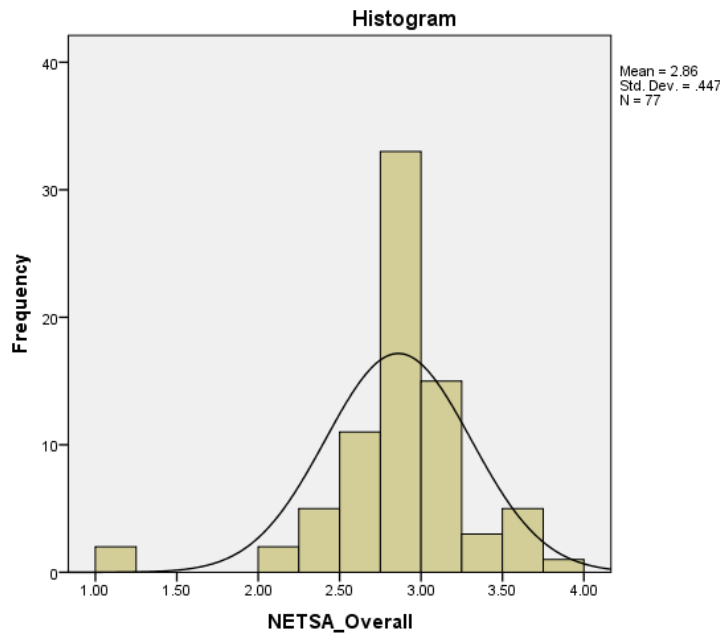


Figure 1. The distribution of overall scores for the NETS-A.

The distribution of scores for the NETS-A is normally distributed. As a result, we use the parametric statistics to test our hypotheses. This hypothesis was largely supported. Five of the six predictor variables showed a significant relationship with classroom implementation of technology. The following lists their correlation value and p value according to each subscale category.

- a. Leadership and vision—( $r = 0.30^{**}$ ,  $p < 0.01$ )

- b. Learning and teaching—( $r = 0.33^{**}$ ,  $p < 0.01$ )
- c. Proficiency and practice—( $r = 0.20^*$ ,  $p < 0.05$ )
- d. Support, mgt, operations—( $r = 0.22^*$ ,  $p < 0.05$ )
- e. Assessment and evaluation—( $r = 0.20^*$ ,  $p < 0.05$ )
- f. Social, legal, ethics—( $r = 0.17$  ns,  $p > 0.01$ )

## Summary of Results

Leadership and vision are the technology leadership role components that demonstrated moderate but significant relationship with school administrators' technology use. The correlation score of 0.30 is moderate but its  $p$ -value less than 0.01 demonstrates how technology implementation is significantly affected by school leaders' outlook of its value displayed through their usage of technology. Learning and teaching are the two key areas of education that school leaders demonstrated a relationship between their perception of technology and their implementation. The survey data analysis demonstrated a moderate correlation score of .33 with a  $p$ -value less than 0.01 that represents a significant relationship between school leader outlook and their technology implementation strategies enhancing learning and teaching. Proficiency and practice of technology use are key indicators of perceptions possessed by school leaders of how technology use is integrated through utilization. The survey data analysis demonstrates a weak positive correlation score of 0.20 with a  $p$ -value less than 0.05 that represents a significant relationship between school leader perceptions and their technology integration practices that promote the use of technology for instruction.

School administrators' decisions and actions in the areas of teacher support, management, and operations are also key indicators of perceptions that influence the integration of technology in schools. The survey data analysis demonstrates a weak positive correlation score of 0.22 with



a  $p$ -value less than 0.05 that represents a significant relationship between school leader perceptions and their technology integration practices that influence technology integration. The use of technology by in the areas of assessment and evaluation are also key indicators of school administrators' perceptions and valuation of its integration. The survey data analysis demonstrates a weak positive correlation score of .20 with a  $p$ -value less than 0.05. This correlation represents a significant relationship between school leader perceptions and their integration practices that model the use of technology for assessment and evaluation purposes. The inquiries related to social, legal, and ethics components to leadership decisions did not play a major role in the integration of technology initiatives developed by school administrators. The survey data analysis demonstrates a weak positive correlation score of 0.17 with a  $p$ -value greater than 0.01. This weak correlation does not represent a significant relationship between school leader perceptions and their integration practices that are driven factors related to social, legal, or ethical context.

## **Summary**

Overall, the results of the data analysis revealed key indicators that demonstrate a significant relationship between the effective implementation of technology and school administrators' usage and perceptions of educational technology. Using Spearman rank-order correlation analysis a significant relationship was found between technology integration in the classroom and school leaders' proficiency and perceptions toward educational technology. School leader responses from both participating school districts generated single-tailed correlation coefficients that revealed two key factors that affect the successful integration of technology. Correlation was found on how school leaders utilize technology to promote student learning and meeting the technology implementation standards in the classroom. Correlation

relationship is also found between school leaders' perceptions toward educational technology and the amount of determination that is place in using technology to enhance learning and instruction.

The hypothesis that tested the relationship between school administrator training and technology implementation was not supported. The correlation between the two variables was not significant with a coefficient of 0.08 and a  $p$ -value of 0.25 placing less emphasis on requiring more training to improve implementation. The hypothesis relating the school administrators approach and outlook to technology implementation was supported by the data analysis. The correlation coefficient of 0.28 and a  $p$ -value less than 0.01 provides significant support to the case that a school administrator's view and approach towards educational technology has a direct affect to its implementation success.

In reviewing the specific questions related to the second hypothesis, which was supported, responses could be assessed in six different predictor variables. The predictor variables, within the questionnaire designed by Weber, provided valuable insight in the specific form in which school leaders perceptions influence technology integration (Weber, 2006). Five of the six hypothesis tested within the predictor variables were significantly supported by the data. The leadership and vision of school leaders had an impact on technology integration. How school leaders use technology to learn and to teach influenced their approach end efforts in technology integration initiatives. School leaders' proficiency, practice, and use of technology transferred into their promotion and assessment of technology use to meet set standards. The use of technology by school leaders to assess and evaluate teacher integration practices was also a key indicator of a correlation between variables measured.

## **Chapter 5: Discussion and Conclusion**

In this chapter readers find the purpose of this study, the structure of the primary sections, and a summary of its findings in response to the research questions addressed. The first part of this chapter a summary of the first three chapters which show the rationale behind the purpose and necessity of this research study. Consequently, this chapter consists of a discussion of the overall conclusions based on the results analyzed and reviewed in Chapter 4. The conclusions that are stated in this chapter attempt to generate a better understanding of the challenges related to technology implementation that must be met. Past research demonstrates that significant studies have analyzed the issue that hinder effective technology implementation through perspectives related to teachers and students. The same research studies show that a gap exist in studying technology implementation through the view point of school leaders. The purpose of this correlation study was to analyze the relationship between school leaders' technology proficiency and effective technology implementation in school classrooms. The discussion in this chapter aims to review the results of the data analysis obtained through the quantitative research process and provide supported conclusions that help the evolving integration process of technology in the classroom.

### **Summary of Results**

The results of this research study demonstrated strong and weak correlations between predictor variables linked to school leaders' technology training and school leaders' outlook of technology to the successful implementation of technology in the classroom. The data analysis revealed descriptive statistics that showed high levels of technology use, technology proficiency, and technology usage related to assessments, evaluations, social, legal, and ethical practices. The highest value was technology use with a 3.92 median and the lowest value was training hours at

1.85 median value. Despite the infrequent technology training acquired by school leaders, there was significant use of technology for administrative purposes.

In the data review of specific questions related to technology use and the outlook of technology, valuable insight was observed. Data showed the more than half of school leaders stated they were part of the technology implementation vision plan. About (65%) of school leaders developed plans that included the improvement of technology, collaboration practices, and was congruent to the school districts' initiatives. About (70%) of participating school leaders affirmed having used research-based strategies to further support implementation of technology. Approximately (85%) school leaders stated they were involved in technology implementation practices that provided guidance for teachers through a collaborative formatted training. Results demonstrated how school leaders revealed having a positive outlook towards technology by being actively engaged in teacher trainings that generated how-to strategies in reinforcing curriculum with technology that focuses on enhancing learning.

Results on questions that assessed technology use by school leaders for administrative and networking tasks revealed a high percentage greater than (90%). It is evident that technology use by school leaders is extensive and plays a significant role in how they promote and support technology implementation in the classroom with equal emphasis. Approximately (65%) of school leaders affirmed to having allocated necessary funding towards technology implementation initiatives. The results revealed that school leaders' with a strong positive perception towards technology took the necessary actions to support implementation initiatives in their schools.

The first research question focused on relating school administrators' training in technology leadership and the successful implementation of technology in schools. The part of

the survey that assessed variables related to this research question demonstrated no significant correlation. The correlation between the two variables was not significant ( $r = 0.08$ ,  $p = 0.25$ ) and therefore revealed no direct relationship between the amount of technology training acquired by school administrators and the implementation of technology in schools.

The second research questions addressed in this research reviews the relationship between the school leaders' outlook towards technology and technology implementation. To assess school leaders' outlook the survey contained questions that assessed specific technology leadership indicators that are directly related to the implementation of technology in the classroom. The results of this study revealed a significant correlation between the school administrators' outlook towards technology and its effective implementation in schools. This hypothesis was supported with a correlation ratio of  $r = 0.28^{**}$  and an alpha value of significance of  $p < 0.01$ . Consequently, 5 out of the 6 subscales used as leadership indicators, that directly affect technology implementation, demonstrated a significant correlation to effective technology implementation in schools.

The results of this study reveal a connection between what are the school leaders' perceptions of technology implementation in schools and what necessary implementation practices are fulfilled. Despite significant training and use of technology without a strong positive outlook towards technology implementation integration will not be as effective. Results showed that school leaders' acquisition of technology training and their proficiency in using technology does not assure successfully technology leadership practices.

## **Discussion of the Results**

The quantitative research in this study used a survey to obtain information from school administrators related to their technology leadership preparation, their views of technology

implementation and their practices of technology within its implementation in the classroom. The survey administered to participating school leaders assessed several leadership role indicators in related to how school administrators perceive, use, and implement technology use in their schools. The results of the data collected from the survey revealed key insights that addressed the research questions of this study concerning technology implementation. Past studies have correlated technology implementation in the classroom to teacher practices and school resource availability. This study demonstrates what impacts technology implementation in the classroom from the perspective of school administrators in regards to their training and perceptions are on educational technology.

The survey instrument assessed participating school leaders in three primary categories related to educational technology. One set of questions addressed practices related to the implementation of technology. A second set of questions addressed the area of technology preparation and a third set to school leaders' outlook and perceptions of educational technology utilization. Perception inquiries can be divided into subcategories related to views of specific components that are necessary to successfully integrate technology in the classroom. These subcategories or leadership indicators as described by the NETS-A standards provide key correlative insight that guide future leadership practices in the development of technology integration processes.

The first research question focused on correlating school administrators' technology preparation and proficiency to the effective integration of technology in schools. The results in this study demonstrate a weak correlation, ( $r = 0.08$ ,  $p = 0.25$ ), that was not significant enough to show that school leaders' technology preparation is a determining factor of successful technology integration in the classroom. The amount of training and technology proficiency by

school administrators, according to data, was not a primary contributor to the implementation of technology in schools.

The second research question explored the school leaders' outlook on technology implementation. A set of questions on the survey used targeted specific leadership indicators that are related to the school leaders' perception on the value of implementing technology in the classroom. The questions focused on specific actions related to practices that, if implemented, determined if school leaders viewed the technology implementation process as a vital part of student learning. Collected data on these questions revealed a significant correlation of  $r = .28^{**}$  and an alpha value of  $p < .01$  which implies that school leadership outlook of technology implementation does affect the successful use of technology in schools. Within the questions that assessed school leader outlook there were specific leadership practice subcategories that were correlated as variables in relation to integration practices implemented. Leadership, vision, learning, and teaching practices revealed a correlation value of 0.3 and a  $p$ -value less than .01 in relation to implementation. Consequently, these subcategories provide significant support of the hypothesis statement in which school leaders' outlook of technology affects its effective implementation. School leaders' approach to launching an initiative to implement instructional technologies is a key factor creating a learning environment in which change is more acceptable by educators and students. A second set of subcategories assessed through the survey reveal the school leaders' outlook of technology. These subcategories include the use of technology, the provision of support, and the use of technology assess instruction. The data collected shows a significant correlation of  $r = .20$  with a  $p$ -value  $< .05$ . The correlation establishes that if school leaders have a strong and positive outlook towards the integration of technology, they will promote its use by modeling implementation. They will influence educators and staff to use

technology through their own practice and by providing the necessary support system to ensure continued use.

### **Discussion of Results in Relation to the Literature**

As an experienced educator involved in the integration process of technology, at different schools and school districts, many challenges were observed in using technology in the classroom. Eventually, it became the status quo to use technology for some time until difficulties developed and were not addressed causing its use to stop and the devices to be stored away. Teachers that were more fluent in technology use would continue its use and implementation. Teachers who skeptically attempted to integrate technology would immediately stop using it if a cliché was encountered during its use in their delivery of instruction. I always felt that a well-developed plan of integration would include the collaborative design of using technologically proficient teachers as mentors to teachers technologically challenged. Collaboration is a strategy that does not happen naturally in school campuses and requires a more intentional implementation preferably developed and led at the administrative level (Berrett et al., 2012). Schools in this country felt the impacts of a federally developed mandate through the No Child Left Behind (NCLD) initiative and the Enhancing Education Through Technology (EETT) policies that required for technology implementation become an essential part of school improvement plans. Consequently, school districts began to revamp their district wide technology implementation goals to include specific timelines and accountability measure showing the use of technology in the classroom (Berrett et al., 2012). This study revealed that practices related to effective technology use were significantly more evident in schools where administrators embraced the technology implementation initiative and became involved in their implementation.



Due to the clearly developed and highlighted need to integrate technology in the classrooms new standards were to guide its process. The standards developed called NETS-A standards listed specific technology leadership indicators that need to be in place for all technology implementation challenges be addressed appropriately (Anderson & Dexter, 2005). The standards of technology integration that were established focus on leadership, vision, instruction, learning, professional practices, support, management, assessments, and social aspects. Past research inquiries focused on the school leaderships' perspective of technology as a key factor in the implementation process. The central question addressed is whether school administrators implemented support components or provided personnel to provide technology support for teachers during integration. Subsequently, the problem this study is addressing is whether the preparation and or perspective of school administrators in the area of technology is a contributing factor to successful implementation in the classroom.

Technology implementation occurs in three components that include planning, teaching, and learning (Inan & Lowther, 2010). The study methodology aims to target specific leadership indicators that play a major role in technology integration. Data from this study provides significant insight that will help guide the preparation process of future and existing school leaders. Technology integration is a practice that will only improve student performance if its intended purpose is collaboratively administered among school leaders and teachers. The findings of this study revealed that technology preparation is related to technology implementation but not as impacting as technology integration perceptions possessed by school leaders. The data analysis on the specific leadership indicators demonstrated a strong correlation between school leaders' perceptions of technology implementation and the effective integration of technology. Though the participating leaders had extensive technology training the school

leaders with a more positive perception of technology were the most successful in leading the integration process.

The purpose of this quantitative correlational study is to determine if there is a significant relationship between school administrators' training in technology leadership and the successful implementation of technology in schools. Previous studies demonstrated that technology integration correlates to diverse predictors related to how teachers are led and prepared by school leaders (Brockmeier et al., 2005). Teachers' preparation and support during the integration process appeared to be key factors that in some form related to school leaders' technology preparation and outlook towards technology implementation. Key factors included professional development availability, technology support provision, and technology resource accessibility (Brockmeier et al., 2005). Nevertheless, studies also demonstrated that despite the provision of resources, support, and training, school leaders must possess a strong positive outlook towards technology for its integration to be successful (Liu et al., 2017). The results of this study show a significant relationship between the outlook of technology possessed by school leaders and their fulfillment of duties and decisions related to the integration of technology in the classroom.

The relationship between technology leadership training and the implementation of technology, in this research, was not significant enough to be considered a key determinant in the process of integration technology in schools. These results lead towards the conjecture that a significant amount of school leaders undergo technology leadership training but do not necessarily use it as a launching platform to become more engaged in the integration of technology in the classroom. According to Machado and Chung (2015) school leaders tend to depend on already established school programs and personnel that are designed to provide guidance to teachers that are implementing technology. In a recent study, an analysis on

assumptions used by technology leaders in schools revealed that technology is perceived as the driving force of a school's curriculum rather than the curriculum directing the use of technology (Webster, 2017). The findings of the study also concluded that not enough research of specific assumptions that lead decision making strategies in technology implementation that are ineffective or inadequately affecting learning in the classroom. Consequently, it is proposed that further research be done on assessing the effectiveness of implementation initiatives the assumptions utilized in providing the necessary support to the integration process. The first research question of this study tested the assumption that if school leaders possess more technology training then technology implementation would be more effectively implemented. The results demonstrated that more training does not imply better implementation of technology in the classroom. School leaders could consider, during their technology preparation, the need to have a well-developed campus plan that influences to use of technology in the classroom. Lastly, along with having a campus technology plan also have a strategic and well-coordinated plan of action to implement each phase of technology implementation (Machado & Chung, 2015).

Conversely, the correlation between technology leadership outlook of technology and its successful implementation was significant to be considered a vital factor in the process of integrating technology in schools. Past research reveals that school leaders play an essential role in leading the technology implementation process through key leadership practices. These practices include being significantly knowledgeable of how technology best applies to the learning progression, what are the needs in the integration structure that must be addressed, and ensuring the educators are provided with optimum resources to facilitate the use of technology in the classroom (Brockmeier et al., 2005). Consequently, if school leaders possess a clear vision or

outlook of what technology offers to education, they must work strategically to help teachers in the adoption process of embracing the same vision of technology implementation. School leaders and educators will then collaboratively plan, and work effectively acquire the enhanced learning potential that educational technology offers. (Brockmeier et al., 2005).

The results of this study show a parallel with findings related to the study completed by Murphy et al. (2018) in which school administrators' perceptions were a determining factor on the effectiveness of technology professionals in the integration process. Due to a lack of clear expectations established for technology professionals' performance levels were lower than expected according to how school administrators' prioritized their tasks or perceived their role in technology implementation. Similarly, in this study a significant correlation is found between effective technology implementation and the school administrators' outlook of technology implementation practices.

In the study by Anthony and Patravani (2014) the results revealed how computers were ineffectively implemented in the classroom as students were completing computer activities that were not linked to the course curriculum. Teachers felt unprepared to implement technology without having the necessary training to utilize technology support instruction and enhance student learning. If integration practices are not clearly defined and supported with effective technology leadership, technology's potential to improve learning will not be unlocked (Machado & Chung, 2015). The results of this study demonstrated that exposing school leaders to new technologies and training does not guarantee effective technology integration. The key component that this study discovered was that the technology outlook of school leaders is the driving force towards successful technology implementation. The school leaders that made the

consistently made decisions and allocated resources for technology integration shared a common positive outlook towards technology integration.

### **Limitations**

The limitations experienced in this research study included participant disposition to participate, the timing of the study in relation to school district calendar events, and the delivery of the invitation method. The initial district approached to participate as part of my research proposal did not approve my request. Consequently, a modification process to my research was processed and approved. Two alternate school districts were approached to participate and ultimately accepted to participate in the study. The smaller district generated a 30% participation of 70 school administrators invited to participate. The larger school district generated a 49% participation out of 140 school administrators invited to participate. The timing of the study also presented limitations in this study.

The initial school district approached and invited to participate was not able to do so due to conflicting dates between the study and school events. The research study administration dates created interference on district days of professional development and testing coordination. Due to conflict the school district chose not to participate in study. Consequently, a small and large district, also located in Texas, became the new target populations for this study. The delivery of the online survey invitation was also a limitation encountered in this study. One school district did not allow for the use of school district email systems as a method of delivering the online study invitation to school administrators. As a result, the invitation to participate on the online survey was delivered through the United States Postal Service. This adjustment on the delivery could have been a factor in the 30% participation generated.

## **Implications and Recommendations**

This study was designed to expand understanding on the relationship between school leadership technology preparation and outlook towards technology in the implementation process. The quantitative method used provided key information on the proficiency levels of school leaders as a result of their training, their approach towards implementation practices as a result of their outlook of technology in the classroom, and whether their role has generated successful technology practices in the classroom. This section expands on the implications this study possesses that are practical, theoretical, and have an impact on policies that affect students in their use of educational technology

The practical implications of this study are centered on the key technology leadership elements that have a positive effect on technology implementation in the classroom. Past studies have addressed some of the issues related to challenges in the form of training for educators, infrastructure, and teacher outlook of technology (Machado & Chung, 2015; Liu et al., 2017). Training for educators was more focused on the functionality of technology than on implementation practices which resulted in teachers developing apprehensions towards the use of technology for instruction (Cox, 2013). Infrastructure, according to research by Harrell and Bynum (2018), in the process of implementation is vital providing necessary support to teachers attempting to enhance their instructional methods with new technologies.

Teacher outlook of technology, according to Cox (2013), is also a key component in studying the positive influences of technology implementation. Study findings showed that teachers possessed perceptions towards technology that were developed as a result of past experiences with technology. Consequently, past research, provided guidelines that helped direct the development of new technology training for teachers and technology implementation plans.

This study showed that insight found on past studies is of vital importance for technology implementation with the addition to new information related to the technology leadership role of school administrators. Attempting to understand the overall successful elements of implementing technology in the classroom without considering the technology leadership role of school administrators is an ineffective study (Anderson & Dexter, 2005). This study shows that the school leadership outlook of technology is the key in providing the necessary support, resources, and training required to implement technology in the classroom.

The theoretical implications of this study consist of foundational ideologies that define how technology integration in the classroom is vital to learning and what integration components are needed to have a positive impact on student learning. Technology integration is described as the process of utilizing tools of information and communication technology (ICT) for classroom instruction (Reid, 2002). The initial theoretical development of technology integration was grounded on the potential or promise that technology possesses in changing how society communicates and learns new knowledge and skills. Reid (2002) explained that technology broadened the spectrum of the level and location of resources available to teachers and students during the learning process. Lessons presented in class, through technology, could engage experts located thousands of miles away via teleconference to engage with students learning new concepts and applications.

The theoretical framework, for this study, describes technology integration as effective utilization where the focus is supporting learning through technology and not technology itself (Norton & Wiburg, 2003). The implications of the results of this study to existing theories of technology implementation consists of targeting school leaders' outlook rather than on their level of technology preparation for future research. Though technology preparation is a contributing

factor to technology implementation the strongest correlation is related to the school leaders' outlook and approach. The results of this study specifically highlighted key areas that formulate a school leaders' outlook of the value and role technology possess in relation to student learning. Key areas consisted on the school leaders' technology role in developmental understanding of leadership, vision, learning, teaching, practice, and provision of technological support.

The policy implications that this study entails is related to the decisions and actions taken by school leaders in relation to the allotment of funds, resources, and professional development to integrate technology in the classroom. Machado and Chung (2015) found that effective technology integration is related to how school leaders perceive the importance level of technology use in the classroom. If school leaders do not believe that technology implementation in the classroom is a valuable asset towards learning their efforts in providing the necessary funds, resources and training will be minimal. The strongest correlation found in this study was the correlation between school leadership outlook of technology and the fulfillment of specific practices that enable effective technology use in schools. This relationship was supported with a correlation ratio of  $r = 0.28^{**}$  and an alpha value of significance of  $p < 0.01$ . Consequently, school leaders can use this finding to modify and adjust their initiatives in the implementation of technology in the classroom. Policies developed by school districts can emphasize the importance and value of technology use in the professional development provided to teachers with the support and guidance of school leaders. School leadership practices related to technology implementation will now focus more on the purpose of technology in the classroom instead of solely focusing on how technology can be used.

Recommendations of this study consist on addressing future research on areas that were not assessed and can provide more information to improve technology implementation in



schools. An important concept to consider is to provide research that relates student performance to technology use from the view point of school administration. School administration is in control of key decision-making that includes the process of technology implementation within the context of meeting campus measures at both state and federal mandates. Data that provides school administrators with key information that connects technology implementation with meeting campus academic standards can generate a map towards improved student learning. Student learning is ultimately the product that justifies the continuation or discontinuation of educational initiatives. Technology implementation plans must be measured in relation to student learning in order to justify its use and modification needs.

## **Conclusion**

The results of this study affirmed findings of past research and revealed new information of school leaders' technology preparation and outlook of technology in relation to technology implementation in the classroom. Past research demonstrates that extensive efforts in the integration of technology in the classroom is focused on the acquisition of technology instead of its implementation practices. The implementation practices studied in past research focused on teaching integration of technologies and not in the contribution or role of the school administration. Consequently, I saw the need or gap in research to analyze how school leaders' technology preparation and outlook of technology implementation determined its success. A key challenge in this study included the acquisition of significant participation of school leaders due to their extensive duties and responsibilities. Nevertheless, the determining factor of effective technology implementation based on this study and past research are the perceptions school administrators develop and exercise. Therefore, it is not surprising to discover that school leaders' outlook of technology implementation will have a vital effect on its integration process.

School leaders must become the primary visionaries and promoters of educational technology in the process of developing an effective implementation plan. Technology in the classroom can only be a key that unlocks student learning depending on the outlook and approach of the key holders.

## References

- Adams, K. A., & Lawrence, E.K. (2014). Research methods, statistics, and applications. Thousand Oaks, CA: Sage.
- Anderson, R. E., & Becker, H. J. (2001). School investment in instructional technology. Teaching, Learning, and Computing: 1998 National Survey of schools and teachers. Report #8. Irvine, California: Center for Research on Information Technology and Organizations.
- Anderson, R. E., & Dexter, S. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly*, 41(1), 49–82.  
doi:10.1177/0013161X04269517
- Anthony, A. B., & Patravvanich, S. (2014). The technology principal to be or not to be? *Journal of Cases in Educational Leadership*, 17(2), 3–19. doi:10.1177/1555458914528913.
- Attaran, M., & VanLaar, I. (2001). Managing the use of school technology: An eight-step guide for administrators. *The Journal of Management Development*, 20(5/6), 393–401.
- Berrett, B., Murphy, J., & Sullivan, J. (2012). Administrator insights and reflections: Technology integration in schools. *The Qualitative Report*, 17(1), 200–221.
- Brockmeier, L. L., Sermon, J. M., & Hope, W. C. (2005). Principals' relationship with computer technology. *National Association of Secondary School Principals. NASSP Bulletin*, 89(643), 45–63.
- Cochran-Armitage test of trend in SPSS Statistics | Laerd Statistics Premium. (n.d.). Retrieved October 24, 2016, from <https://statistics.laerd.com/premium/spss/cat/cochran-armitage-test-of-trend-in-spss.php>

- Cox, J. (2013). Tenured teachers and technology integration in the classroom. *Contemporary Issues in Education Research (Online)*; 6(2), 209–218. doi: 10.19030/cier.v6i2.7730
- Draper, K. L. (2013). *An examination of the relationship between principal technology leadership and technology integration in urban schools* (Ph.D., The University of Oklahoma). Retrieved from <http://search.proquest.com.cupdx.idm.oclc.org/eric/docview/1426640891/abstract/5F72B84A6C6E458DPQ/1>
- Fullan, M. (2011). *Change leader* (1st ed.). San Francisco, CA: Jossey-Bass.
- Göb, R., Mccollin, C., & Ramalhoto, M. F. (2007). Ordinal Methodology in the Analysis of Likert Scales. *Quality and Quantity; Dordrecht*, 41(5), 601–626. doi:10.1007/s11135-007-9089-z
- Gujjar, A. A., Choudhry, B. N., & Page, T. (2008). Role of Educational Technology in Distance Teacher Training Programme. *I-Manager's Journal on School Educational Technology; Nagercoil*, 3(4), 85–92.
- Hall, G. E., & George, A. A. (1999). The impact of principal change facilitator style on school and classroom culture. In H. J. Freiberg (Ed.), *School climate: Measuring, improving, and sustaining healthy learning environments*, 165–185. London, England: RoutledgeFalmer
- Harrell, S., & Bynum, Y. (2018). Factors Affecting Technology Integration in the Classroom. *Alabama Journal of Educational Leadership*, 5, 12–18.
- Holbrook, T., May, L., Albers, P., Dooley, C., & Flint, A. S. (2012). Teachers as Co-Learners in the Digital Age. *Language Arts*, 89(4), 219–221.

- Hope, W. C., & Stakenas, R. G. (1999). Leading the technology revolution: A new challenge for principals. In F. Kochan (Ed.), *Southern Regional Conference on Educational Leadership 199 Yearbook: Leadership for the 21st Century* (pp. 25–31). Auburn, AL: University of Auburn, Pierce Institute.
- Howell, M. P., Reames, E. H., & Andrzejewski, C. E. (2014). Educational Leadership Program Faculty as Technology Leaders: What Support Will They Need? *New Waves*, 17(1), 31–49.
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K–12 classrooms: a path model. *Educational Technology, Research, and Development; New York*, 58(2), 137–154.
- ISTE. (2002). The NETS project. Retrieved April 10, 2003. From <http://cnets.iste.org/overview.htm>
- Lafont, S. L. B. (2011). *The relationship between principals' technology leadership and the teachers' use of technology* (Ed.D., Southeastern Louisiana University). Retrieved from <http://search.proquest.com.cupdx.idm.oclc.org/pqdtglobal/docview/909958633/abstract/D E3B1A33EBFE48FDPQ/1>
- Leonard, L. J., & Leonard, P. E. (2006). Leadership for Technology Integration: Computing the Reality. *Alberta Journal of Educational Research*, 52(4), 212–224.
- Liu, F., Ritzhaupt, A., & Cavanaugh, C. (2013). Leaders of school technology innovation: A confirmatory factor analysis of the Change Facilitator Style Questionnaire (CFSQ). *Journal of Educational Administration*, 51(5), 576–593. doi:10.1108/JEA-01-2012-0011

- Liu, F., Ritzhaupt, A. D., Dawson, K., & Barron, A. E. (2017). Explaining technology integration in K–12 classrooms: a multilevel path analysis model. *Educational Technology, Research and Development*, 65(4), 795–813. doi:10.1007/s11423-016-9487-9
- Machado, L. J., & Chung, C.-J. (2015). Integrating Technology: The Principals' Role and Effect. *International Education Studies*, 8(5), 43–53.
- Means, B. (2010). Technology and Education Change: Focus on Student Learning. *Journal of Research on Technology in Education*, 42(3), 285–307.
- Murphy, C. A., Allred, J. B., & Brescia, W. F. (2018). The role of educational technology professionals as perceived by building administrators. *Education and Information Technologies*, 23(1), 179–191. doi:10.1007/s10639-017-9593-2
- Northouse, P. G. (2013). *Leadership: Theory and practice* (6th ed.). Thousand Oaks, CA: Sage.
- Norton, P., & Wiburg, K. M. (2003). *Teaching with Technology* (2nd ed.). Belmont, CA: Wadsworth/Thomson Learning.
- Patten, M. L., & Bruce, R. R. (2007). *Understanding research methods: An overview of the essentials*. Glendale, CA: Pyrczak.
- Reid, S. (2002). The integration of information and communication technology into classroom teaching. *Alberta Journal of Educational Research*, 48(1), 30–46.
- Sugar, W., & Holloman, H. (2009). Technology leaders wanted: Acknowledging the leadership role of a technology coordinator. *TechTrends*, 53(6), 66–75.
- Ury, G. G. (2003). *Missouri public school principals' computer usage and conformity to technology standards* (Order No. 3091975). Available from ProQuest Dissertations & Theses Global. (305308546). Retrieved from

<https://login.libweb.lib.utsa.edu/login?url=https://search-proquest-com.libweb.lib.utsa.edu/docview/305308546?accountid=712>

- Weber, M. J. (2006). *A study of computer technology use and technology leadership of Texas elementary public school principals* (Ed.D., University of North Texas). Retrieved from <http://search.proquest.com.cupdx.idm.oclc.org/pqdtglobal/docview/305293874/abstract/246E7271D2434D48PQ/1>
- Webster, M. D. (2017). Philosophy of Technology Assumptions in Educational Technology Leadership. *Journal of Educational Technology & Society; Palmerston North*, 20(1), 25–36.
- Whitehead, B., Jensen, D. & Boschee, F. (2013). *Planning for technology: a guide for school administrators, technology coordinators, and curriculum leaders*. Thousand Oaks, CA: Corwin.

## Appendix A: Questionnaire

### Survey of Technology Competency and Proficiency to the National Educational Technology Standards For Administrators

#### PART I

Please use a #2 pencil to darken the appropriate oval. Please choose only one answer per question.

*Please select the response below that best reflects your usage of technology as a school principal.*

**Response definitions: D=Daily, W=Weekly, M=Monthly, S=Seldom, N=Never**

	D	W	M	S	N
1. I solve common printing problems.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I use formulas and/or functions in a spreadsheet.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I create a graph from spreadsheet data.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I copy a graphic from a website. ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I send email messages and send/receive email attachments.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I access a specific web-page (URL). ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I search the Internet using a variety of tools.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I create and use bookmarks/favorites in a web browser.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I create an electronic presentation. ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I reduce, enlarge, or crop a graphic and convert graphics from one file format to another. ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I start up and shut down the computer; open and close an application/ program; insert and eject a removable disk (floppy disk, CD-ROM).....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I create, copy, move, rename, and delete files and folders on a computer.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I cut, copy, paste text both within an application and between multiple open applications. ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Part II** *Please select the response below that best represents the type of computer technology training you have received and the category for the number of hours of each type of training you have received.*

**Response Definition: A=0 Hrs. of training B= 1-12 Hrs. of training C= 13-25 Hrs of training D= 26-50 Hrs. of training E= 50 or more Hrs. of training**

	A	B	C	D	E
14. Administrator Certification Program – Computer use training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Administrator Certification Program – Technology integration training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Local school district - Computer use training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Local school district - Technology integration training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. T.E.A. Regional Service Center – Computer use training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. T.E.A. Regional Service Center – Technology integration training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. T.A.S.A. Technology Leadership Academy – Computer use training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. T.A.S.A. Technology Leadership Academy – Technology integration training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Professional education organizations (Ex: T.E.P.S.A., A.S.C.D. etc.)- Computer use training.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Part II Continued:** Please select the response below that best represents the type of computer technology training you have received and the category from the number of hours of each type of training you have received.

**Response Definition:** A=0 Hrs. of training B= 1-12 Hrs. of training C= 13-25 Hrs of training  
D= 26-50 Hrs. of training E= 50 or more Hrs. of training

	A	B	C	D	E
23. Professional education organizations (Ex: T.E.P.S.A., A.S.C.D. etc.)- Technology integration training .....	O	O	O	O	O
24. Post graduate college/university courses – Computer use training.....	O	O	O	O	O
25. Post graduate college/university courses – Technology integration training.....	O	O	O	O	O
26. Other sources not mentioned here – Computer use training.....	O	O	O	O	O
27. Other sources not mentioned here – Technology integration training.....	O	O	O	O	O

### PART III Principal Perceptions

Please select the response below that best represents your perception of implementation of computer technology integration in your school.

**Response definitions:** SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree

	SD	D	A	SA
28. I believe technology integration will improve student learning. ....	O	O	O	O
29.I believe technology integration will improve my school's test scores. ....	O	O	O	O
30. I believe teachers in my school are resistant to technology integration.....	O	O	O	O
31. I believe the money and staffing used to integrate technology take away from more important areas in my school. ....	O	O	O	O
32.I have participated in an inclusive district process through which stakeholders formulate a shared vision that clearly defines expectations for technology use .....	O	O	O	O
33.I have developed a collaborative, technology-rich school improvement plan, grounded in research and aligned with the district strategic plan. ....	O	O	O	O
34. I promote highly effective practices in technology integration among faculty and other staff. ....	O	O	O	O
35. I assist teachers in using technology to access, analyze, and interpret student performance data, and in using results to appropriately design, assess, and modify student instruction. ....	O	O	O	O
36. I collaboratively design, implement, support, and participate in professional development for all instructional staff that institutionalizes effective integration of technology for improved student learning. ....	O	O	O	O
37. I use current technology-based management systems to access and maintain personnel and student records.....	O	O	O	O

Please select the response below that best reflects your opinion of the associated statement.

**Response definition: SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly A**

38. I use a variety of media and formats, including telecommunications and the school website, to communicate, interact, and collaborate with peers, experts, and other education stakeholders. ....	SD	D	A	SA
	0	0	0	0
39. I provide campus-wide staff development for sharing work and resources across commonly used formats and platforms.....	0	0	0	0
40. I allocate campus discretionary funds and other resources to advance implementation of the technology plan.....	0	0	0	0
41. I advocate for adequate, timely, and high quality technology support services .....	0	0	0	0
42. I promote and model the use of technology to access, analyze, and interpret campus data to focus efforts for improving student learning and productivity.....	0	0	0	0
43. I implement evaluation procedures for teachers that assess Individual growth toward established technology standards and guide professional development planning.....	0	0	0	0
44. I include effectiveness of technology use in the learning and teaching process as criteria in assessing performance of instructional staff.....	0	0	0	0
45. I secure and allocate technology resources to enable teachers to better meet the needs for all learners on campus.....	0	0	0	0
46. I adhere to and enforce among staff and students the district's acceptable use policy and other policies and procedures related to security, copyright, and technology use. ....	0	0	0	0
47. I participate in the development of facility plans that support and focus on health and environmentally safe practices related to the use of technology.....	0	0	0	0

Please rate the following a sources of information about education you value as a school principal.

**Response definition: N= Not important SI=Slightly important IM= Important VI = Very important ES = Essential**

	NI	SI	IM	VI	ES
48. Peer principals.....	0	0	0	0	0
49. Administrators from the administration office in my district.....	0	0	0	0	0
50. Educators from the TEA regional service center .....	0	0	0	0	0
51. University/college professors of education/administration.....	0	0	0	0	0
52. Fellow educators from professional organizations (Example: TASA, TEPSA...etc). ....	0	0	0	0	0

Response definitions: N= No pressure, L= Low pressure, M= Moderate pressure, H= High pressure

## PART IV General Information

[illegible]

62. At present, my campus student population contains more minority students  
than non-minority students..... Y N O O

63. At present, my campus qualifies for school-wide Title I funding..... O O

C. Small town/rural – my school is located in a small town community not associated with a large city or metropolitan area. A B C

.....Response to question 3 above (chose one)..... O O O

## Appendix B: Consent Form

**Read and check the box below if you consent and want to take this survey.**

**Research Study Title:** CORRELATION STUDY BETWEEN SCHOOL ADMINISTRATORS' TECHNOLOGY LEADERSHIP PREPARATION AND TECHNOLOGY INTEGRATION

**Principal Investigator:** Jaime Villarreal

**Research Institution:** Concordia University–Portland

**Faculty Advisor:** Dr. Jillian Skelton

The purpose of this survey is to gain a better understanding of the relationship between technology leadership proficiency and integration effectiveness of instructional technologies. This is an anonymous survey. The participants will include all administrators from elementary, middle, and high school levels. This Qualtrics survey will ask you approximately 64 questions about your perceptions and experiences of technology leadership and integration in education. Doing this online survey should require about 20 minutes of your time.

Your responses will not be linked to your name or any other identifying information. The principal investigator will not know how any person responded to the anonymous survey. There are no significant risks in taking this survey, since it is anonymous.

Information you provide will help establish a greater understanding of any common factors or gaps in the relationship of technology leadership and integration effectiveness. Your participation can benefit a campus and organization within the Texas public school system.

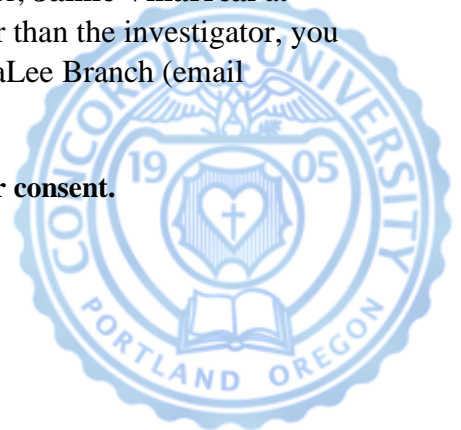
You may skip any questions you do not wish to answer. This study is not required and there is no penalty for not participating.

You can print this page, or I can provide you a copy of this page at your request.

If you have questions you can talk to or write the principal investigator, **Jaime Villarreal** at email [redacted]. If you want to talk with a participant advocate other than the investigator, you can write or call the director of our institutional review board, Dr. OraLee Branch (email [obbranch@cu-portland.edu](mailto:obbranch@cu-portland.edu) or call 503-493-6390).

☐

**Please click on this box to begin this survey. This indicates your consent.**



### **Appendix C: District Invitation Letter**

Dear Superintended and Research Committee Members,

I am a doctoral student in the Doctorate of Education program in Educational Leadership from the University of Concordia of Portland Oregon. I have been an educator for 22 years in the [redacted] as a high school math teacher and have currently accepted a teaching position in [redacted]. Working currently on my doctorate, I am in the quest of conducting research that will include all schools of your district to be published in a dissertation. The title of the research is: **CORRELATION STUDY BETWEEN SCHOOL ADMINISTRATORS' TECHNOLOGY LEADERSHIP PREPARATION AND TECHNOLOGY INTEGRATION**. The focus of the study is to analyze any relationship between school administrators' technology preparation and the successful integration of technology in the classroom. The study will include data from two school districts from your District Region of which one will be your district if approved.

If approved, I will email an online survey, developed through Qualtrics, to all of your school administrators. The names of participating administrators that choose to participate will be kept anonymous. The data collected will be used to compare findings from past research in the topic of technology integration and provide valuable insight for further efforts in technology use in the classroom.

Should you approve this request, I would greatly appreciate that your reply would be in writing on an official letterhead to be submitted to the Institutional Review Board of Concordia University. I have attached a written copy of the survey that will be used in the online format, a copy of the IRB approval, and a copy of the consent form that will be read by participants receiving the online survey upon your approval. I would gladly talk to you in person if you would prefer to answer any questions or concerns.

Thank you,

Jaime Villarreal

## **Appendix D: Participant Invitation Letter**

Dear School Administrator,

My name is Jaime Villarreal a doctoral candidate completing my online studies through the University of Concordia in Portland Oregon. I have been teaching high school mathematics for 22 years in the [redacted] and currently accepted a teaching in [redacted]. I am writing to you to request your participation in an online survey as part of my dissertation research study. The research focuses on analyzing correlations between technology integration in the classroom and the technology leadership preparation of school administrators in public schools. I have selected your district to collect data that will provide insight on specific practices and perceptions that may have an impact on the successful integration of technology in the classroom. Having your perspective as school administrators will significantly contribute to past research and serve as a guide to future development of implementation strategies.

The online survey is brief and should only take about 10 minutes. I have included in this letter the web link that will provide access to the survey through the use of a computer or your mobile device as well. Your participation in the survey is completely voluntary, and all of your responses will be kept confidential. No personal identifiable information will be associated with your responses to any reports of these data. Superintendent as well as the IRB committees your district and Concordia University, approved the administration of this survey as part of the proposed study.

Should you have any comments or questions, please feel free to contact me.

Sincerely,

Jaime Villarreal

Doctoral Candidate

## **Appendix E: District 1 Permission Letter**

Good afternoon Mr. Villarreal,

I am pleased to inform you that your proposed study has been approved by our Superintendent, [redacted]. Please note, participation by schools, teachers, and/or principals is voluntary and they may choose not to participate in research studies, even if they are approved by the District. Please ensure you distribute and collect the appropriate consent forms. The privacy and rights of individuals and schools shall be respected. Data with student, employee, school, or other personal identifiers shall not be reported or presented (school identifiers may be reported upon explicit approval).

Upon conclusion of your research, a copy of the final report will be submitted at no charge to the Director of Accountability and Assessment. However, if a more formal report is to be released (dissertation, thesis, book, journal article, etc.), the researcher shall provide [redacted] a formal copy at no charge. The researcher further agrees to release this report for use by [redacted] without remuneration. If your research extends beyond your timeline, you will need to request an extension with [redacted] permitting that it is approved by your IRB. We ask that you keep us informed of your project status throughout the year.

Our District welcomes research in areas that benefit the school system and our students. Should you have any questions, please feel free to email or call me.

Respectfully,

[Redacted]

[Redacted] ISD

## **Appendix F: District 2 Permission Letter**

Sir,

Your survey request has been approved.

Thank You,

[redacted] **Coordinator**

[redacted] [redacted] **Independent School District**

[redacted]



## **Appendix G: Survey Author Permission Email**

On Dec 16, 2016, at 6:02 PM, Jaime Villarreal wrote:

Hello Dr. Weber,

My name is Jaime Villarreal and I am currently developing my dissertation proposal. I am requesting your permission to use your survey on technology integration (STCP-NETS-A). I would appreciate your support. My phone number is [redacted] if you should have any questions.

Respectfully,

Jaime Villarreal.

---

Jaime, you have my permission to use the survey. Good luck with your study. Soon you will be Dr. Villarreal!

Thank you for doing things the right way.  
Dr. Mark J. Weber

## **Appendix H: Survey Author Permission Email to Publish Survey**

On July 17, 2019, at 8:28 PM Jaime Villarreal wrote:

Hello Dr. Weber, I am working on my final edits for commons and would appreciate if I could have your permission to publish your survey on technology integration (STCP-NETS-A) in my dissertation as part of my research study.

Thank you for your time and consideration.

---

On July 17, 2019, at 9:10 PM Dr. Mark Weber responded:

To Jaime Villarreal

Hello, Mr. Jaime Villarreal. Thank you for asking for permission to use my survey with your dissertation work. I gladly give you full permission to use the survey from my dissertation. I wish you the best of luck in completing your study. Dr. Mark J. Weber

## **Appendix I: Statement of Original Work**

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

### **Statement of academic integrity.**

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

#### **Explanations:**

##### ***What does “fraudulent” mean?***

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

##### ***What is “unauthorized” assistance?***

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

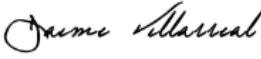
- Use of unauthorized notes or another’s work during an online test
- Use of unauthorized notes or personal assistance in an online exam setting
- Inappropriate collaboration in preparation and/or completion of a project
- Unauthorized solicitation of professional resources for the completion of the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

### Statement of Original Work (Continued)

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University–Portland Academic Integrity Policy during the development and writing of this dissertation.
2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*

3.

DocuSigned by:  
  
58199A4BF0B34B2...

Digital Signature

Jaime Villarreal

Name (Typed)

July 18, 2019

Date

## Appendix J: IRB Research Study and Consent Letter Approval

DATE: March 5, 2017

TO: Jaime Villarreal, M.Ed  
FROM: Concordia University - Portland IRB (CU IRB)

PROJECT TITLE: [1002911-1] Dissertation Proposal  
REFERENCE #: EDD-20161216-Skelton-Villarreal  
SUBMISSION TYPE: New Project

ACTION: APPROVED  
APPROVAL DATE: March 5, 2017  
EXPIRATION DATE: March 5, 2018  
REVIEW TYPE: Facilitated Review

Thank you for your submission of New Project materials for this project. The Concordia University - Portland IRB (CU IRB) has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Facilitated Review based on the applicable federal regulations. Your study involves Classroom Management that is fitting for exemption from further IRB new project review procedures. The definition of a classroom management research study is described at the end of this approval letter.

You are responsible for contacting and following the procedures and policies of Concordia University and any other institution where you conduct research.

You have been approved to enroll participants without requiring written documentation of the participant's consent. The policy of written informed consent was waived because 1) this is a minimum risk study, 2) the largest risk in conducting the study is in collection of their name or other identifying information within the consent form process itself, and 3) there are other methods proposed that demonstrate the researcher will obtain non-written consent. Instead of written documentation of consent, you will obtain informal consent using a non-person-specific method. Even with a waiver for written documented consent, participants must be informed volunteers. You are responsible for communicating, from the beginning to the end of the study, that participation is voluntary.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. The form needed to request a revision is called a Modification Request Form, which is available at [www.cu-portland.edu/IRB/Forms](http://www.cu-portland.edu/IRB/Forms).

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please email the CU IRB

## **IRB Research Study and Consent Letter Approval (Continued)**

Director directly, at [obran@cu-portland.edu](mailto:obran@cu-portland.edu), if you have an unanticipated problem or other such urgent question or report.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of March 5, 2018.

You must submit a close-out report at the expiration of your project or upon completion of your project. The Close-out Report Form is available at [www.cu-portland.edu/IRB/Forms](http://www.cu-portland.edu/IRB/Forms).

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Dr. OraLee Branch at 503-493-6390 or [irb@cu-portland.edu](mailto:irb@cu-portland.edu). Please include your project title and reference number in all correspondence with this committee.