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The Impact of Technology Centered Instruction and Implementation Measures on Student Performance

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A Dissertation submitted to the Education Faculty of Lindenwood University in partial fulfillment of the requirements for the degree of

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and Implementation Measures
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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

Daniel James Kania Jr.

Signature  Date 08-20-2021

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Abstract

This study was conducted to compare the impact of technology-centered instructional methods on student performance in literacy to the impact of non-digital instructional practices. Additionally, this research was designed to identify specific program implementation measures used during the implementation of the prevailing instructional method and identify what link existed between these measures and the performance of students. The researcher examined quantitative and qualitative data obtained from both public data sources and from a survey administered to teachers in eight school districts in Missouri. The participants responded to questions that provided the researcher with quantitative and qualitative data to be used in completing the research study. This data was used to determine: a) if a relationship existed between the utilization of technology-centered practices and performance on state assessments, b) if a relationship existed between implementation methods of technology and performance on state assessments, and c) whether the performance experienced by these schools was in line with perceptual data. The information gathered throughout this research provided the researcher insight into current instructional practices, comparative data sets to isolate the most effective balances of technology during instruction, and an analysis of effective implementation measures. The researcher found that there was no definitive correlation that existed between student performance and the focus areas of the study. When looking at the data from the survey, the perceptions of teachers did show to support the idea that technology does have an impact on performance, but that it was not supported as the primary reason for student performance. The findings of this study would be useful to

educational decision-makers and school leaders in making informed decisions in regards to the selection of instructional methods.

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Chapter One: Introduction

The ability to read and write, also known as literacy, is a crucial component of an individual's process of development. An individual's abilities within literacy have been shown to have an impact on their day-to-day quality of life even into adulthood (Vagi et al., 2017). Literacy has also proven to be an integral component in the process of formal learning. Its impact has been documented in studies from the foundational development of early learning to the reaches of higher education. A direct correlation has been shown between the development of language proficiency and the development of learning for students (Crim et al., 2008). This link between literacy and learning has been used as a predictor of educational outcomes for students. One of these predictors is the link between literacy proficiency and a child's potential for success in later grade levels (Vagi et al., 2017).

In a study conducted by the National Center for Education Statistics on the literacy rates, students' literacy proficiency rates were shown to be lagging behind and a lack of focus on literacy programming existed (Swanson et al., 2016). This trend has continued to grow in recent years and has gained increasing attention from educators (Swanson et al., 2016). With all of these factors in mind there has been a greater focus on literacy rates by educators. The most effective method of improving literacy proficiency has been the implementation of targeted reading instruction in schools, carried out by teachers who utilized research based, best practice instructional methods (Foorman et al., 2017).

As school district officials have searched for measurable movement in the direction of increased student performance, they have begun to explore new methods for

addressing literacy problems in their schools (Gulamhussein, 2013). This exploration for more innovative means to approach struggles with literacy instruction have led to an exponential growth in the application of technology. As this growth in application has continued to occur in many areas of industry and business, education has begun to implement technology into professional practices throughout many components of education (Neupokoeva et al., 2016). These advances in technology have rapidly changed the landscape of education (Oriji & Amadi, 2016). With the increased accessibility of technological resources, instructional practices have shifted to incorporate increasing methods of digital delivery of instruction (Elmendorf & Song, 2015). The implementation of technology has continued to evolve. Technology has increased efficiency of instructional delivery and has allowed for teachers to spend more time concentrating on the facilitation of learning in their classroom (Oriji & Amadi, 2016). Technology has also been shown to increase the flexibility of when and where learning occurs (Oriji & Amadi, 2016). Continued advancements in the accessibility and variety of technology continues to bring about change in implementation of educational practices and traditions (Elmendorf & Song, 2015). Many of the roles and professional practices of teachers have evolved as education puts more emphasis on the implementation of technology-centered instruction (Elmendorf & Song, 2015). Teachers have developed new proficiencies with instructional and support technologies to keep pace with the shift in educational practices (Oriji & Amadi, 2016).

Background of the Study

Educators are continually faced with difficult decisions often centered on improving student performance. Literacy plays a pivotal role in all stages of development

and has had a direct impact on many other factors related to later success in life (Akubuilo et al., 2015). Deficiencies and gaps in literacy development were identified and have been addressed as they pose the greatest threat to future opportunities for student success (Akubuilo et al., 2015). The development of specific structures and processes involved in literacy development had begun prior to children entering into kindergarten programs (Crim et al., 2008). In a report conducted on methods for reducing literacy gaps in early development, it was shown home practices and early elementary intervention practices played a crucial role in the development of literacy in children (Kinkead-Clark, 2017). Exposure to reading and literacy in the home has been vital in the development of proficiency in literacy (Tichnor-Wagner, 2016). However, despite these efforts, gaps in literacy readiness for students entering school continued to persist and school officials were left searching for ways to meet these challenges (Yoschikawa et al., 2016). The correlation between literacy proficiency and the success of the student forced educators to pay more attention to factors within the scope of influence of the school that are related to student growth in literacy (Crim et al., 2008). Educators have begun tracking literacy along the continuum of education and now use literacy measurements such as the Developmental Reading Assessment (DRA) in specified grades to identify literacy gaps. Additionally, schools have begun to isolate the internal and external factors associated with the development of literacy proficiency for school age children (Akubuilo et al., 2015). Educators have implemented new interventions with Title II funding aimed at addressing these factors and to ensure the reading readiness of students entering into elementary school (Akubuilo et al., 2015). Schools have committed time and resources to ensure teachers possess knowledge of literacy development and the methods of

instruction used to deliver essential components of literacy development (Crim et al., 2008). Crim (2008) added that all stakeholders, including administrators, are responsible for the development of literacy practices and the promotion of literacy proficiency. It is crucial that educators commit to improving their instructional process as they are essential to student growth in literacy proficiency (Machado & Chung, 2015). Along these lines, administrators have begun to implement more standardized benchmark tools to help in the tracking and management of student literacy (Machado & Chung, 2015).

Educators found themselves teaching in atmospheres of increased criticism and heightened accountability from the federal government (Tatto et al., 2016). A study measuring the literacy rates of students in the United States, as opposed to students in other developed countries, showed that students in the United States continued to fall behind in the literacy race and have now dropped to 15th amongst developed nations (Swanson et al., 2016). As a result of slumping literacy rates, the government has been taking more direct action in the development of literacy. As government concerns over student literacy rates increased, more direct involvement in educational practices shifted from a support-and-assist model to a regulate-and-mandate model. Joint federal and state initiatives, such as the Every Student Succeeds Act (ESSA) and its predecessor No Child Left Behind (NCLB), are evidence of increased government control of education and literacy (Mathis & Trujillo, 2016). Legislation, such as the Individuals with Disabilities Act (IDEA), has placed increased accountability on schools to guarantee students access to reading intervention programs, as well as instructional technology (Adebisi et al., 2015). In 2010, the Common Core State Standards (CCSS) legislation, with a prevailing emphasis on English Language Arts, began taking steps at nationalizing instructional

content and restructuring many curricular practices involved in literacy (Lee, 2017). State agencies have begun more targeted support initiatives to address literacy development at even younger ages through its implementation of programs like the Missouri Preschool Program (MPP), which has sought to increase student involvement in preschool programs and to govern the instruction of literacy (Missouri Department of Elementary and Secondary Education [MODESE], 2021). The State of Missouri legislators ensured the implementation of this initiative by offering funding and monitoring performance through competitive grant-driven programs designed for both public and private organizations (MODESE, 2021).

With the significant impact literacy has on education and the increased accountability for academic performance being placed on schools, educators sought to isolate best practice instructional techniques. As a result of this search, many educators have begun to utilize technological resources targeted at student growth in literacy proficiency (Sharp, 2014). In a report conducted on principals' perceptions of technology in education, it was shown that building level administrators have placed an increasing emphasis on the impact technology has had on instruction in classrooms (Machado & Chung, 2015). It has become the professional responsibility of educators to stay current with technological trends and to develop successful implementation strategies for technology (Sert & Boynuegri, 2017). Technology transformed the landscape of instructional practices and ushered in the implementation of 21st century skills. Research conducted on the impact technology has on at-risk students showed that the right forms of technology implemented in specific ways could have a serious impact on student achievement (Darling-Hammond et al., 2014).

The use of technology in the process of education is not a new concept. Technology has been utilized to improve literacy and language as far back as the early 1900's when phonograph recordings were used to help with certain aspects of literacy, such as pronunciation (Chau & Lee, 2014). Despite early uses of technology to aid in areas of language and literacy proficiency, technology has not been implemented as a central theme for educator development until 20 years prior to Mims-Word's (2012) work. In those 20 years, education has experienced an increased demand for the overall accessibility of technology, as well as a push to seek out new and innovative ways to implement technology in schools (Mims-Word, 2012). The emphasis of technology in daily instruction was largely focused on ensuring access to technology but it has begun to grow far beyond ensuring accessibility (Machado & Chung, 2015). Technology has begun to be a primary media for instructional resources. As technology use has surged and become more global, the balance of instructional resources has become increasingly digital (Johnson et al., 2016). In less than a decade there have been nearly 90 million e-readers and tablets sold (Biancarosa & Griffiths, 2012). Many schools have begun shifting towards programs that place instruction directly into the hands of students full time with initiatives such as 1:1, which places a computer assigned by the district with each student (Johnson et al., 2016). Practices similar to 1:1 technology initiatives have been implemented from the most affluent urban schools to the far reaches of rural communities (Johnson et al., 2016). Personal use of technology has grown exponentially and the future possibilities for technology has become seemingly endless (Johnson et al., 2016). Increased availability and variety of technology has fostered the use of technology as a primary means for delivering instruction and improving learning (Machado &

Chung, 2015). With such an increase in technology, the demand for students and teachers to possess 21st Century skills, such as technological literacy has grown. The increased demand and accessibility of technology has also altered the pedagogy of how educators view curriculum and instruction (Biancarosa & Griffiths, 2012). The impact that technology has had on learning has led more educators to explore instructional practices that have become increasingly structured around the implementation of technology (Machado & Chung, 2015). All of these factors have led to an increased belief in technology-centered curriculum, which has led to an increase in self-directed and autonomous learning (Sert & Boynuegri, 2017).

Increased availability and wider acceptance of technology as a viable means for delivering instruction has led educators to search for more effective ways to close education gaps (Mims-Word, 2012). This push has seen the percentage of schools that have full technological accessibility grow by over 64% in just the last few decades (Mims-Word, 2012). Reports showed public education sitting at nearly 100% of all schools having some form of technology directly accessible to students (Mims-Word, 2012). Many changes evolved in educational practices regarding the implementation of technology and led many states to adopt educational standards centered on the effective implementation of technology (Mims-Word, 2012). Organizations, such as the International Society for Technology in Education (ISTE), have focused their efforts at improving the effective implementation of technology and have created standards for students, teachers, and administrators from (ISTE, 2021). Development and implementation of technology-centered education standards continue to evolve, and from the conceptualization brought forth by ISTE, new developments, such as the Educational

Technology Standards Self-Efficacy (ETSSE) scale have emerged, which utilize the fundamental standards of ISTE to provide teachers a measurement of the effectiveness of their implementation practices (Simsek & Yazar, 2017).

As technology-centered instruction has continued to drive the evolution of curriculum and instruction, there have been many great accomplishments in education. This rapid growth of availability of instructional technology and its implementation has also brought about an entirely new set of obstacles for educators (Chau & Lee, 2014). In early implementation periods, despite all of the initiatives and practices to make technology a larger part of education, there had been little relevant data collected in regards to student growth resulting from these programs (Johnson et al., 2016). State Education Departments provided school officials across the nation with standardized assessments to assess student retention of education, as well as evaluation models to assess the effectiveness of educators. Unfortunately, those agencies offered little guidance or metrics for schools to ensure accountability with regards to best practice implementation of technology in schools, and provided no concrete framework for schools to evaluate the true effectiveness of technology-centered instruction (Wong, 2020).

Schools have had to move beyond merely ensuring the accessibility of technology and take intentional measures to ensure the efficacy of their practices and integration policies (Johnson et al., 2016). School districts continually monitored student literacy performance. State standardized tests and benchmark assessments are frequently used to gauge proficiency levels and analyze the growth of individual students across predetermined spans of time. When the data are collected, they are most often associated

with the effectiveness of an individual teacher. Hur et al. (2016) reported that new research has been conducted, which aimed at identifying the existence of key contributing factors associated with the successful integration of technology-centered instruction and establishing a model that would assist educators in the implementation of technology. Research into the types of educational research being conducted revealed that educators have begun evaluating technology practices in education much more frequently (Erdem-Aydin et al., 2019). Organizations, such as What Works Clearinghouse (WWC), have provided educators with evaluation of specific technology-centered programs (Institute of Education Services, 2021). Educators have continued to prioritize the use of technology, which has led to directed efforts to quantify variables involved in the effective implementation of technology in education (Hur et al., 2016). Specifically, there has been a need to research the effectiveness of technology-centered instruction by diagnosing the ability of technology to improve literacy proficiency (Tang & Chaw, 2016).

As research on effective implementation of technology in education has advanced, the methods of evaluating these programs have also grown. Tang and Chaw (2016) conducted a quantitative research study on the impact that technology has on literacy and analyzed teacher perception, cost against funding, and pedagogical ability to effectively implement technology. Charbonneau-Gowdy (2017) also conducted a qualitative study, this one utilizing both student and teacher perception to find greater depth in the discussion of implementation versus impact and analyzed current research models based solely on performance data. With the recent growth in the amount of research being conducted, there is still a need to find precision within the data that might

lead educators to a clearer understanding of what truly impacts education (Sarrab et al., 2016).

As research progressed into the effectiveness of educational technology and effective implementation measures, educators also had to compare the costs of implementing technology to the benefits of technology-centered instruction (Burch & Heinrich, 2016). Educators have continued to look at all factors associated with the implementation of technology and have identified the need to also evaluate the sustainability of technology integration (Burch & Heinrich, 2016). The cost to educate a student has risen and school systems have had to evaluate their spending as they have looked to implement cost-effective methods without sacrificing performance (Hollands & Tirthali, 2014). Educators must carefully monitor the changing educational climate and be mindful of missed opportunities brought on by implementation without consideration of what consequences may arise from those actions (Risko & Vogt, 2017).

Conceptual Frameworks

Technology is an excellent resource that has changed the look and feel of the modern classroom. While this is true, there still exist many challenges when implementing and ensuring success with technology. Much uncertainty remains when trying to quantify the impact that technology has on student performance, as well as what factors of the implementation process are most important. Often the implementation of technology-centered instruction has fallen short of its intended goals, due to the lack of proper planning and research (Stanford University, 2014). The frequency and variety of technology available to education has seen immense growth in the two decades prior to Mims-Word's (2012) work. This has brought about an infusion of new resources and

applications within education. This vast variety and increased availability make it difficult to measure the impact of a particular resource and even more difficult to discern the level of impact from technology when compared to the impact of the teacher. There is still a struggle that exists for school in regards to adopting and implementing technology-centered instruction (Hur et al., 2016). As this problem has proven to impede the educational process, there has been a growth in the amount of research conducted on effective implementation practices with regards to technology in education (Aydin et al., 2019). The lack of a proper model for educators to follow regarding implementing technology is a direct obstacle to the advancement of instructional practices targeted at increasing student achievement (National Education Association, 2019)

The implementation of technology must be thought out and implemented with fidelity (Murati & Ceka, 2017). Teachers and administrators must take a more analytical approach to studying the specific impact that technology can play in education, with a specific focus on improving student literacy (Biancarosa & Griffiths, 2012). Educators have seen an increase in the amount of research conducted on the impact of technological integration in the classroom (Machado & Chung, 2015). According to Sarrab et al. (2016), the issue with much of this research is that it fails to isolate and analyze individual factors of performance and lacks cohesion within the research. This lack of cohesion often leaves educators without a clear direction during the selection and implementation process with technology.

Current research on technology integration has incurred much debate, as there are many schools of thought in regards to which factors have a greater impact on instruction and performance (Tang & Chaw, 2016). Hur et al. (2016) conducted a study, which found

that a district level integration plan, a budgetary commitment to technological resources, and teachers' initial perceptions were key indicators leading to the effective implementation of technological centered instruction. Other research conducted placed a greater emphasis on the implementation of technology standards, such as those provided by ISTE that outline a necessary blueprint for the successful implementation of technology (Simsek & Yazar, 2016). Other research pointed to continued professional learning targeted at technology training is the key functional component of seeing a true impact on student growth (Machado & Chung, 2015). Research on ethics with regards to successful implementation has also been conducted (Guney, 2019).

Little consistency can be found in the practices used in the implementation of technology (Burch & Heinrich, 2016). This lack of consistency makes it difficult to effectively measure the true impact technology has on education (Burch & Heinrich, 2016). Educators must begin to isolate and analyze relevant factors surrounding technology-centered instruction and develop an evaluation model to more effectively and efficiently analyze the implementation of technology (Institute of Education Services, 2021). A framework for evaluating the effectiveness and equity of current and future practices is provided by organizational researchers, Bolman and Deal (as cited in Lyon et al., 2014). Bolman and Deal's (2017) research provided educators with the requirements necessary to effectively implement change in their programs (Hodgman, 2013). This construct comprised four key frameworks: structural, human resource, political, and symbolic (Lyon et al., 2014). The structural framework analyzes organizational components, the human resource framework considers the organization from the viewpoint of a family, the political framework views issues from a hierarchy of power,

and the symbolic framework lends itself to the practices and traditions of the group (Bentley et al., 2014). These four frameworks provide school districts with the means to analyze the effectiveness of a practice through multiple lenses and isolate the strengths and weaknesses of its practices (Lyon et al., 2014). Each of the four frameworks support a different need with a different target and can be used fluidly as the implementation process evolves (Bolman & Deal, 2017). The dynamic nature of the four frameworks provides the researcher with the option to use whichever lens is best suited for the issue at hand (Clark & Lindahl, 2014).

Statement of the Problem

There is currently a lack of congruence in research regarding the impact of technology on student growth in literacy proficiency (Tang & Chaw, 2016). This lack of congruence amongst existing educational studies has forced educators to focus resources and isolate which variables truly provide the desired outcomes on literacy proficiency (Hur et al., 2016). Additionally, the current educational economy causes a need for additional study into the cost effectiveness of technology-centered instruction, as opposed to traditional instructional techniques (Hollands & Tirthali, 2014). The analysis of the instructional process is integral to the success of improving education (Siadaty et al., 2016). There are a significant number of factors to consider when discussing technological integration (Burch & Heinrich, 2016). Research must be advanced to isolate factors involved in using technology to increase literacy proficiency (Hur et al., 2016). District administrative teams have begun to evaluate the ability of current technology-centered programs to impact student growth in literacy proficiency and

measure those results against findings from other available technological resources (Akbar et al., 2015).

Purpose of the Study

In this study, the researcher analyzed both quantitative and qualitative data from schools that used technology-centered instruction practices in the delivery of literacy curriculum. The design of this research was to compare any data that existed in relation to student performance on standardized tests and to measure the impact and effectiveness of the instructional models being used. The researcher also examined factors associated with the implementation of technology and identified factors having the greatest impact on literacy proficiency. Additionally, the researcher examined the relationship between student performance when technology was the primary practice used compared to the implementation of non-digital methods.

If the implementation of technology-centered instruction is shown to have had a relationship to student literacy proficiency, then educators will be able to more directly target improving student performance (del Prado Hill et al., 2016). If factors related to successful implementation of technology can be isolated, then educators can make well informed and effective decisions (Hur et al., 2016). If the implementation of technology showed to have a greater relationship to student performance than non-digital methods, then educators can direct their efforts and justify their resource commitments (Hur et al., 2016).

The purpose of this study was to measure the impact that technology-centered instruction had on literacy proficiency and to provide a framework for evaluating the effectiveness of technology-centered instruction programs. Additionally, this study

compared implementation measures used in establishing instructional programming to isolate common variables from successful programs. Bolman and Deal's (2017) structural, human resource, political, and symbolic frameworks provided the basis for evaluating these practices from all angles and decreased the limitations of single variable studies.

The first research question was addressed by comparing quantitative data on literacy proficiency from annual state standardized testing to qualitative data produced and collected from surveys in reference to the amount of time teachers spent using technology to deliver classroom instruction. The second research question was answered by comparing the same performance data as Question 1 and survey data linked to teachers' perceptions of the effectiveness of the technologies they used in their classrooms. An analysis of both quantitative and qualitative findings was used to answer Research Questions 3 and 4. The researcher compared performance data from individual schools, perceptual data from survey participants, and state performance data. The researcher predicted that a careful analysis of available data would provide evidence that technology does play a significant role in literacy proficiency (Oriji & Amadi, 2016).

According to Hollands and Tirthali (2014), the cost to educate a student is on the rise. Each year school districts across the country spend tens of billions on technology alone (Burch & Heinrich, 2016). Careful attention must be paid to all factors related to student growth in literacy (Crim et al., 2008). In a time where education has fallen under increased federal regulation and faces growing accountability it is vital to continually evaluate instructional practices (Tatto et al., 2016).

In this study, the researcher analyzed available performance data from various assessment methods that outlined students' literacy proficiency. The researcher also evaluated perceptual data from teachers in regard to which factors involved with the implementation of technology had the greatest relationship to the success of that practice.

Research Questions and Hypotheses

The following research questions guided the study and are derived from Bolman and Deal's (2017), *Reframing Organizations with specific emphasis on the Structural and Human Resource Frameworks*.

1) What correlation exists between teacher perceptions of technology and its ability to impact student literacy proficiency?
2) What significance structured implementation of technology-centered instruction has on student achievement in literacy proficiency?
3) How does technology centered instruction compare with non-digital instruction in regards to the impact on student literacy proficiency?
4) What does the evidence suggest to a district when deciding if the impact of technology-centered instruction is great enough to justify the resource commitment of these programs?

Alternative Hypothesis

H_1**:** The alternative hypothesis is that there is a positive relationship between the use of technology-centered instructional practices and student achievement in literacy.

H_2**:** The alternative hypothesis is that there is a significant relationship between structured implementation measures for technology and student achievement in literacy.

H_3**:** The alternative hypothesis is that there is a relationship between teacher perceptions of technology and student achievement in literacy.

Null Hypothesis

NH_1**:** There is no relationship between the use of technology-centered instructional practices and student achievement in literacy.

NH_2**:** There is no relationship between structured implementation measures for technology and student achievement in literacy.

NH_3**:** There is no relationship between teacher perceptions of technology and student achievement in literacy.

Rationale for the study

With the plethora of new instructional approaches targeted at improving literacy in students, the process of identifying a specialized approach that will have the greatest impact on student performance with literacy proficiency has proven to be a challenging task for educators (Foorman et al., 2017). A study conducted on the link between factors affecting the integration of technology was unable to isolate the impact of specific factors of technology-centered instruction on student growth (Hur et al., 2016). As researchers have attempted to quantify the impact of technology-centered instruction on literacy proficiency the lack of relevant research has become more apparent (Robinson, 2016). What little research has been conducted is largely based on qualitative data from teacher and student perceptions, with little support from quantitative data stemming from true performance metrics (Robinson, 2016). As educators looked to effectively implement technology in their schools, they found a lack of congruence within factors attributed to the successful integration of technological resources, which presented further obstacles

(Hur et al., 2016). For this study the researcher conducted a mixed-methods analysis of student performance data in middle and high school students, as well as perceptual data from teachers. Data were derived from state reported standardized testing results, student performance outcomes on technology-centered assessment tools, and a survey administered to teachers in participating schools. The data gathered in this research will provide educators with an assessment tool and implementation model targeted at improving student performance in literacy.

Definition of Key Terms

For the purpose of this study the following key terms were defined:

Literacy- Literacy in the context of the school setting is defined as the student's ability to either meet or exceed predetermined standards in third grade (Vagi et al., 2017).

Literacy proficiency- The number of students that score in the proficient range on state and national testing defines the level of literacy proficiency (Swanson et al., 2016).

Technology-centered instruction- The use of technology in a blended construct of application and methodology with digital resources to achieve desired outcomes (Lakhana, 2014).

Student Growth- The process of monitoring performance progress over a defined period of time through the use of interim assessments (Petscher et al., 2014).

International Society for Technology in Education (ISTE) - ISTE is an educational organization aimed at assisting educators in the implementation of technology in the educational setting (ISTE.org 2017).

Educational Technology Standards Self-Efficacy Scale (ETSSE)- is a calibration tool aimed at providing educators a way to measure how effectively and to what level they have implemented educational technology standards (Simsek & Yazar, 2016).

Common Core State Standards (CCSS) - The CCSS are curricular standards designed at improving English Language Arts and Mathematics curriculums and ensure the college and career readiness of students (MODESE, 2021).

Individuals with Disabilities Act (IDEA) – The Individuals with Disabilities Act (IDEA) is a federal regulation that ensures students with disabilities an equal and fair educational experience (Institute of Education Services, 2021).

Elementary and Secondary Education Act (ESEA)- The ESEA is federal legislation initially passed in 1965 designed to increase the level of government commitment and interest in education with a specific focus on low-income students and school (Institute of Education Services, 2021).

End of Course (EOC) - Assessment that are taken by students at the conclusion of a specific course at the secondary level (MODESE, 2021).

Missouri Assessment Program (MAP) - A state initiative in Missouri for assessing a student's level of ability towards state approved content standards (MODESE, 2021).

Missouri Preschool Program (MPP) - The MPP is a state initiative which provides funding to Early Childhood education programs and focuses on improving and increasing the access to pre-kindergarten education (MODESE, 2021).

Structural Framework- is a focal lens by which organizations analyze the formal relationships of the organization such as its procedural, environmental, and operational practices to foster change within the organization (Bolman & Deal, 2017).

Human Resource Framework-is a focal lens by which organizations analyze the individuals within the organization and focus on the implementation of practices based upon the abilities and perceptions of the individuals (Bolman & Deal, 2017).

Political Framework-is a focal lens by which organizations foster a competitive environment in which programs within the organization contend and compete for available resources (Bolman & Deal, 2017).

Symbolic Framework-is a focal lens by which organizations operate on the basis of culture based primarily on the practices and adherence to ritual and customary practices rather than formal or institutional designs (Bolman & Deal, 2017).

Limitations

The limitations listed by the researcher in this report are an effort to establish the boundaries existing within the research (Brutus et al., 2013). One strength of this research is the ongoing analysis of the increasing availability and application of technology, as well as the growing body of research on effective implementation of technology, but within all research lies limitations (Brutus et al, 2013). The limitations presented in the study both raised awareness about the boundaries of the study and established the need for the research (Brutus et al., 2013). Brutus et al. (2013) suggested that by including the limitations the researcher has in fact contributed to future research on the topic, as it provides a basis for a continuation and advancement on the topic. The following

limitations were identified in this study: instrumentation, data collection, and implementation methods.

Instrumentation

One of the limitations of this study is in the instrument used in the framework of the study, Bolman and Deal's (2017), *Reframing Organizations: Artistry, Choice, and Leadership*. The four key frameworks provided in this study provide leaders with multiple constructs to use to effect change within the organization (Lyon et al., 2014). However, these frameworks were not specifically written with the intent for use in an educational setting and were adapted for use in this setting by the researcher.

The second limitation of this study was the use of the on-line tool, *Qualtrics*, to facilitate the delivery of a staff survey (Qualtrics, 2021). The survey was modeled after the educational technology survey administered at Lansing Community College. Several questions were modified to fit the K-12 educational setting for the purpose of this research. The survey was used to collect information from participating schools regarding teacher perceptions on technology.

The survey consisted of 15 questions. The results of the survey were used to determine if teachers believed technology has an impact on student achievement and if they believed technology is worth the investment in resources. The researcher cross-referenced the results of the survey with student performance data to determine if a correlation existed between teacher perception and performance outcomes. During the analysis of the research a limitation was discovered. The initial intent of the researcher was to make a direct comparison between performance data and the survey data. However, in retrospect this was not feasible for the research, as there was a two-year gap

in the collection of survey data and the available performance data. The State of Missouri had suspended state testing for the year prior to the survey due to COVID-19 and data were not available yet for the current year.

The third limitation was in the specific implementation methods used within the districts. Not all participants were familiar with specific components related to instructional practices. Adoption dates of resources, professional development selections and opportunities available during different intervals of implementation, and information associated with costs were all items where subjects had limited knowledge.

Data collection

The main limitations associated with this study were related to data collection. One limitation of the collection process was the use of student achievement data. Assessments exist and are implemented in various forms. Locally created assessments have a potential for bias and inconsistency in practice. While data from nationally recognized assessments such as the ACT provide non bias data, not all students are subjected to the assessment. For the purposes of this study, data collection was limited to state issued standardized test scores and norm-referenced benchmark testing. This limited the amount of data and increased the intervals for assessment.

A second limitation with data collection occurred within the collection of survey data. While the size of schools chosen had similar numbers of teachers, there was no way of ensuring equal numbers of teachers from participating schools took the survey. Additionally, there was no way to ensure that teachers answered all questions from the survey. A third limitation to this study stems from the variety of technology in use in participating schools. Schools that participated in the study used different technology in

different ways. This limited the ability of the researcher to specifically isolate types of technology and methods of implementation. Instead, the researcher just viewed technology from a general use standpoint. Additionally, this same variance occurs in the variety of benchmark assessment tools in use by participating schools. For this reason, the researcher limited the study to schools utilizing the same benchmark assessment tool.

The following assumptions were accepted:

1. Participating schools implemented technology with the intent of improving teacher performance and increasing student achievement.
2. The responses of participants were offered honestly and without bias.

In this study the researcher took steps to ensure validity by eliminating locally created assessments and limiting data collection to state-issued standardized tests and norm-referenced benchmark assessments. Additionally, the researcher cross-referenced survey data with student performance data to establish a correlation between the two variables. However, there were notable threats to both the internal and external validity of the research.

One notable internal threat to validity was history of the study, as variances occurred between measurements of achievement (Taylor, 2013). The use of standardized test scores, or Missouri Assessment Program (MAP) and End of Course (EOC) scores presented several challenges to the researcher. State assessments underwent multiple changes from year to year which resulted from changing state standards and shifts in assessment vendors. Recent school closings to state and federal policy also limited data availability. Building level achievement data was used, rather than individual student performance data. This allowed for potential discrepancies in reporting as data may not

have included the same students from year to year, as well as protection of individual student information. Another internal threat to validity was in the instrumentation of technology in the participating schools (Taylor, 2013). Teacher perceptions on the use of technology have a potential to be impacted by the method of implementation and the level of support they receive from the administration. Currently, there is not a uniform policy for how districts monitor the facilitation and implementation of technology. There is also no set standard for how much professional development schools should provide. The potential for variances within instrumentation of technology from participating schools left some limiting factors to the responses received in the survey. The researcher believes that cross-referencing the data available from state assessments, benchmark assessments, and survey data will provide an accurate measure of the impact that technology has on student literacy proficiency.

One notable external threat to validity is in population sample selection. In choosing the population sample, the researcher limited the study to schools of similar size and grade configuration. This method limits the applications of findings to schools of similar constructs and may not have validity if applied to other grade levels or schools of differing size. While the direct correlation of this research may be limited to the sample size, the research includes information in the literature review that provides evidence of transference of the findings to schools across many levels and compositions.

Summary

This chapter provided the foundation for a research study centered on the increased implementation of technology-centered instruction methods. Specifically, the study's focus was on measuring the effectiveness of the technology-centered instructional

practices, isolating key factors involved in successful implementation, comparing technological instruction to non-digital instruction, and evaluating if the resources needed to implement such programs are justifiable. Quantifying the impact that technology has on education, as well as creating a framework for evaluating implementation practices, will allow educators to employ best-practice methods for increasing literacy proficiency and ensure that the implementation process is effective and sustainable.

Three main concepts provided the foundation for this study. The first was structural framework, which analyzed the performance data of students as schools transitioned to the implementation of technology-centered instruction (Bolman & Deal, 2017). The second was human resource framework, which analyzed teacher perceptions on the implementation of technology integration (Bolman & Deal, 2017). The third was a political framework, which evaluated the impact of technology and justified the expense of resources in an ever-increasing climate of accountability. Chapter Two contains a review of current literature and educational research studies exploring in detail the importance of literacy, the growth of technology aimed at improving literacy proficiency, current research on the topic of technology, and comparison data on the implementation of technology-centered literacy programming.

Chapter Two: Review of Literature

As educational leaders have continued searching for a way to combat slumping literacy rates, many educators believed that turning to technology was a viable option to turn the corner on such a critical component of education (Halverson & Smith 2009). Chapter Two includes a review of literature which provides a historical overview of the changing understanding and practices surrounding improving student literacy and the evolution of the role technology has played in this process. In this chapter, the researcher examined a variety of instruction and assessment methods targeted at improving student literacy to determine if there has been correlational data presented from studies conducted by various researchers on specific literacy programs. In addition, the researcher investigated the implementation practices of technology programs in education. The researcher examined literacy and technology through these lenses in an effort to determine if a link existed between specific models of technology integration and growth in student literacy rates in school districts employing similar models.

Conceptual Frameworks

Educational leaders have continued to search for new resources and isolate factors surrounding literacy proficiency to target a best practice approach to instructional remediation strategies (Hur et al., 2016). Reports have shown a growth in the number of building level administrators that have placed an increasing emphasis on the impact that technology has had on instruction (Machado & Chung, 2015). However, a report published by Stanford University indicated that there is still much uncertainty surrounding the impact that technology has had on student literacy rates, with a specific emphasis on the lack of isolating an effective implementation model (Stanford

University, 2014). Because of this shortfall, the impact technology has on literacy may not reach its full potential (Stanford University, 2014).

Educators have been in need of a method to isolate and analyze relevant factors related to technology-centered instruction and develop an evaluation model to more effectively and efficiently orchestrate the implementation of technology (Department of Ed, 2017). A framework for evaluating the effectiveness and equity of an organization's practices was provided by organizational researchers Bolman and Deal (as cited in Lyon et al., 2014). Bolman and Deal's (2017) research has provided educators with the platform necessary to effectively implement change in their programs (Hodgman, 2013). This construct comprises four key frameworks: structural, human resource, political, and symbolic (Lyon et al., 2014). The structural framework analyzes organizational components, the human resource framework considers the organization from the viewpoint of a family, the political framework views issues from a hierarchy of power, and the symbolic framework lends itself to the practices and traditions of the group (Bentley et al., 2014). These four frameworks have provided school districts with the necessary tools to analyze the effectiveness of a practice through multiple lenses and isolate the strengths and weaknesses of the measures (Lyon et al., 2014). Bolman and Deal (2017) added that each of the frameworks could be used at different stages of development of common problems and that doing so would help create a more holistic response to the situation. Clark and Lindahl (2014) added that the four frameworks existed in a dynamic relationship and the option to use various lenses provided the researcher with a more complete solution.

Studies conducted on the root cause of literacy gaps show an increase in research targeted at ways educators can narrow these gaps once identified (Yoschikawa et al., 2016). In recent years, educators have seen an increase in the amount of research being conducted on the impact of technological integration in the classroom (Machado & Chung, 2015). The issue with much of this research has been that it fails to isolate and analyze individual factors of performance and lacks cohesion within the research (Sarrab et al., 2016). Bolman and Deal (2017) reported that most problems faced by an institution tended to outlast their solutions. This occurrence is linked to a lack of proper framing by institutional managers (Bolman & Deal, 2017). The ability to place key quantitative and quality data into their appropriate frames has allowed institutional managers to process what has happened and what needs to occur in response (Bolman & Deal, 2017). Ultimately, understanding and utilizing the four frameworks has allowed leaders to ask the right questions when searching for solutions (Bolman & Deal, 2017).

The level of implementation and variety of technological applications in education has continued to transform the educational construct (Kearney & Maakrun, 2020). Educators have seen an increase in the amount of research being conducted on the impact of technological integration in the classroom (Machado & Chung, 2015). Despite this growth, there was still a need for additional research to be conducted to isolate the factors that have the greatest correlation to the effectiveness of technology-centered instruction on student performance (Hur, et al., 2016). Without this research, a lack of consistency found in the practices guiding the implementation of technology has persisted (Burch & Heinrich, 2016). Bolman and Deal (2017), offered that the structural framework would provide educators the ability to organize, plan, and coordinate the

factors surrounding successful technological implementation. Additionally, it is offered that the structural framework would allow for policy to align with resources and provide an effective model of implementation, creating a cohesive unified effort (Bolman & Deal, 2017). Educators needed to ensure greater consistency in regards to implementation measures adopted by school districts to effectively measure the direct impact technology has had on education (Burch & Heinrich, 2016).

Current research on technology integration has incurred much debate (Robinson, 2016). Staying at the forefront of technological trends has become the professional responsibility of all educators (Sert & Boynuegri, 2017). Keeping up with these trends provides a level of assurance towards the successful implementation of technology (Sert & Boynuegri, 2017). Administrators have pointed out that the learning curve associated with technology for new teachers has been an obstacle (Buss et al., 2017). There are many schools of thought in regards to which factors have had the greatest impact on instruction and performance (Robinson, 2016). A study conducted on factors that surrounded the effective implementation of technology-centered instructional practices found that initial teacher perception was a key indicator leading to a successful implementation model (Hur et al., 2016). Also, ensuring a platform of professional development targeted at meshing the technology and the craft of teaching was needed (Buss et al., 2017). The human resource framework provided by Bolman and Deal (2017) provided the necessary applications for assessing and shaping the family frame within an institution. The human resource framework highlighted that a successful integration model is attained when the needs and abilities of the individual are in alignment with the requirements of the organization (Bolman and Deal, 2017). In a report presented by Perez

et al. (2019), it was found that a positive teacher perception and mindframe directly correlated to the ability of technology to improve student learning outcomes. Research conducted on teacher perceptions utilized the Technology Readiness Index to identify key motivators for educators in regards to any predispositions to technology that may exist (Perez et al., 2019). Continued professional learning targeted at technology training is the key functional component of seeing a true impact on student growth (Machado & Chung, 2015). Trained teachers are confident teachers, and the success of a program weighs greatly on teacher buy-in (Rienties et al., 2018)

Research involving implementation practices lacks cohesion and has failed to provide consistent data driven factors of performance that would allow for a more targeted approach to implementing technology (Sarrab et al., 2016). The discontinuity of research surrounding technological implementation measures has made it difficult to effectively measure the true impact technology has on education (Burch & Heinrich, 2016). For greater success to occur, the implementation of technology must be thought out and implemented with fidelity (Murati & Ceka, 2017). Administrators must take a more analytical approach to studying the specific impact that technological implementation can have on education (Biancaros & Griffiths, 2012). They must take steps to improve communication and develop concrete measures for ensuring effective implementation of district initiatives (Snyder, 2018). Bolman and Deal have provided the necessary political framework for evaluating the effectiveness and equity of current and future practices (as cited in Lyon et al., 2014).

Defining Literacy

As Gaston et al. (2016) explained, “Definitions of literacy have continued to evolve and parallel changes in society, culture, and education” (p. 74). As educators have studied the topic of literacy it has been difficult to pinpoint what exactly it means to be literate, but at its most simplistic core the ability of an individual to read and write at specific ability levels at a specific age has been the fundamental basis of literacy (Burriss, 2017). A more specific analysis of literacy defined literacy as the ability of an individual to read, process, and transfer the information to applications in real life, such as social skills and independent functioning (Breadmore et al., 2019). Shihab (2011) expanded further still on the concept of the application of reading to real life by offering that literacy is a process of critical thinking, which involves the intentional interaction between the reader and the text to produce meaning, and that true comprehension occurred when there was a function produced by what was read.

Importance of Literacy

Literacy has played an important role in the growth and development of societies (Burriss, 2017). Literacy is a critical tool in all stages of human development, as well as the educational process and has been the basis for acquiring knowledge, as well as being the catalyst for an individual becoming involved at a greater level with society (Akubuilo et al., 2015). Studies on factors related to economic development have shown that countries that experienced struggling literacy rates also showed a relative correlation in regards to economic development (Burriss, 2017). The lack of literacy in countries around the world has hindered many other aspects of growth, such as social development in society (McKay, 2018). Other studies on the socio-economic development of regions

of the world, show that the standard of living has been directly related to that region's level of literacy (Aberogba, 2018).

Literacy in Education

Much of an individual's early literacy learning has been found to begin in the home (Tichnor-Wagner, 2016). In addition to home practices, early elementary practices have assisted in the development of literacy (Kinkead-Clark, 2017). The development of these literacy skills has been vital for students to be able to make the transition to the academic setting. Akubuilo et al. (2015) stated that reading is the fundamental core of education. Burriss (2017) offered that literacy, more specifically being literate, had a causal relationship with the educational success of an individual meaning that learning to read made an individual a better student. McKay (2018) has argued against this linear philosophy and offered that literacy and learning exist on a continuum together and that as an individual becomes more proficient in one aspect it will elicit growth in the other. Practices in literacy instruction were found to focus heavily on the skill building within reading in students during the beginning years of their education (Edwards et al., 2015). As students got older a fundamental shift in reading occurred that transferred practices from skill building to comprehension (Edwards et al., 2015). Edwards et al. (2015) went on to add that this shift caused trouble in processing content specific material for secondary students, even amongst proficient readers. Ultimately, the primary focus of educators should be the creations of students who are capable of performing at adequate levels of social and cultural success (Sang, 2017).

New Literacies

As with all things in education, the concept of literacy has continually evolved in schools. As society pushes further into the 21st century, it has become increasingly evident that students need to be prepared for a much different world than what educators have traditionally prepared (Sang, 2017). As the varieties and implementation of technology continues to expand, so much the ability of the students to use and understand the implications of this technology. This realization has brought about an emergence in the practice of teaching digital literacy to students

Struggles in Literacy and Education

Studies have shown that there is a growing number of students entering K-12 education who lack proficient reading skills (Swanson et al., 2016). Many factors have been shown to contribute to reading deficiencies with students (Akubuilo et al., 2015). Factors, such as socio-economic status, cognitive disabilities, and early exposure are among the more prevalent links to reading delays or gaps (Akubuilo et al., 2015). While low levels of literacy have often been thought of globally as a problem in countries with low socio-economic levels, reports have shown that developed countries of the world have not been able to separate themselves from this problem (United States Department of Education, 2019). In a report by the U.S. Department of Education (2019), it was shown that in the United States there were nearly 35 million Americans that operated at or below a basic level of literacy. Literacy has proven to be a building block for society and it has been recognized as a critical component to the basic development of an individual, as well as that individual being able to evolve into a lifelong learner (McKay 2018). As these literacy gaps have persisted with students, educational entities have been in search of ways to narrow these gaps (Yoschikawa et al., 2016). Diagnosing literacy

gaps has not been enough (Machado & Chung, 2015). The correlation between literacy proficiency and the success of the student has forced educators to divert more attention to the factors leading to student struggles in literacy (Crim et al., 2008). To address literacy gaps for students entering education, school districts have begun to develop measures for targeting specific reading gaps and employ measures to combat specific literacy deficiencies (Akubuilo et al., 2015). Leveled Literacy Intervention is one such program, and it is aimed at targeting literacy deficiencies in small group instruction (Institute of Education Services, 2017).

As schools have implemented new practices, many educators have committed themselves to professional development and research targeted at practices to improve the learning process (Machado & Chung, 2015). While many reading intervention programs are targeted at elementary settings, schools are beginning to dedicate efforts to address secondary concerns (Vaughn et al., 2018). Schools in Georgia have begun to embed teaching literacy into all disciplines of secondary education (Gaston et al., 2016). While educators have long supported teaching content, specific literacy many have had to seek help to merge their content and teaching literacy (Edwards et al., 2015). School district officials have increasingly turned to technological intervention to assist in the improvement of education (Halverson & Smith, 2009). Passport Reading Journeys is an initiative targeted at secondary education that infuses literacy intervention with technology (Institute of Education Services, 2019).

Role of the Government

Despite current efforts, studies have found the United States continues to struggle nationwide with literacy (Swanson et al., 2016). As a result of this struggle, the role of

the government in the United States has shifted significantly in the last 20 years in regards to education (Mathis & Trujillo, 2016). What was once a support and aide relationship with state education agencies has developed into an oversight and regulation model (Mathis & Trujillo, 2016). The No Child Left Behind Act of 2001 (NCLB, 2001) was the first major step in regulation of education and tasked state education agencies to use data to analyze student learning levels. The Common Core State Standards (CCSS, 2009) emerged as the next phase in government regulation and targeted the nationalization of educational standards for students. The most current large-scale legislation on education was the Every Student Succeeds Act (ESSA, 2015) which scaled back on specific assessment-based measures from NCLB and instead refocused attention on success-based measures such as graduation rate and college readiness. Increased regulation has not been limited to the national level. State education agencies have implemented targeted educational initiatives, such as the Missouri Pre-school Plan (MODESE, 2021), which targeted kindergarten entry skills in students up to two years prior to entering kindergarten. Other states have begun implementing initiatives as well, such as Alabama, which created its Alabama Math, Science, and Technology Initiative (AMSTI, 2002), which specifically targeted improvement in student scores in math and science as compared to national averages.

The Evolution of Technology in Education

“Technology has changed the way people live, from use of the Internet to the way they communicate with text messages and e-mails. This change is also evident in the education system” (Ugur & Koc, 2019, p. 2). Education continues to take technology and adapt to the educational setting to solve problems and encourage innovation (Lakhana,

2014). From early on, technology has played at least a small role in education, as some of its first implementations can be traced back to the early 1900's when early accounts show the use of phonograph recordings to help students with pronunciation (Chau & Lee, 2014). However, the role of technology remained largely unchanged from its earliest applications and methodologies until roughly 2005, as technology became more accessible and nearly 99% of schools reported the use of tech (Mims-Word, 2012). The use of technology has continued to become increasingly widespread in education (Serin & Bozdag, 2020). In the last few decades, technology has been utilized in increasingly expansive roles in education (Mims-Word, 2012). Technology's role in education has evolved as rapidly as technology. Technology has emerged from a once fixed role, as an adaptive tool used to increase efficiency to a seemingly limitless resource with rapidly increasing applications. As this role has been expanded over time, educators have placed an increased level of confidence in the ability of technology to improve instruction (Frolova et al., 2019).

A key task for educators is to actively engage the students in the learning process (Bond & Bedenlier, 2019). As educators continue to search for ways to elicit higher engagement from students in the classroom, traditional pedagogy has come under increased scrutiny (Gordy et al., 2018). Educators in the modern classroom are tasked with infusing 21st Century skills into their daily designs and as this push has grown, there has been an increased reliance on technology to help carry out this task (Gordy et al., 2018). As technology has continued to carve out its place in education a transformational period has taken place that has led to a shift in the delivery of instruction and the process of learning all together (Gordy et al., 2018).

Newest Trends in Educational Technology

Educators have traditionally been held as the primary source of information in the process of learning (Anderson & Keehn, 2019). As mentioned earlier, technology has continued to change the landscape of instruction (Gordy et. al., 2018). Amongst these changes, one source of technology, social media, has proven to be a major catalyst for change in the landscape of the classroom (Anderson & Keehn, 2019).

> Social media has created a large universe by gathering all the people and institutions that can react to an unwanted event regardless of where it occurs in the world and all the people who can think and express what they think at anytime and anywhere in the world. (Gedik & Cosar, 2020, p. 7)

Social media is changing the way students interact and engage with the world around them. It has quickly transitioned from a source of entertainment to the primary vessel by which many people receive information and interact with each other.

Other technologies, such as virtual reality have seen a growth in the practical applications of this technology in the educational setting (Lege & Bonner, 2020). Virtual reality (VR) has begun to carve out a space in education, as it can be used to vastly expand the learning environment of its users. The various applications of VR have led to the infusion of this technology into an increasing range of educational fields (Kavanagh et al., 2017). One of the major draws to implementing VR in the classroom is the ability to take students to places they normally cannot access.

> VR technology allows users to supplant their current reality with a virtual environment that can be any location, real or imagined. Educators can leverage this capability to meet educational objectives that cannot satisfactorily be met

> within the constraints imposed by the current physical location. In many contexts, activities such as field trips are both logistically and cost prohibitive. However, projects like Blazauskas, Maskeliunas, and Kersiene's (2017), which used VR as a way to conduct a historical tour of a city, show that VR can provide access to learning experiences. (Lege & Bonner, 2020, p. 169)

Many fields of education have looked for increasing ways to utilize this technology. Health sciences has begun to infuse virtual reality into the daily instructional practices (Kavanagh et. al., 2017). Virtual reality allows for students to connect with science in a way they previously could not (Maulucci & Guffey, 2020). The ability of virtual reality to allow for a deeper emersion into the content continues to grow its uses and application in education.

Although there are many positive factors associated with these new technologies, they do not come without their challenges. Just as quickly as social media's popularity grew amongst educators, its downsides began to emerge. Students and teachers alike have noted an ability for social media to give access to as much or more negative content as it does positive (Gedik & Cosar, 2020, p. 7). Addiction to social media has become an increasing concern and has drawn negative attention to its growing prominence in the classroom setting (Akkus, 2021). Other challenges exist in the application of technology. While a continued increase in popularity can be seen with virtual reality, the level of instructional practices and adaptations by educators is still lagging behind (Lege & Bonner, 2020). Challenges will continue to appear with technology implementation but education will be forced to meet those challenges as there are no signs of technology losing its grip on education.

Educational Preparation, Concept of Change and Professional Development

Ongoing professional development is an essential action that has the ability to impact education in a variety of ways (Ackah-Jnr, 2020). Educational preparation involves the ongoing training and practice in the area of focus for educators and is a driving force behind the continued growth of that educator (Gregson, 2020). When reviewing the idea of educational preparedness and professional development it is important to focus on teacher buy-in and understanding of the foundational vision and mission of the end goal. As stated, McKnight and Glennie (2019), instead of treating teacher resistance as something to manage top-down, education reformers are shifted to a different approach: from change management to change leadership.

> Change leadership assumes successful changes are not done to but rather with stakeholders, including teachers, Emphasis is placed on change leadership skills, including collaboration with teachers, students and families to identify needs, plan and implement change and assess progress and success. (McKinght & Glennie, 2019, p. 2)

Many times, educators are resistant to change in general, although change is frequent in this job setting. “A key barrier to evaluating change readiness is a sense of urgency among the leadership” (McKnight & Glennie, 2019, p. 3). “Education becomes dysfunctional when there is no change according to the need of time,” (Ismail, 2021, p. 264). Furthermore, Ismail (2021), stated “to sustain advancements in terms of the future of the country and society, educational institutions should be open to change and innovation process, as the models developed for the healthy functioning of change in educational organizations.” (p. 264). “The teachers’ readiness for change is considered

important for the effective functioning of the process" (Ismail, 2021, p. 264). A powerful statement by Ismail (2021), "it is essential to manage initiatives of innovation and organization managers have an important role in embedding innovative values and norms such as risk taking and creating culture." (p. 283). The importance of preparation of change, professional development and foundational understanding are worth the time and effort to forefront and innovation or change presented to staff. Ndrauhutse et al. (2019) sum it up by stating, "carefully balance what the system can achieve with personal and collective responsibility for decisions that can (negatively or positively) impact the functioning of the system" (p. 13).

> When using systems thinking to support teacher buy-in or onboarding literacy support and technology perceptions, a system thinking approach can help "a recognition that pre-existing paradigms and preconceived ideas often limit our ability to understand local contexts. (Ndrauhutse et al., 2019, p. 16)

Caliskan and Zhu (2020) stated, "Creating an organizational culture in which all management and academic staff can work collaboratively and consider new ideas has a vital role in developing innovations." (p. 140). "Therefore, academic staff members with positive attitudes towards instructional innovations will be positively disposed towards using them in the classroom; otherwise, they will be less likely to accept and adapt to instructional innovations than those with positive attitudes," (Caliskan & Zhu, 2020, p. 5). Caliskan and Zhu (2020) recognize;

> That organizational culture with a focus on trust and open communication supports innovation, which creates the impression that it will be easier for

> stakeholders to adapt to the use of innovations if there is a relationship with a high level of trust between employees and academic leaders. (p. 6)

Academic staff members can be provided opportunities such as projects, seminars, and workshops to strengthen their foundational knowledge and trust when dealing with educational preparation, concepts of change, and professional development support.

Perceptions on Technology

Perceptions on technology can range from both ends of the spectrums. “The unprecedented growth in new technologies that can be used in teaching and learning has brought remarkable changes in the quality of teaching and learning in recent years” (Edannur & Marie, 2017, p. 31). Furthermore, Edannur and Marie (2017) recognized the importance of developing teacher education programs that practices new technologies in the field of education to meet the needs and expectations of digital learners (p. 32). There is also just as high a stake to have trained teachers to use these technologies. “Teachers' perception on the effectiveness of blending technology in regular classrooms may thus bring an impact on its use and in turn improve the effectiveness of learning” (Edannur & Marie, 2017, p. 32). Edannur and Marie (2017) stated, “Teachers’ beliefs are essential in considering how a teacher teaches, thinks, and learns.” (p. 3). “Understanding and improving upon teachers' perceptions towards use of technology in teaching plays an essential role in successful technology integration in teaching learning” (Edannur & Marie, 2017, p. 32). These statements were supported by Hol and Aydin (2020), who recognized, “The past decade has witnessed a rapid development in the field of education technology with the increasing role of technology in every part of human life.” (p. 1). Hol

and Ayden (2020) alleged, “that teachers have educational beliefs about distinct themes and areas along with general beliefs and their educational beliefs help their decision-making process about integrating technology to the curriculum.” (p. 3). As mentioned, Hol and Ayden (2020);

> Technology is improving at a dazzling and continuous pace, but in this movement and chance, students are final users, and that is teachers who are anticipated to integrate technology into their practices in learning and teaching environment, and they are the key utilizer of technology implementation in education. (p. 2)

Summary

This chapter offered a review of current literature and educational research studies exploring in detail the importance of literacy, the growth of technology aimed at improving literacy proficiency, current research on the topic of technology, and comparison data on the implementation of technology-centered literacy programming.

Specifically, the study’s focus was on measuring the effectiveness of the technology-centered instructional practices, isolating key factors involved in successful implementation, comparing technological instruction to non-digital instruction, and evaluating if the resources needed to implement such programs are justifiable. Quantifying the impact that technology has on education as well as creating a framework for evaluating implementation practices will allow educators to employ best practice methods for increasing literacy proficiency and ensure that the implementation process is effective and sustainable.

Three main concepts provided the foundation for this study. The first was structural framework, which analyzed the performance data of students as schools

transitioned to the implementation of technology-centered instruction (Bolman & Deal, 2017). The second was human resource framework, which analyzed teacher perceptions on the implementation of technology integration (Bolman & Deal, 2017). The third was a political framework, which evaluated the impact of technology and justified the expense of resources in an ever-increasing climate of accountability. Chapter Two contains a review of current literature and educational research studies exploring in detail the importance of literacy, the growth of technology aimed at improving literacy proficiency, current research.

Chapter Three: Methodology

In this study, the researcher examined the effects of technology-centered instruction on literacy proficiency and factors involved in the successful implementation of targeted literacy intervention. The researcher aimed to establish the level of impact on student growth in literacy proficiency when utilizing a technology-centered instructional approach compared to that of one focusing more directly on traditional methods. Additionally, the researcher aimed to compare implementation practices of schools to isolate factors that have the greatest correlation to the success of technology implementation. The researcher compared practices that promote traditional instructional practices to ones that used technology as the primary resources for instruction to determine if one practice proved to produce greater results.

This mixed-methods study provided quantitative data related to student performance on state standardized assessments to measure the effectiveness of remediation practices. A survey tool was used to collect descriptive qualitative data regarding the perceptions of teachers on the effectiveness of a specific instructional method. Participants in the survey were also asked to provide information on factors that contributed to the effectiveness of the selected practices being implemented during instruction. The quantitative and qualitative data sets were then combined to determine if the hypotheses were supported or refuted.

The researcher analyzed the student performance data on the state assessments resulting from both traditional instructional methods and technology-centered instructional practices. The intent was to determine if performance levels that were experienced proved to be greater in one model over the other. Additionally, the

researcher investigated the methods of implementation associated with the instructional models in use. The intent was to identify common factors of implementation and quantify which ones had the greatest impact on student success.

The researcher specifically investigated the performance of students in grades 7 through 12 in selected schools in the South-Central region of Missouri to determine if the instructional methods and implementation protocols had produced positive results on the identified student indicators of success. The student indicators for success in this study were: a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing year in and year out.

Literacy proficiency has been found to be one of the single greatest indicators of a child's potential for success (Vagi et al., 2017). By identifying which instructional methods elicit the highest levels of success for students, educators can begin to focus efforts on aligning their practices to these methods. Edwards et al. (2015) added that, as students got older a fundamental shift in reading occurred that transferred practices from skill building to comprehension and that this posed a greater barrier to future learning if not corrected. There is a need for targeted research on the impact of specific instructional practices being implemented (Hur et al, 2016). These facts translate to a need to amplify research and to identify areas for growth in secondary settings. This research should be aimed not only at instructional techniques but also at the measures used by districts to introduce, train, and follow up on these measures.

What research has been conducted to date has been largely based on qualitative analysis. Quantitative data to support these assumptions is often hard to consolidate.

Available research has not successfully isolated factors that can be directly attributed to the success of a specific method (Hur et al., 2016). School districts must both create and execute a targeted plan for instruction based on research based best practices with measures in place to continually review the effectiveness of these practices.

Problem and Purpose Overview

Declining literacy rates have continued to be a concern for educators. As a result, educational leaders have continued searching for ways to combat slumping performance. Many educators believed that turning to technology would be a viable option (Halverson & Smith, 2009). While many new advancements in technology and implementation strategies have emerged in recent years, there are still obstacles to overcome in relation to ensuring the impact of these practices. Much of the current research available has failed to adequately measure the impact of technology-centered instruction on student literacy proficiency (Robinson, 2016).

The cost to educate a student is on the rise (Hollands & Tirthali, 2014). The implementation of technology-centered instructional resources is often costly. Each year, school districts across the country spend tens of billions on technology alone (Burch & Heinrich, 2016). Careful attention must be paid to all factors related to student growth in literacy (Crim et al., 2008). In a time where education has fallen under increased federal regulation and faces growing accountability it is vital to continually evaluate instructional practices (Tatto et al., 2016). A reality for most school systems is that financial resources are often limited. With the knowledge that the availability of financial resources can impact the efficacy of a practice, there exists a need for additional study into the cost effectiveness of technology-centered instruction, as opposed to traditional instructional

techniques (Hollands & Tirthali, 2014). The analysis of the instructional process is integral to the success of improving education (Siadaty et al., 2016).

There are a significant number of factors that must be considered when discussing technological integration (Burch & Heinrich, 2016). School district officials must make efforts to isolate factors surrounding literacy proficiency to target a best practice approach to instructional strategies (Hur et al., 2016). Advancements must be made in research to isolate factors involved in using technology to increase literacy proficiency (Hur et al., 2016). Even with the introduction of new technology and implementation of new practices, there is still a large gap in the availability of correlation data between these innovations and literacy growth. As a result, district administrative teams have begun to evaluate these innovations in relation to each other, as well as traditional practices (Akbar et al., 2015).

In this study, the researcher analyzed both quantitative and qualitative data from schools that used technology-centered instruction practices in the delivery of literacy curriculum. The design of this research was to compare data from schools to measure the percentage of instruction that was centered on technology, compared to traditional teacher-led practices and to assess the impact and effectiveness of technology in fostering literacy proficiency. The researcher also examined factors associated with the implementation of instructional programming from both fields being observed and identified factors having the greatest impact on literacy proficiency.

If the implementation of technology-centered instruction does have a measurable impact on student literacy proficiency, then schools will be able to take a more targeted approach at improving student literacy proficiency (Hill et al., 2016). If factors related to

successful implementation of technology can be isolated, then educators can make well-informed and effective decisions (Hur et al., 2016). If the implementation of technology does show to have a significant impact over non-digital methods, then educators can more appropriately align their resource commitments of time and money.

The purpose of this study was to measure the impact technology-centered instruction has on literacy proficiency and to provide an overall framework for evaluating the effectiveness of technology-centered instruction programs. Additionally, the researcher attempted to isolate any significant implementation measures that correlated to the greatest impact on the success of each selected method. By conducting this study, the researcher may be providing evaluation criteria to assess the effectiveness of current instructional programming. The researcher also isolated the common implementation strategies identified in successful programs to provide a blueprint to ensure success in resource selection, implementation protocols, and literacy advancement. Bolman and Deal's structural, human resource, political, and symbolic frameworks provided the basis for evaluating these practices from all angles and decreased the limitations of single variable studies (as cited in Lyon et al., 2014).

Research Questions and Hypotheses

The following research questions guided the study and are derived from Bolman and Deal's (2017), *Reframing Organizations with specific emphasis on the Structural and Human Resource Frameworks*.

1) What correlation exists between teacher perceptions of technology and its ability to impact student literacy proficiency?

2) What significance structured implementation of technology-centered instruction has on student achievement in literacy proficiency?
3) How does technology-centered instruction compare with non-digital instruction in regards to the impact on student literacy proficiency?
4) What does the evidence suggest to a district when deciding if the impact of technology-centered instruction is great enough to justify the resource commitment of these programs?

H_1**:** The alternative hypothesis is that there is a relationship between the instructional processes used, teacher perceptions of that process, and indicators of student success: a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing year in and year out.

H_2**:** The alternative hypothesis is that there is a relationship between the instructional implementation measures in place and the overall performance of students on state standardized assessment.

H_3**:** The alternative hypothesis is that there is a relationship between the perceptions of teachers and overall performance of students on state standardized assessment.

Null Hypothesis

NH_1**:** There is no relationship between the use of technology-centered instructional practices and student achievement in literacy.

NH_2**:** There is no relationship between structured implementation measures for technology and student achievement in literacy.

NH_3**:** There is no relationship between teacher perceptions of technology and student achievement in literacy.

Research Design

Mixed-methods research designs are an evolution of research which involves the analysis of both quantitative and qualitative data that provides a deeper understanding of the events and information surrounding an event (Creswell & Plano Clark, 2018). The quantitative data used in this study provided the researcher with the necessary data to test and measure specific variables within the study whereas the qualitative data of the research allowed the researcher to explore perceptions and rationales involving methodologies of the study (Creswell & Plano Clark, 2018). A mixed-methods research design was adopted by the researcher to gain a holistic understanding and perspective related to the relationships of technology-centered instructional practices, growth in literacy rates, and effective implementation measures (Creswell & Plano Clark, 2018). The combination of quantitative and qualitative data in a mixed-methods approach was effective for this research. The quantitative research assessed the scope of performance and growth in performance rates by students. Additionally, the quantitative data were used to test the hypotheses regarding which instructional platform elicited the greatest results in student performance. The qualitative research helped to elaborate on the correlation of specific implementation measures and the sustained impact of technology-centered instruction (Creswell & Plano Clark, 2018). The observational study provided a cross-sectional look at data that was collected across a whole population to provide a snapshot of the population at one point in time (Agresti & Franklin, 2017).

The independent variable was a selected variable which could not be controlled by the researcher (Fraenkel et al., 2012). For this study, the independent variable was the instructional process used by the schools involved in the study. Fraenkel et al., (2012) wrote the dependent variable was the object of the study that was modified or impacted by the independent variable. The dependent variable for this research study was the level of student literacy proficiency which was measured by two indicators of student success: a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing year in and year out. A moderator variable, which was a variable that could change the relationship between other variables, was presented in this study (Creswell & Guetterman, 2018). The implementation measures taken by school district leaders were a moderator variable in this study, due to the variance in which school districts oversaw the implementation of instructional practices (Creswell & Guetterman, 2018).

Validity of the instrument was determined by alternative forms reliability (Creswell & Guetterman, 2018). The results of the survey data were compared to the two indicators of student success: a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing year in and year out. These indicators of student success pointed to proficiency and growth in literacy proficiency. The performance data that was gathered through school performance reports was compared to the data obtained from the survey. The use of alternative forms of reliability allowed the researcher to establish a relationship between the two instruments (Creswell & Guetterman, 2018).

The first research question was addressed by comparing quantitative data on literacy proficiency from annual state standardized testing with qualitative data produced from portions of the teacher survey on perceptions of the effectiveness of the technology was used. The researcher used this comparison to evaluate the performance of schools in comparison to the perceptions of the teachers to see what relationship existed. Qualitative data from the teacher perception survey were used to answer the second research question. A comparison of both quantitative and qualitative findings was used to answer Research Questions 3 and 4. The researcher predicted that a careful analysis of available data would provide evidence that technology does play a significant role in literacy proficiency (Oriji & Amadi, 2016)

In this study the researcher analyzed available performance data from multiple assessment years to outline the level of student literacy proficiency. The researcher also evaluated perceptual data from the teachers in regards to which factors involved with the implementation of technology had the greatest relationship to the success of that practice.

Population and Sample

The target population for this study was school districts located in the South-Central region of Missouri. The population to which this study focused on consisted of 16 schools from eight school districts in the region. The sample size of this research consisted of all teachers from these schools, from grades 7 through 10. The districts in this sample were chosen due to geographic proximity, socio-economic similarities, and relative population size. Selecting schools with geographic proximity allowed the researcher to collect and review data from communities with similar make-ups, educational influences, population stresses, and educational opportunities to be compared

in this study, which would help negate any limitations stemming from regional differences.

Focusing on schools with socio-economic similarities allowed the researcher to ensure that performance information gathered from schools was based on participation of districts with similar opportunities and resources available for students which would help prevent a discrepancy in performance based solely on greater financial capacities of one district over another. Population sizes of the school was a relevant factor in that it reinforced the function that performance data derived in school was neither enhanced nor diminished, due to an imbalance of student populations existing. For example, in a school with a large population, 10 students performing poorly or well on an assessment would have less of an effect on performance data than in a small district.

The researcher aimed to create a systematic sample by using an enrollment list of all of the eight school districts in this region provided on the Missouri Department of Elementary and Secondary Education (MODESE) website. All of the eight superintendents in school districts in the South-Central region of Missouri were invited to have their districts participate in the research study via an electronic mail communication, Recruitment Letter (see Appendix A). Before accessing the survey, superintendents were informed about the study; the confidentiality and anonymity of the participants were addressed (see Appendix B). The superintendents were all assured of the security of any information gathered and that all personal information would be kept in a locked, secure location for the required period of three years from the date the research was completed then destroyed. Permission for districts to participate was granted from the superintendents by means of electronic mail communication.

Instrumentation

The administrators who responded affirmatively to the request were contacted by the researcher with an email (see Appendix B), which included additional instructions regarding procedures for data collection used for this study, as well as the timeline for the project. The e-mail message contained a confirmation of their participation and provided an outlined explanation of the data collection process. Each participating superintendent was also sent a copy of the Lindenwood Informed Consent for Participation in Research Activities document (see Appendix C) as a requirement of the university. Additional follow-up correspondences were sent via email as needed, to complete the data collection portion of the project.

Data for each participating school district in the sample were provided and used to tabulate two student indicators of success: a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing, year in and year out. Quantitative data were collected in a combination of information available for each school on the Department of Elementary and Secondary Education website and data provided by each school from benchmark assessments used by the school district.

To obtain qualitative evidence, the researcher prepared a survey instrument that was approved by the IRB committee. The survey was distributed to educators to gather evidence regarding their perceptions of the effectiveness of technology in the teaching of literacy as another source of data. The survey tool consisted of 15 questions. The first three questions collected basic demographic information about the responsibilities and employment with the district for each teacher who completed the survey. The survey

included 12 Likert Scale questions about the application of technology, training for that technology, the percentage of instruction directly involving the implementation of technology, the perceived impact of technology by teachers, student factors involved in technology, and future use of technology. The modified on-line survey instrument (Appendix D) was distributed to administrators and educators using a link to the on-line data collections program, *Qualtrics* (Qualtrics, 2021). The use of the qualitative data was to identify if a relationship existed between actual performance data and perceptual data. The results of this qualitative data were then compared to the results of the quantitative data to determine if there was a relationship between the type of technology in use, the implementation methods of the technology, and perception of technology as related to the indicators of student success.

Data Collection

Recruitment letters (see Appendix A) were emailed to each of the eight school districts in the Four Rivers conference of the South-Central region of Missouri to gain permission for participation in the study from superintendents. The letters defined the periods of recruitment and the follow-up dates for the project. After school districts were selected for participation, the participating schools received letters confirming their respective participation (see Appendix E). The letters included information regarding informed consent (see Appendix C). These letters explained that the IRB Committee was aware of all of the procedures prior to the study. They also outlined the kinds of questions the survey would ask and about how much of an individual's time it would take to complete the survey.

The researcher explained in the letter the nature and purpose of the study and outlined all possible risks. The letters assured the participants that accurate, unbiased, complete, and insightful reporting of data would be a component of all research reports. To ensure the confidentiality of the participants, the names of the schools were not used as part of the study or provided to the researcher, and the data received was coded for the purpose of analysis.

To address the limiting factors in gathering the data for this study, the researcher used performance on benchmark assessments in the areas of literacy and language in place of any unavailable standardized test scores provided by the EOC/MAP testing. In addition, the reported data represented averages for student performance at the eighth and tenth grade level within the school district for a given school year. Individual student data would not be used for this study.

A further limitation in the instrumentation was the use of a modified survey tool created by the researcher. The survey collected information from the participating schools regarding the technology practices in use and the implementation methods of that technology. A Likert scale was used to analyze the results of the survey and reliability and validity tests were performed on the results.

A second limitation to this study involved maintaining continuity in the collection of data from the sample schools. Different schools used different benchmark assessments. Not all schools had required benchmark assessments in place. Not all of the participants chose to respond to each question, which caused some gaps in assessing the results. Wherever possible, data were collected from information provided by the individual school districts to the MODESE website. Measures were taken to eliminate

any bias from the implementation and reporting of this study. In an effort to maintain the confidentiality of the school districts, names were not used in the analysis or reporting of data for the study. All results were coded.

Data Analysis

All data received from participating schools will be coded upon collection with an alphanumeric code. Upon completion of the data coding and collection process the data will first be analyzed in its separate qualitative and quantitative components. The qualitative elements from the survey will be divided into the seven individually measured components of the survey: basic demographic information, application of technology, training for that technology, the percentage of instruction directly involving the implementation of technology, the perceived impact of technology by teachers, student factors involved in technology, and future use of technology. These components will be sorted and ranked within their respective categories. The quantitative data gathered will be sorted and ranked from highest performing to lowest performing based on student performance outcomes in the two measured categories of state standardized testing and benchmark assessment data. The final step of data analysis will be to overlay the two sets of data to see what correlations exist between the school's performance rankings and their qualitative reporting.

Ethical Considerations

The confidentiality of all of the participants in the study was maintained. The researcher protected the privacy of the respondents to the survey by not using the names of any of the participating school districts when reporting results. The researcher did not report the schools' names when providing results to all participating school districts, but

rather all data pertaining to the school districts were coded. What paper data available were stored in a locked drawer to assure confidentiality and anonymity of all participants. Electronic data were password protected.

Summary

The availability and implementation of technology-centered instructional practices has grown exponentially in the last decade. Technology has even begun to alter the manner in which traditional practices are incorporated in many classrooms. The current rate of development and rollout of new technology makes selecting an appropriate and cost-effective program a difficult task. District administrative teams must evaluate the effectiveness of current programs and measure that effectiveness against other available technological resources. Furthermore, the cost and sustainability of these new programs must be measured as districts have begun to realize harsh financial setbacks over the last decade. “Proper understanding of their financial duties should promote sound decision making in respect of financial management in schools” (Aina & Bipath, 2020, p. 3). The cost of instructional programs must be measured against their effectiveness. This research is aimed at providing district administrative teams a foundation of items to consider when deciding to make the switch to a new instructional platform.

Chapter Four will provide an overview of the data that were collected and the instruments used for collection. In this chapter, the results of the statistical analyses of data will be revealed using appropriate charts, graphs, and tables. The researcher will provide summaries of the responses to the open-ended questions and the Likert-scale items that were collected, the procedures that were followed, and outcome of the study.

Chapter Four: Results

Overview

The analysis described in Chapter Four aimed to explore the relationship between technology-centered instruction and literacy proficiency amongst secondary students. The analysis also took into account the implementation measures in place and the impact those structures had on the success of students. Additionally, the analysis sought to examine the relationship between teacher perceptions of technology and the successful implementation of technology-centered instruction. The researcher conducted this study to establish if the data presented resulted in a refutation of the null hypotheses. A mixed-methods approach was utilized in order to analyze the quantitative data resulting from secondary student performance data from state standardized test scores and qualitative data collected through a survey instrument sent out to secondary teachers.

The quantitative data collected were information gathered on individual school performance available on the Missouri Comprehensive Data System (MCDS) provided by the Department of Elementary and Secondary Education (MODESE) for Missouri. The qualitative data were derived from a *Qualtrics* survey, which was emailed out to potential participants. The survey contained 15 questions consisting of both direct response and Likert-scale questions. Upon completion of the survey by participants, the researcher analyzed the resulting data and stored it along with the school performance data from MODESE in a password-protected file. The individual school names in the performance reports and from the survey were organized and then coded to ensure confidentiality. In Chapter Four the researcher presented the hypotheses and research questions as described in a previous chapter, with the quantitative and qualitative data

analysis. The initial intent of the researcher was to make a direct comparison between performance data and the survey data. However, in retrospect this was not feasible for the research, as there was a two-year gap in the collection of survey data and the available performance data. The State of Missouri had suspended state testing for the year prior to the survey, due to COVID-19 and data were not available yet for the current year.

State Performance Data

As mentioned in Chapter Three, standardized test performance data from participating schools was gathered from the MODESE website from publicly available data reported in the MCDS portal. This information was used by the researcher to establish a baseline rank of how participating districts performed on state testing by calculating the total number of students that scored proficient and advanced. This information was then cross-referenced with the survey results to test the null hypotheses presented for the research. Table 1 provides the overall performance report for participating schools for grades 8-12 on the MAP and EOC tests for 8th grade English Language Arts and high school English II.

Table 1

Proficient or Advanced (P/A) ELA Standardized Test Scores

School	Tested	Proficient	Advanced	Total P/A	Percent P/A
School A	891	327	124	451	50.62%
School B	159	74	28	102	64.15%
School C	942	376	122	498	52.87%
State	263,792	100242	38713	138955	52.68%

Note. (P/A) is used in proficient or advanced in the body of the table.

Survey Results

As indicated in Chapter Three, the researcher collected data for the investigation from a survey distributed to educators. The survey instrument contained 15 questions, four direct response questions, and 11 Likert scale questions. The direct response questions in the survey were designed to provide the researcher with non-identifiable demographic information. The Likert scale questions were designed to provide data in relation to the frequency of instructional practices, teacher perceptions of technology, and data on implementation measures in use at participating districts.

The Likert questions from the survey were designed so that responses could be categorized into four main measurable values for each question answered. Those values presented to participants for selection were; never/strongly disagree, sometimes/somewhat disagree, most of the time/somewhat agree, and always/strongly agree.

The researcher began by analyzing the survey results and disaggregating the responses from participants into four subgroups. The subgroups were as follows: years of service and/or emphasis area in education, frequency of technology use, perceptions of technology, and implementation measures surrounding technology.

The first three questions in the survey were direct response questions. Question 1 asked participants to respond with the name of the district at which they are employed. The information gained from this question was utilized in the organization of the responses in order to assist in the later correlational components of the research. The next two questions were used to establish the first subgroups in the research. Subgroup one was used to establish the years of experience in education for each participant and Subgroup 2 provided the researcher with the area of emphasis in teaching for each

participant. This information allowed the researcher to isolate responses to the remaining questions in the survey, in an effort to analyze what variations to responses might take place based on how long a participant had been in education or what subject area they were responsible for teaching. The breakdown for participant years of service can be found in Table 2 while the breakdown of participant's instructional areas listed in Table 3

Table 2

Responses by Years of Service

YEARS	RESPONSES
5 or less	14
6 to 10	9
11 to 15	11
16 or more	29
Grand Total	**63**

Table 3

Responses by Area of Study

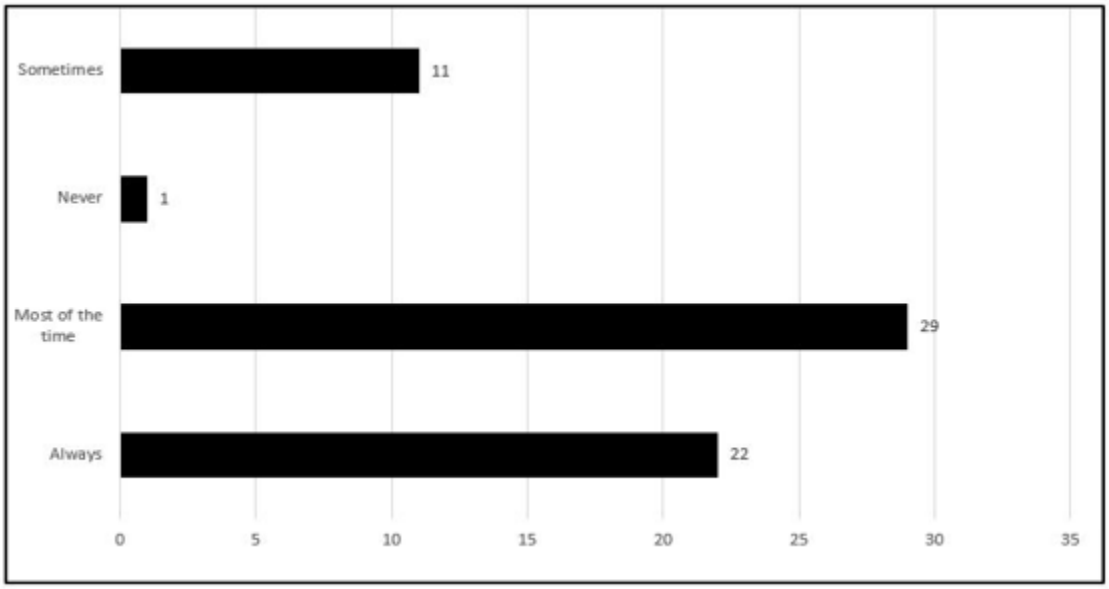
AREA	RESPONSES
ENGLISH	4
MATH	7
OTHER	32
SCIENCE	7
SPED	7
Soc. Stud.	6
Grand Total	**63**

The next subgroup in the data enabled the researcher to establish a basis of frequency. The introduction of technology to the learning process has the ability to enhance and expand educational instruction (Gaddis, 2020). Questions 4 and 5 from the survey focused on how frequently technology was implemented during instruction in the

classroom. This information was then disaggregated between use by teachers and students. Question 4 specifically focused on how often technology was used in the classroom room by the teacher. The data reflected in Figure 1, shows that 80.95% of the total participants responded in the affirmative that they use technology most or all of the time in the classroom during instructional time.

Figure 1

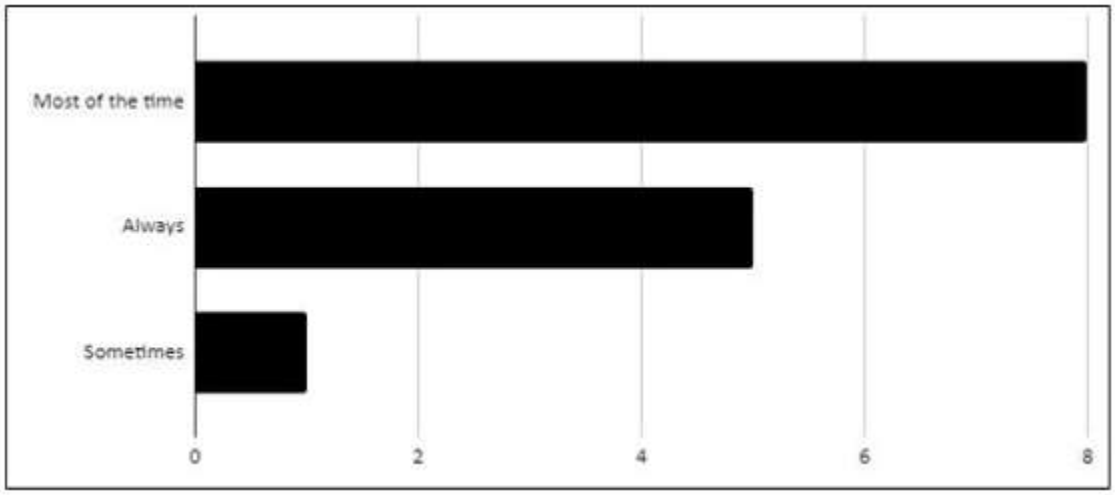
How Often Teachers Reported Using Technology During Instruction



Further review of responses to Question 4 revealed that the responses from the group of participants in the experience group of five or less years show a more frequent use of technology during instruction than their more experienced counterparts. Figure 2 shows that 92.85 % of teachers in the five years or less experience category use technology most or all of the time.

Figure 2

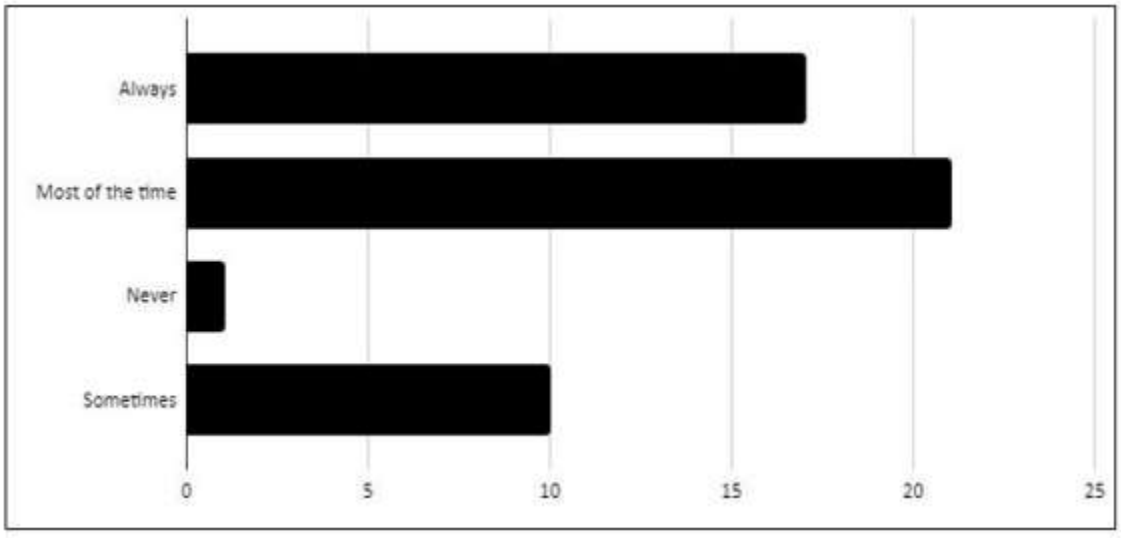
How Often Teachers in Year 5 or Less Use Technology During Instructions



The responses from the remaining participants from the groups revealed a tendency to use technology only 77.55% of the time as shown in Figure 3.

Figure 3

Teachers in Year 6 and Beyond Use Technology During Instruction



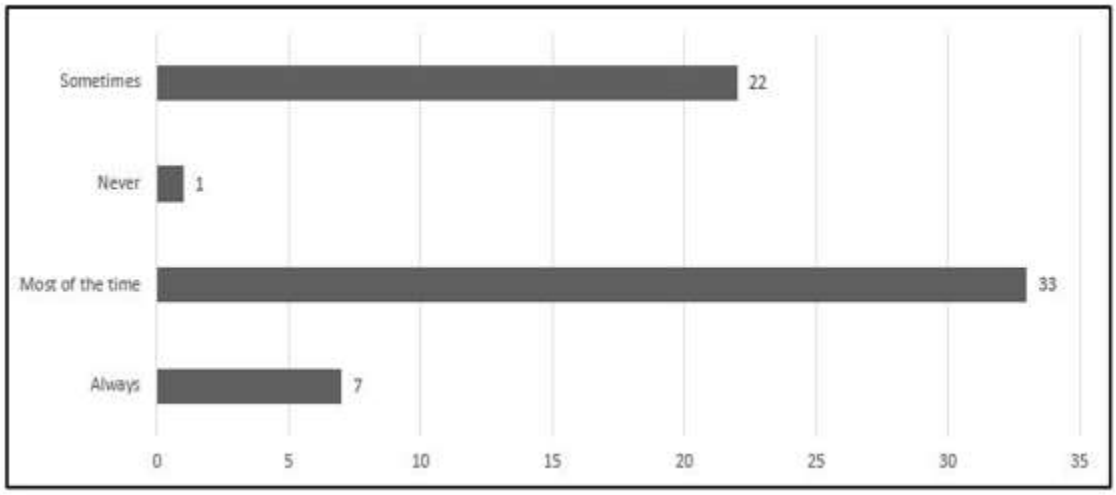
While the data in Figure 3 is still representative of a large portion of instruction being

delivered using technology, it is a 15% drop in total use from the participants with five years or less experience.

Question 5 targeted the direct use of technology by students in the classroom. Figure 4 shows that 63.50% of participants indicated that students use technology a majority of the time during the learning process. While this percentage is a significant drop from the use by teachers, it is still indicative that students are utilizing technology in the classroom a majority of the time.

Figure 4

How Often Do Students Use Technology During Instruction?



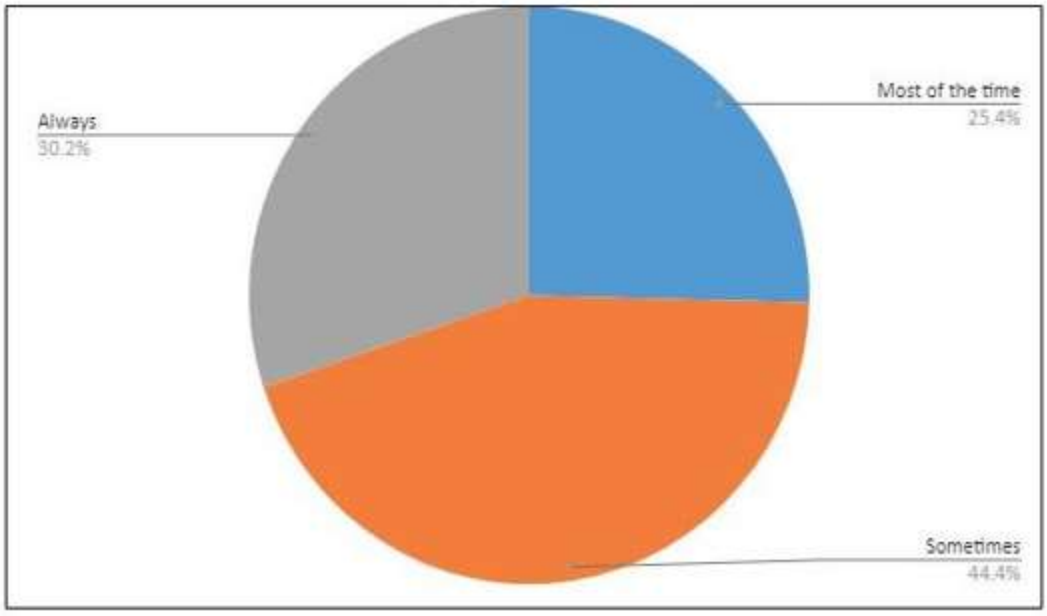
The data represented in this section of the survey establish the argument that participants utilized technology as a primary means to carry out the delivery of instruction and the learning process as a whole.

Professional learning, particularly related to the improvement of education through use of technology in the classroom, is vital to the continued improvement and success of the educational system (Ndrauhutse et al., 2019). The next subgroup of questions in the survey was designed to parse teacher's perceptions of the implementation

of instructional practices with an additional area of focus on technology. Questions 6 and 7 from the survey asked participants how often they received professional development and how often they felt that the training they did receive had an emphasis on technology. This data allowed the researcher to document how much training teachers reported receiving and how those trainings may impact performance by students. Figure 5 shows that 55.55% of teachers report receiving professional development on general education practices from their districts.

Figure 5

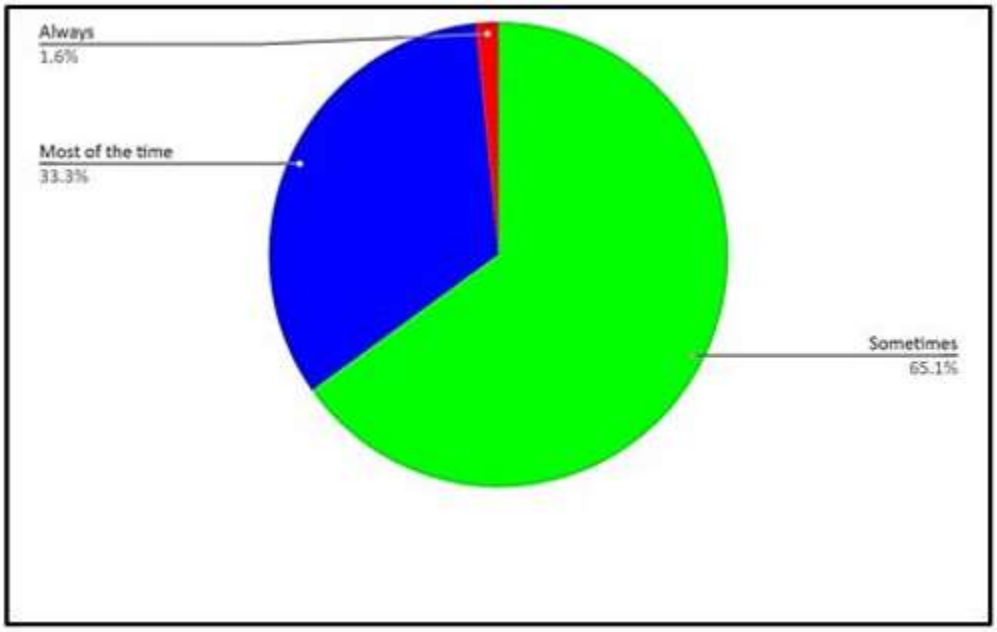
Percentage of Teachers That Reported to Receive Training



Of that training, only 35.48% of the time is the training related directly to technology shown in Figure 6.

Figure 6

Percentage of Professional Development Targeted on Technology



The significance to this data can be seen when comparing it to the earlier information in Figure 1 where 80.95% of all participants reported utilizing technology in the classroom. A comparison of these two figures shows a gap of nearly 46 % between teachers that are utilizing technology compared to the number of teachers being trained in technology. This represents a significant imbalance in the relationship between the use and training of technology.

The perceptions teachers have in regards to specific educational operations can have a direct impact on the success or failure of a program (Ismail, 2021). Questions 8-14 in the survey specifically address teacher perceptions in regards to technology. The first three questions in this section are included in Subgroup 3 and specifically focus on teachers' perceptions of what level of impact technology has on student achievement. The results of those responses can be found in Table 4.

Table 4

Overall Teacher Perceptions Toward Technology

Perception level	Positive impact	Greatest Impact	Student Preference
Strongly Agree	8	0	0
Somewhat Agree	41	24	28
Somewhat Disagree	8	28	28
Strongly Disagree	6	11	7

When teachers were asked if they felt technology had a positive impact on student literacy, responses showed that 77.77% of respondents agreed that technology had a positive impact on student literacy. When comparing the impact of technology on student achievement to other factors, such as teacher effectiveness, the number of people in agreement began to fall drastically. When asked if technology had the largest impact on student performance, the responses fell to only 38.09% of participants who agreed with that statement. Additionally, when participants were asked if they believed students preferred using technology, only 49.20% of responses indicated they agreed. From this data it can be inferred that while teachers do perceive that technology has an impact on student learning and reading proficiency, they do not feel that technology plays a greater role than that of the instructor.

The researcher then reexamined data provided in Figure 1. Several inconsistencies were found when comparing data from Figure 1 with that in Table 4. As mentioned previously in this chapter, respondents reported to use technology 80.95% of the time, which would indicate that technology has a dominant presence in their instructional practices. However, only 38.09% reported that technology has a significant impact on

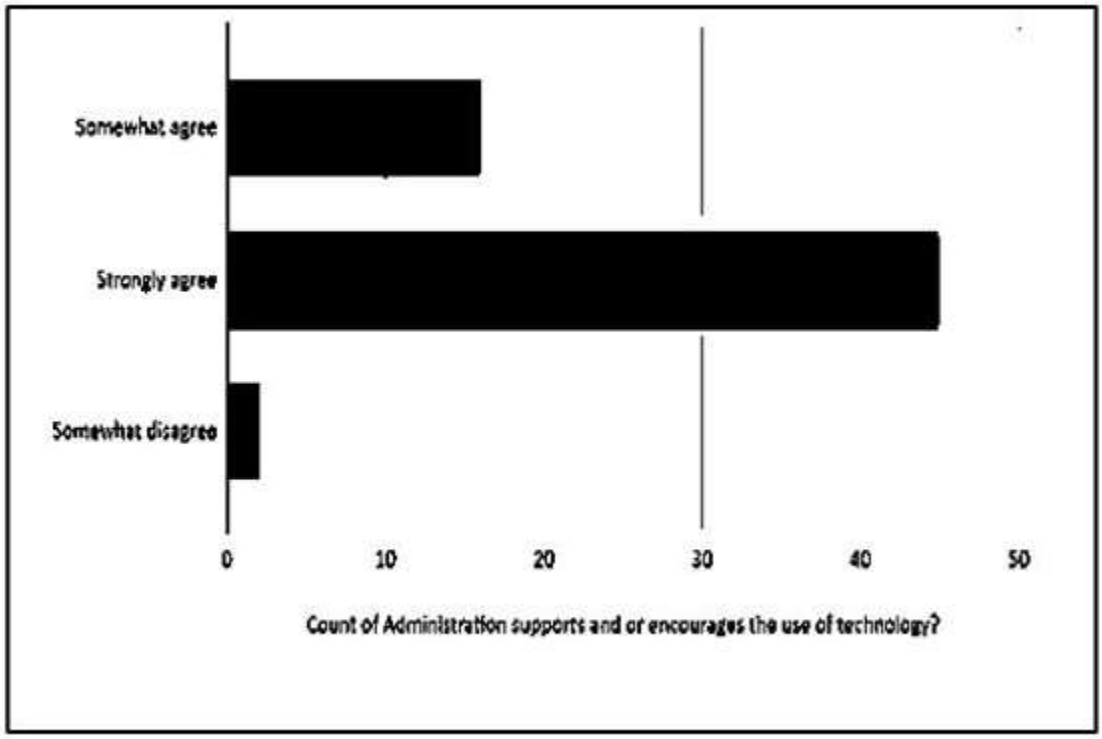
instruction. The comparison of this data would indicate that the majority of teachers are utilizing technology in the classroom, even though only a small percentage believed that it is the best practice to be using.

When comparing the data in Figure 4 to the responses in Table 4 there were discrepancies that existed as well. Responses in Figure 4 reported that nearly two thirds of teachers have students using technology a majority of the time for instruction, however when compared to Table 4, only 49.20% of teachers feel that students even prefer to use technology. Again, this would indicate that despite the belief that less than half of students preferred technology, the classroom teachers were still promoting its use a majority of the time during instruction.

The next two questions in this subgroup targeted teachers' perceptions when analyzing the role of administration in technology. The researcher specifically aimed to determine if teachers felt their administration supported technology use and what level of control teachers felt they had with technology. When teachers were asked if they felt that administration supported the use of technology, 96.82% of the participants reported to believe that their administration fully supported technology being used in the classroom. Figure 7 illustrates the responses and shows that of those in agreement with the statement, the overwhelming majority believed the use of technology was strongly encouraged by administration. This statistic is significant as it provides a possible explanation as to the discrepancies in the data listed above.

Figure 7

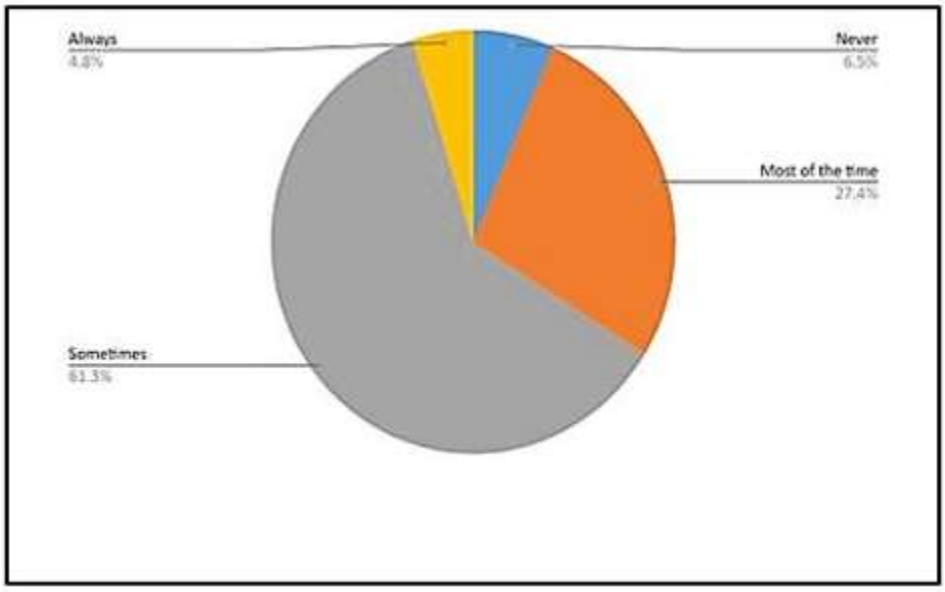
Teacher Perceptions on Administrative Push for Technology



Incorporating teachers into the development and learning of specific building practices significantly increases the possibility of positive results (Peddell et al., 2020). To establish an effective implementation plan, the administration must take steps to ensure that teachers are involved in the selection process, or that a representative body of the teachers has been appointed and involved in selection, as well as the continued professional development plan. The last question from this subgroup asks teachers to provide input on how involved they felt in the selection of instructional technology. Figure 8 shows that 67.80% of responding teachers feel as if they have little-to-no input in the selection process of instructional technology.

Figure 8

Teacher Perceptions of Their Involvement in Tech Selection

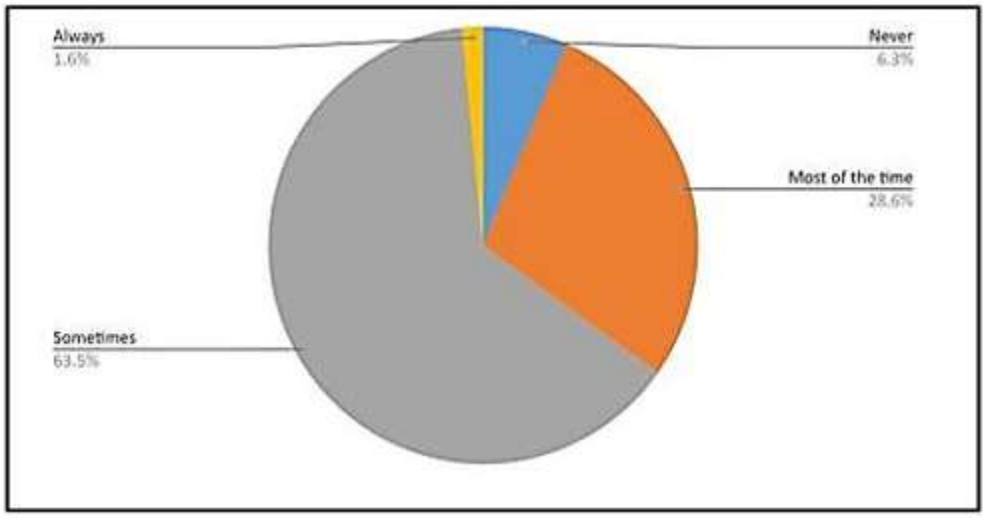


Knowing when to implement a change is almost as important as the change itself and knowing how that change might affect stakeholders is crucial to deciding whether or not to change (McKnight & Glennie, 2019). The comparison of data from Figure 7 and Figure 8 illustrate a lack of intentional processes put in place by district administration to engage teachers in the process of technology selection and implementation.

The final questions regarding teacher perceptions asked teachers to identify how often and why they believed district administration chose to change technology. Figure 9 shows that 69.80% of teachers believed their school districts did not change instructional technology very often.

Figure 9

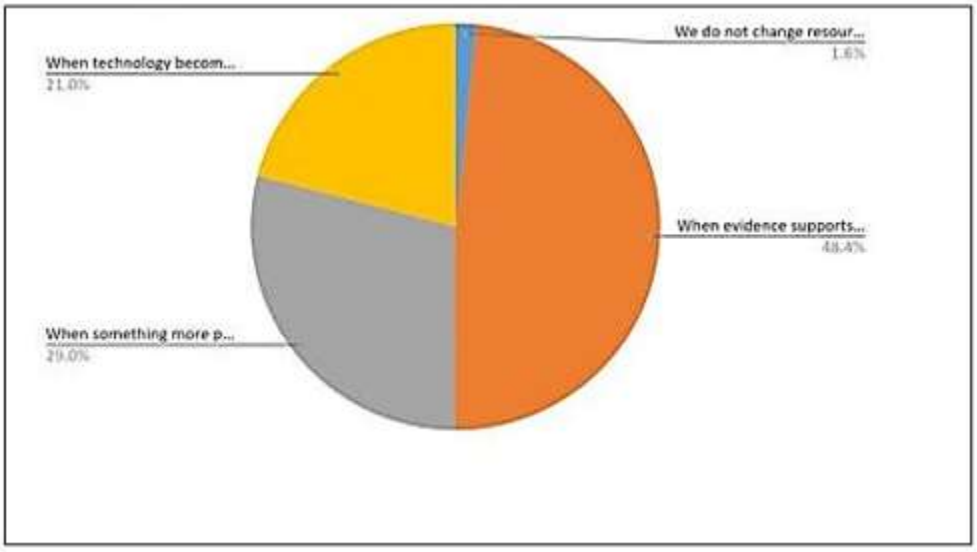
Teacher Perceptions on How Often Districts Change Tech Resources



Likewise, Figure 10 finds 69.42% of teachers responding that they believed that their school districts only make changes when technology became outdated, or when evidence supported a need for change.

Figure 10

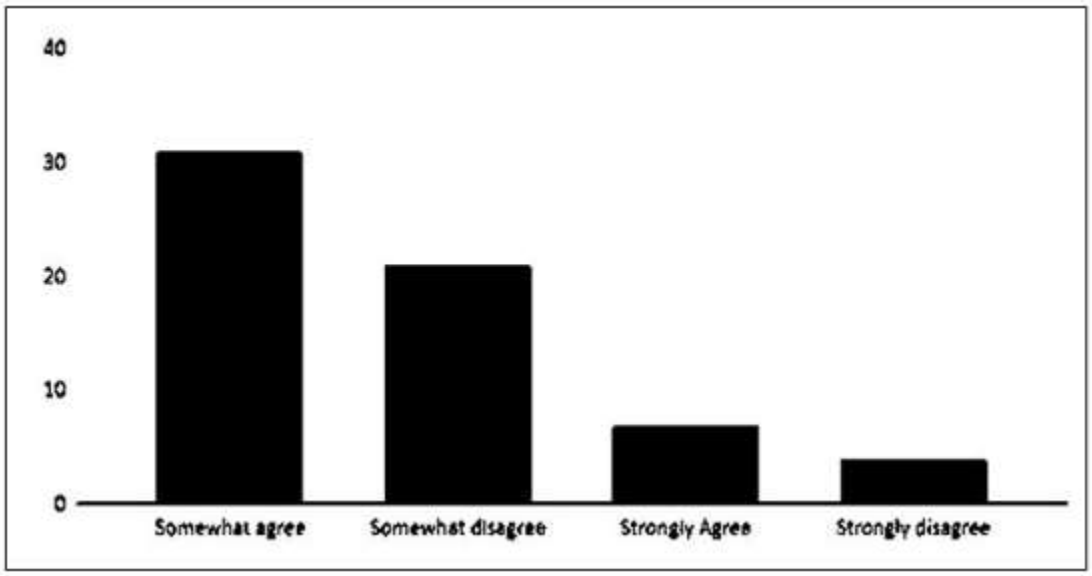
Why a District Decides to Change Tech Resources



The final question from the survey asked teachers to respond whether or not they would incorporate more technology into their classrooms if given the opportunity. The responses showed that teachers leaned more towards the center here. Figure 11 shows that 49.20% of teachers responded that they somewhat agreed with the statement and that 33.33% somewhat disagreed with the statement. Overall teachers favoring at least some increase in the use of technology edged out the teachers that were less likely to use more technology, and 60.31% of teachers reported to somewhat or strongly agree with the statement.

Figure 11

The Number of Teachers That Would Use Tech More



The information shown above is in conflict with portions of table 3.1, as a majority of responding teachers affirmed in Figure 11 that they would be in favor of adding more technology to the learning environment. Only 38.09% of teachers felt technology had the highest potential as an instructional tool to impact student learning and literacy.

Null Hypothesis 1

The performance data for each school participating in the survey was compared to the survey data from each respondent from the school. In this particular situation the researcher examined teacher responses to the frequency of technology use in the classroom.

NH_1**:** There is no relationship between the use of technology-centered instructional practices and student achievement in literacy.

As stated in Chapter Three, the researcher used two indicators of student success, a) student performance at the proficient level or higher on grade level reading assessments and b) a growth in the overall performance levels of students over the course of state testing year in and year out. In cross-referencing this information with the survey results from each school the researcher is able to analyze the data against the null hypothesis. Table 5 shows the percentages of total instructional use by students and teachers and compares those percentages the performance and growth of students taking the English Language Arts portion of the state standardized test.

Table 5

Tech Use v. Performance and Growth

Participating Schools	% OF TECH USE	PERFORMANCE %	GROWTH %
SCHOOL A	72.22	50.62%	-6.84
SCHOOL B	92.85	64.15%	9.26
SCHOOL C	67.25	52.87%	6.04

As can be seen in the table, School B was the school with the highest number of respondents and also showed to be the school with the highest percentages of student

performance and growth. However, School A showed to be the next highest percentage of total technology use, but did not have a greater number of students performing proficient or advanced or higher growth percentages than School C. In order to test whether or not there was a relationship between use of technology-centered instructional practices and student achievement, the researcher calculated the Pearson Product Moment Correlation (PPMC) coefficient and ran a *t*-test. The analysis showed that the coefficient of correlation ($r = .943$) was not significant; $t(3) = 2.834$, $p = .216$. The researcher failed to reject the null hypothesis and concluded that use of technology-centered instructional practices and student performance are not related. The results of this hypothesis are invalid due to the gap of two years between the current survey data and the collected performance data.

Null Hypothesis 2

This data was analyzed to investigate if there was a relationship between the level of initial and ongoing training in relation to technology and the performance of students on state testing.

NH_2**:** There is no relationship between structured implementation measures for technology and student achievement in literacy.

The purpose of this test is to see if districts that place a greater emphasis on providing teachers professional development for technology experience higher levels of student performance. The researcher tested the data from each school to identify if teachers that have had more extensive training in technology experience greater success outcomes with their students. This was done to help establish a relationship between

student achievement in rooms where technology was used frequently and the amount of training teachers received to implement technology.

Table 6

Tech Training v. Performance and Growth

Participating School	% of training in tech	Performance %
SCHOOL A	33.33%	50.62%
SCHOOL B	57.14%	64.15%
SCHOOL C	31.03%	52.87%

In Table 6, respondents from School B reported receiving professional development specifically related to technology at a higher rate than the other participating schools. School B also experienced the highest rate of student achievement on standardized testing. The same did not prove true when comparing the data for School A and School C. Upon analyzing the data from the two remaining schools, School A held a slight edge in the number of teachers reporting they received training related to technology. However, School C showed to have a slightly better performance on state testing data than School A. In order to test whether or not there is a relationship between the structure of implementation measures and student achievement, the researcher calculated the Pearson Product Moment Correlation (PPMC) coefficient and ran a *t*-test. The analysis showed that the coefficient of correlation (r = .973) was not significant; $t(3) = 4.216$, p = .1483. The null hypothesis was not rejected, as the researcher concluded that the structure of implementation measures and student performance were not related. The

results of this hypothesis are invalid due to the gap of two years between the current survey data and the collected performance data.

Null Hypothesis 3

This data was analyzed to investigate if there was a relationship between teacher perceptions of technology and the level of student success experienced in participating schools.

NH_3**:** There is no relationship between teacher perceptions of technology and student achievement in literacy.

The researcher examined the data collected on teacher perceptions of the impact of technology on two scales. The first scale asks teachers if they feel that technology has a general impact on student achievement. The second scale asks educators if they feel that technology is the most important factor in student achievement. This information was collected to assist the researcher in determining if the level of belief in technology has a significant impact on the success of student performance. Table 7 illustrates the first scale of teacher perceptions toward technology and the level of student performance at each school.

Table 7

Teacher Perceptions of Tech Having Positive Impact v. Performance

Participating School	% of teachers	Performance %
SCHOOL A	77.77%	50.62%
SCHOOL B	85.71%	64.15%
SCHOOL C	82.75%	52.87%

The findings in table 7 show that School B had both the highest percentage of respondents that believed technology has an impact on student achievement, as well as the highest rate of student achievement experienced by students. This trend holds true upon examination of the next highest percentages with School C and School A. In order to test whether or not there is a relationship between teacher perceptions of technology having some impact and student achievement, the researcher calculated the Pearson Product Moment Correlation (PPMC) coefficient and ran a *t*-test. The analysis showed that the coefficient of correlation ($r = .871$) was not significant; $t(3) = 1.773$, $p = .3269$. The researcher failed to reject the null hypothesis and concluded that teacher perceptions of technology and student performance were not related.

The data provided in Table 8 comprises the second scale of teacher perceptions towards technology. In this section teachers were asked if they believed that technology was the greatest factor attributed towards student achievement. While School B once again had both the largest percentage of teachers that believed technology has the greatest impact on student achievement and the highest percentage of student achievement, the trend did not continue when examining data from School C and School B.

In order to test whether or not there was a relationship between teacher perceptions of technology having the greatest impact and student achievement, the researcher calculated the Pearson Product Moment Correlation (PPMC) coefficient and ran a *t*-test. The analysis showed that the coefficient of correlation ($r = .576$) was not significant; $t(3) = .705$, $p = .6092$. The researcher failed to reject the null hypothesis and concluded that teacher perceptions of technology and student performance were not related.

Table 8

Teacher Perceptions of Tech Having the Greatest Impact v. Performance

Participating School	% of teachers	PERFORMANCE %
SCHOOL A	40.74%	50.62%
SCHOOL B	42.86%	64.15%
SCHOOL C	34.48%	52.87%

Findings from Tables 7 and 8 present conflicting arguments. As teachers are asked to place greater emphasis on technology, the correlation between their perceptions of the impact of technology and student performance begin to degrade. The researcher failed to reject the null hypothesis, based on the outcomes in Table 8 and concluded that there was no definitive relationship between teacher perceptions toward technology and student performance. The results of this hypothesis are invalid due to the gap of two years between the current survey data and the collected performance data.

Research Question 1

What correlation exists between teacher perceptions of technology and its ability to impact student literacy proficiency?

Teacher perceptions have the ability to shape many facets of education. School culture, selection of resources, curricular direction, and many other areas of education all have the ability to be shaped by perceptions. This survey approached teacher perceptions of technology from three lenses: direct impact technology has on performance, student preference toward technology, and administration's structuring of technology. After

conducting the survey and comparing the results to performance outcomes from state standardized tests, there were varied outcomes found in the survey data.

As mentioned earlier in this chapter, Question 8 asked teachers to report on the general belief technology has an impact on student performance. A slight relationship, nonsignificant relationship between that information and student achievement was presented. However, as Question 9 asked teachers to place greater confidence in the ability of technology to impact student achievement the correlation between that data and student performance began to diminish when analyzing results from Question 9 in the survey. Additionally, survey data from Question 10 in the survey showed that less than half of the participants believed students showed a preference towards using technology. Again, in Question 12 from the survey, we see a majority of teachers reporting a belief that they were not involved in the selection process with technology.

Positive associations to technology began to emerge when analyzing data from Question 11. Over 96% of teachers reported they believed that administration strongly supports technology. While Questions 13 and 14 showed a strong belief amongst teachers that districts were consistent with technology and only changed resources when a change was necessary.

The emerging theme that is developed from this survey shows that, while teachers do show a general trust in technology and the purpose and plan of administration for technology, the level of confidence in technology diminishes as teachers are asked to place greater emphasis on technology.

Research Question 2

What significance structured implementation of technology-centered instruction has on student achievement in literacy proficiency?

The data in response to specific implementation strategies was represented in the survey by Questions 6 and 7, involving teacher perceptions on professional development. A majority of teachers did report that they received professional development. However, data that resulted from this portion of the survey showed that the large majority of teachers did not believe that the available professional development included much technology. The data from Question 7 shows that only 35% of professional development was centered on technology. When this data is compared data from Question 4 in the survey where 81% of teachers reported using technology, a significant amount of the time a gap in practice versus training emerged.

The researcher analyzed the professional development data and compared it to the performance data. While the school that reported the highest level of professional development associated with technology did show to have the highest level of performance, this trend did not hold true with the other schools in the survey, as was demonstrated in Table 5. In the overall comparison, the researcher was unable to identify a relationship between professional development and performance. However, when comparing results to Question 6 and individually by school, a separate theme emerged. While all schools together reported less than half of training being centered on technology, the individual results did show that one school did have a majority of its teachers reporting to receiving training in technology. This school was also the school that experienced the highest performance levels in the survey. This evidence shows a

measurable impact of structured implementation measures to impact student achievement, once teachers experience training a majority of the time.

Research Question 3

How does technology-centered instruction compare with non-digital instruction in regards to the impact on student literacy proficiency?

There are many variants to be considered when analyzing the data related to the implementation of technology-centered instruction and its impact on student achievement. When attempting to directly compare technology-centered instruction to non-digital methods, it is difficult to form a comparison between the two instructional preferences. As was reported in Question 4 of the survey, the overwhelming majority of participants reported using technology as a primary means of instruction. This fact would also indicate that there is a significantly small sample size of teachers reporting the use of non-digital methods as the primary method of instruction. The lack of comparative data makes it difficult to formulate an argument between the two instructional platforms, as there is a lack of an adequate sample size from non-digital instructional methods. Additionally, the available performance data generated from the public portion of the MCDS provides an overview of district performance, but did not provide a breakdown of individual teacher performance, which prevents a teacher-by-teacher comparison from being made.

With these limiting factors in mind, the researcher focused on questions from the research focused on the frequency of technology use, the perceptions of teachers, and the overall performance of the participating districts in the study, compared to how much technology they used during instruction. Again, the survey data included in this research

found that teachers reported using technology in their classrooms a majority of the time during instruction. Data from the survey also highlighted a perception amongst teachers that district administration strongly supports the implementation of technology and that administration selects and implements technology for the right reasons. While not all teachers believed technology is the primary factor related to student success, the vast majority of responses indicated a belief that technology did have a positive impact on student performance.

Technology was shown to be the preferred method of instruction in the participating schools in Question 4. Table 1 shows that the majority of students from participating schools performed at a proficient or advanced level on standardized tests for English Language Arts. Analysis of this data illustrates a nonsignificant, positive relationship between technology-centered instruction and student performance. The lack of teachers choosing to implement non-digital instructional methods limits the researcher in measuring the impact that these methods can have on student performance.

Research Question 4

What does the evidence suggest to a district when deciding if the impact of technology-centered instruction is great enough to justify the resource commitment of these programs?

When making building or district-level decisions, it is important that administrators view solutions and outcomes with multiple lenses. As mentioned earlier, the researcher approached this study from frameworks provided by Bolman and Deal. These frameworks are structural, human resource, and political. The use of Questions 1 through 7 in the survey centered on the fixed data related to the participants. It provided

the researcher with quantitative data in relation to years of experience, areas of study, amount of technology in use, and the level of professional development available at each participating school. Questions 8 through 14 were used to establish the human resource framework. In these questions the researcher asked teachers to provide information about their perceptions of technology and their overall judgement of how district administration approached technology as a whole.

The political framework in this study was the main focus in Research Question 3. The political framework is constituted in the decision-making process that must take place, especially when there are conflicting arguments in the setting. While the data present in the study was unable to explicitly isolate a relationship between technology and perceptions with performance, there were instances that would allow teachers and administrators to draw on outcomes to make a decision to continue to commit to the implementation of instructional technology.

Summary

The mixed methods study provided insight into the many factors surrounding the selection of instructional practices. While not all data in this study supported the initial hypotheses of the researcher, there were quantitative relationships between student performance and the predominant methods of instruction employed by the studies participants. The qualitative information provided a deeper understanding of teacher perceptions of the impact of technology and the alignment of those beliefs with the performance outcomes. The overall impact of this research would provide a comparison approach to a district considering making a greater commitment to technology, as well areas of consideration when determining the most effective implementation practices.

Chapter Five provides an overview of the research study and offers suggestions for future research.

Chapter Five: Discussion, Reflection, and Recommendations

Overview

In order to evaluate the overall impact of technology-centered instruction, the researcher analyzed performance and perception data from public school districts within the Four Rivers Conference in the South-Central Region of Missouri. By evaluating data from this research, this study aimed to determine the effectiveness of technology-centered instruction. Additionally, this study evaluated the implementation strategies in place at each school to provide useful information to administrators for future decision making. The collection of this information may assist school district officials when deciding which platforms to select and how to go about implementing them in the most effective manner. In order to assess these items, the researcher examined the survey results gathered in May 2021, and compared that information with the latest available standardized assessment data available to the public from the 2018 and 2019 school years.

The researcher analyzed the data in the following comparison frameworks: frequency against performance; training against performance; perceptions against performance. In this study the researcher attempted to evaluate the relationship between the percentage of instruction that was composed of technology and the level of performance associated with that level of use. Additionally, the researcher hoped to determine the level of impact that professional development for technology being available and offered to teachers had on performance outcomes. Finally, the researcher attempted to quantify the relationship between teacher perceptions and student performance. By conducting this mixed methods analysis, the researcher sought to isolate

specific variables that can be attributed to student performance on standardized English Language Arts assessments. It is the hope of the researcher that these results will provide tangible metrics to guide decision making when considering how much influence technology should have over the instructional process, how teacher perceptions can affect student success, and most importantly, the impact of initial and ongoing professional development centered on technology that is provided to teachers.

Discussion

Null Hypothesis 1. Data from the study did show that the highest performing school also had the highest rate of technology use in the classroom. The reliability of this analysis did not hold true however, as other schools tested in the study provided instances where reporting schools showed greater use of technology but failed to outperform schools with a lesser frequency of use. Despite a lack of correlation amongst the results it should be noted that while School A did have a five percent higher usage rate and a lower performance rate, they were only edged out by School C by roughly two percent in overall performance. The null hypothesis was not rejected on the premise of the study; however, the variances between schools was not large enough to reject the thought of a statistically nonsignificant, relative correlation between the level of technology use and student performance. The researcher reached this conclusion, as data provided in the performance comparisons from the participating schools did find that these schools all used technology a majority of the time during instructional delivery and all schools in the study outperformed the state average in the tested area.

Null Hypothesis 2. When district administration fails to provide teachers a sufficient level of professional development, they are harming the continued growth and

development of a teacher's individual craft (Gregson, 2020). Results from the survey were used to establish a relationship between the level of professional development implemented and the performance of students on standardized tests. In the study, no specifically identifiable relationship between implementation and training measures and student performance could be shown. Even with the absence of this relationship, the results from the study can still be useful to district administration.

In this study it was noted that only 35% of respondents felt their districts provided them with the necessary professional development centered on technology implementation. The data from this research could be used by district administrators in analyzing the focus of future professional development. In Chapter Four, it was noted that the majority of teachers reported using technology, but only a small portion reported to believing technology could significantly impact student performance. The distance between the number of teachers using technology and the number of teachers that put full belief in technology should be taken into greater consideration when deciding the course of future professional development. Additionally, the majority of teacher's felt disconnected from the district selection processes, as only 32% of teachers reported having input in resource selection. This information is significant as this lack of input has the ability to negatively impact teachers' perceptions of technology and therefore to negatively impact the effectiveness of technology. The more involved teachers are in the change and implementation decisions, the greater the likelihood for success (McKnight & Glennie, 2019). It is the belief of the researcher that a district-wide refocusing of efforts to match the usage of technology would lead to a greater level of teacher competency

with technology. An increase in the level of ability to implement technology would lead to a greater amount of faith being placed in technology by educators.

Null Hypothesis 3. As mentioned in Chapter Four, the data retrieved in this study in regard to teacher perceptions of technology failed to reject the null hypothesis and showed that no relationship existed between perception and performance. While the majority of teachers in the study did respond to an overall acceptance that technology has an impact on student learning, the evidence was not strong enough to support this assumption. Additionally, the data from the survey showed a decrease in support from teachers as they were asked to place greater emphasis on the impact of technology.

The outcome from this data could provide administrators with the basis for research and discussion with their teachers in regards to the amount of technology being used and the teachers' perceptions on the impact technology can represent. It should be noted that the overwhelming majority of teachers stated they used technology all or most of the time during instruction. The professional dialogue based around the findings in this study should be centered on the lack of correlation between the individual perceptions in regards to technology and the amount of technology employed by teachers. An effort should be made to discover the basis for this deviation. Collaboration amongst teachers and district administration teams would allow for a deeper look into the perceptions of teachers and to better align teacher practices and perceptions.

It was also reported that teachers believed that administrators placed a large stake in the ability of technology to impact student achievement. A strong level of consistency on the part of district administration was shown in the data, as most teachers replied that they believed administration will only shift technological resources when there is an

expressed need for change. Consistency in practice has the ability to develop a certain level of trust by the teachers that administrators are making choices for the right reasons. This relationship between teachers and administrators shows that when change is implemented it is likely a change that was recognized by stakeholders as needed change, which can greatly improve the opportunity for success (McKnight & Glennie, 2019).

Recommendations for Future Application

Based on the outcomes of the study, the researcher has recommendations for teachers and administrators looking to make decisions on the role that technology will play during the instructional process. More consistent dialogue and reflection needs to transpire between teachers and administration to ensure that the true direction and focus on technology is understood by all stakeholders. The data from the survey showed that nearly 81% of teachers reported using technology as a primary means of instruction, but only 38% of teachers believed that technology is the greatest factor related to student achievement. A rift seems to exist between what instructional techniques teachers were using the most frequently and what instructional practices they believed in the most. District administrators must look at these numbers and begin to dialogue with the teachers in their buildings and analyze why this gap exists.

A similar gap in the decision-making process can be seen when looking at the amount of training teachers report to receive. Again, results show 81% of teachers using technology, but 65% of teachers reported that they were not trained in educational technology. Additionally, 97% of educators from this study said they believed district administration shows a strong preference to the use of technology. In consideration of this data, administrators have a duty to provide ongoing training for teachers and teachers

need to ensure that they are pushing to be properly trained in implementing their instructional practices in the most effective manners. Educational technology has become an instructional necessity in today's classroom. Teachers must be properly trained in the use and inclusion of these resources if they are to help students succeed at the highest possible levels.

When making a commitment to an instructional resource, school administrators should commit to an on-going analysis of practices and results. With the overwhelming majority of teachers showing a preference to using technology and showing trust in technology to impact student achievement, there is sufficient data to suggest that school districts should look to make a commitment to the utilization of technology-centered instruction. All educational stakeholders from the state level to classroom teachers should reflect on the wide variations of data in this research. It is evident that there is a prevailing trend that educators have a variety of opinions on the many different components of educational technology. If continued emphasis is going to be placed on 21st century skills and the increased role of educational technology, the findings of this study should be expanded upon and looked at on a larger scale to help establish a more expansive data set. In doing so, it is the belief of the researcher that a more consistent forward-thinking approach can be implemented and perhaps then some of these gaps in responses begin to close.

Recommendation for Future Research

Upon completion of this study, the researcher has suggestions for improvement from this project that should be taken into consideration before future research on the topic is conducted. The availability of current data posed an issue for the researcher. Due

to the global pandemic, the most recent standardized assessment data currently available for the study was from 2019, as Missouri did not test in 2020 and the results from assessments taken during the 2021 school year were not available. Additionally, testing that did occur in 2021 would likely not be representative of traditional results, as not all students were able to meet the requirements to test in person this year. The separation in time from when the quantitative data were generated and the administration of the survey to current teachers created a scenario in which there was a possibility that a portion of the responding teachers may not have actually been a teacher at the school from which they were representing in their responses. These scenarios could lead to a possible gap in the data. The basis for teacher perceptions of student performance and preference were largely based on their current group of students, which would not account for the entire population of students being represented in the quantitative performance data being analyzed.

An additional suggestion for future research would be in the timing of the research. It was the aim of the researcher to conduct the study as near to the state testing window as possible, so as to be certain the responses were reflective of current student progress and performance. This timing structure meant that teachers would be asked to respond to the survey in what were likely the last few weeks of the school year for them. This window of time is typically one of the busiest times of the year for educators. The researcher believes these factors had a possible impact on the level of participation and responses, which in turn limited the overall scope of data collection that could be analyzed. It would be the suggestion of the researcher to allow additional time for responses and move the survey collection up to an early point in the school year. This

would provide the researcher with a higher likelihood of participation from a larger portion of the target population.

An additional consideration for future research would be to expand the line of questioning in use in the survey. In an effort to encourage greater participation, the researcher intentionally limited the number of questions in the survey and thereby decreased the time it took to respond. The intent was that these considerations would produce a greater number of responses and provide the researcher with a greater set of responses to pull information from. The limitations in the line of questioning forced the researcher to eliminate potentially clarifying questions from the survey. The elimination of these questions left a need for further information to expand on the topics from the research.

To provide additional statistical validity to the research questions, it would have been beneficial for the researcher to have data available on the percentages on the state average of technology usage in the classroom setting. Such information is not currently collected or calculated by the MODESE. While the researcher was able to ascertain the performance outcomes of each participating school compared to the state averages in performance, there was no available data to allow the researcher to see how the level of technology implemented in the participating schools compared to other schools across the state.

The researcher would suggest that any further research on this topic include additional data sets from other sources, such as benchmark assessments conducted in English Language Arts courses. As mentioned previously in this section, the global pandemic prevented many educational institutions from conducting assessments. In most

cases this was not limited to standardized assessments. Benchmark assessments in reference to literacy went largely under-utilized during this school year. In the case of this study, the inclusion of benchmark data would have added a greater layer of depth to the performance variable portion of this study.

In review, if this study were to be replicated by the researcher or by another party, the following elements would be altered: timing, survey questions, additional anecdotal data, and possibly the inclusion of interviews.

Conclusion

As educators continue to embrace technology's advancement and increasing necessity in the realm of literacy education, more direct emphasis must be placed on what role technology plays and how that technology is implemented into the classroom. Currently, many of the selection and implementation methods in place at districts are largely reactive and lack a cohesive understanding on the part of all stakeholders to be fully effective. School districts must become more in tune with the needs of students and abilities of educators and begin to develop selection criteria and strategies for implementation on a more proactive basis.

In the current world of education, the role of the classroom educator continues to evolve and take on new responsibilities. There are many educational technology tools available that can assist classroom teachers in meeting the increasing demands on their time. Although the full measure of the impact of technology as an instructional tool continues to be a topic of debate, the evidence is there to support that technology does, in fact, have a positive impact on student performance, as well as enhancing teachers' best practices. With continued support from state education departments and district

leadership, more research can, and should, be conducted to create a more consistent needs-based implementation model for educational technology. Such an approach would make a positive impact on perceptions of technology by all stakeholders, as well as provide a more consistent metric to evaluate the effectiveness of technological practices as a whole.

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Appendix A

Teacher Participation Letter

To Participating Teachers,

Thank you for agreeing to participate in this study related to student performance, improving integration and use of technological resources, and teacher perceptions towards technology. The survey includes background information about the teacher and questions regarding teaching practices surrounding technology. Participation in this survey is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. You may choose not to answer any question that you do not want to answer. Please complete the survey within two weeks of receiving this message. You will NOT be penalized in any way for completion or denial of participation in this survey. As part of this effort, the identity of the teacher and school district will not be used in any publication or presentation that may result from this study, and the information collected will remain in the possession of the investigator in a password protected environment. All specific data related to the teacher will be coded to help maintain confidentiality. Please complete the 15 question survey to the best of your ability. Surveys may be accessed through the Qualtrics link shown below:

Instructional Technology Survey

If you have any questions, you may contact me at djk193@lindenwood.edu or my faculty advisor, Dr. Tonya Thompson at tthompson@lindenwood.edu.
Thank you for your time, effort, and participation.

Sincerely,

Daniel Kania
Doctoral Student
Lindenwood University

Appendix B

Request for Research Permission

April 2021

Central Office Administration

Superintendent

Missouri School District

Dear Superintendent,
I am writing to request permission to survey your district teachers, grades 7-12, for my doctoral dissertation research project at Lindenwood University. I believe the information gathered through this study will positively contribute to the body of knowledge regarding secondary student performance, improving integration and use of technological resources, and teacher perceptions towards technology.

The purpose of the survey is to gain quantitative and qualitative data about the relationships between student performance and specific instructional practices being utilized and strategies involved in the implementation and ongoing use of instructional programming. In total I hope to have 600 teachers participate across the state to have a robust study, and your district's participation would greatly help in this endeavor.

Attached to this document is the survey to be distributed, as well as the teacher letter and Lindenwood University's Exempt Research Information Sheet. Participation in this study is completely voluntary and may be withdrawn at any time. Confidentiality is assured as the survey will be administered through Qualtrics; specific data related to school districts will be coded and kept locked up at all times. Teachers' consent to participate in this study is given by either completing the survey or with a non-response.

If you agree to participate in the survey, please respond with approval, and forward this email with attachments to your district teachers. If you have any questions, you may contact me at djk193@lindenwood.edu or my dissertation chair, Dr. Tonya Thompson, at tthompson@lindenwood.edu. Thank you for your time and consideration.

Sincerely,

Daniel Kania
Doctoral Student
Lindenwood University

Appendix C

Research Information Sheet

You are being asked to participate in a research study. We are doing this study to measure the relationship between technology-centered instruction and literacy proficiency and to provide a framework for evaluating the effectiveness of technology-centered instructional programs. During this study you will be asked to take a 15 question survey. It will take less than 10 minutes to complete this study.

Your participation is voluntary. You may choose not to participate or withdraw at any time.

There are no risks from participating in this project. There are no direct benefits for you participating in this study.

We will not collect any data which may identify you.

We will do everything we can to protect your privacy. We do not intend to include information that could identify you in any publication or presentation. Any information we collect will be stored by the researcher in a secure location. The only people who will be able to see your data are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

Who can I contact with questions?

If you have concerns or complaints about this project, please use the following contact information:

Daniel Kania, djk193@lindenwood.edu

Dr. Tonya Thompson tthompson@lindenwood.edu

If you have questions about your rights as a participant or concerns about the project and wish to talk to someone outside the research team, you can contact Michael Leary (Director - Institutional Review Board) at 636-949-4730 or mleary@lindenwood.edu.

Appendix D

Instructional Technology Survey

What is the name of your school district? (The name of your district will not be included in any reporting portion of this research; it is simply a tool to assist in the disaggregation of the data.)

How many years have you been in education?

- 5 or less
- 6-10
- 11-15
- 16 or more

What grade or subject do you teach?

How often do you use technology during instruction?

- Never
- Sometimes
- Most of the time
- Always

How often do students use technology during instruction?

- Never
- Sometimes
- Most of the time
- Always

I receive/attend professional development?

- Never
- Sometimes
- Most of the time
- Always

How often is your professional development related to technology?

- Never
- Sometimes
- Most of the time
- Always

Technology has a positive impact on student literacy

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Technology has the greatest impact on student performance.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Students prefer using technology over teacher led instruction.

- Strongly Agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Administration supports and or encourages the use of technology?

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Teachers are involved in the selection of technological resources.

- Never
- Sometimes
- Most of the time
- Always

How frequently does my district change technology tools and resources?

- Never
- Sometimes
- Most of the time
- Always

When does my district make the decision to switch technological resources?

- We do not change resources
- When technology becomes outdated
- When evidence supports a need for a change
- When something more popular or trendy arises

If given the opportunity, I would use more technology during instruction.

- Strongly Agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

Vita

Dan Kania has been a public-school educator for the past 16 years. He taught grades nine through 12 as a Social Studies teacher for six years and has spent the last 10 years as a secondary administrator. Currently he is a building principal at Meramec Valley R-III School District.

He earned a Bachelor of Arts Degree in Humanities and Social Sciences from the Missouri University of Science and Technology (formerly University of Missouri-Rolla); a Master of Educational Administration from Missouri Baptist University, St. Louis, MO; and a Specialist Degree in School Administration from Lindenwood University in St. Charles, MO.

This dissertation was the final phase of an Educational Leadership program for Dr. Kania, as he completed his Doctorate in Education from Lindenwood University in 2021. Dr. Kania currently resides in Union, Missouri.