A QUANTITATIVE STUDY OF SECONDARY TEACHER PERSPECTIVES ON STUDENT ENGAGEMENT IN A ONE-TO-ONE ENVIRONMENT

JASON R. BUCK

2019

The undersigned, approved by the Department Chair of Graduate Studies in Education, have examined a dissertation entitled:

A QUANTITATIVE STUDY OF SECONDARY TEACHER PERSPECTIVES ON STUDENT ENGAGEMENT IN A ONE-TO-ONE ENVIRONMENT

Presented by Jason R. Buck a candidate for the degree of Doctor of Education and hereby certify that in their opinion it is worthy of acceptance.

Dr. Joe Sartorius, Advisor/Chair

Graduate Education, Southwest Baptist University

Dr. Kevin Patterson, Committee Member

Graduate Education, Southwest Baptist University

Dr. Benny Fong, Committee Member

Graduate Education, Southwest Baptist University

A QUANTITATIVE STUDY OF SECONDARY TEACHER PERSPECTIVES ON STUDENT ENGAGEMENT IN A ONE-TO-ONE ENVIRONMENT

A Dissertation
Presented to
The Faculty of the Graduate Education Department
Southwest Baptist University

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Education

By

Jason R. Buck, B.S., M.S.

Dr. Joe Sartorius, Dissertation Advisor

December 2019

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Dr. Joe Sartorius for jumping in mid-stream and agreeing to serve as both advisor and committee chair. Your constant encouragement over the last several years has provided the momentum necessary to complete this process. I would also like to thank Dr. Benny Fong, Dr. Tammy Condren, and Dr. Kevin Patterson for joining the committee and the process near the end to make sure I made it across the finish. Thank you to Dr. Condren and Dr. Fong for providing the additional support workshops to reinvigorate the process. Thank you, Dr. Fong for providing near constant guidance and amazingly responsive feeback throughout the design, data collection, and analysis phases of this project. Your insistence on maintaining the highest standards and providing the support to reach them has been invaluable. Thank you, Dr. Patterson for providing the leadership and assurance needed to convince me that I would complete this process.

Thank you, also, to fellow members of the cohort three, both those that completed the journey and those that didn't, but especially those that made the frequent treks from St. Louis to be a part of the cohort. Your companionship and support along the way has made the process that much more bearable. Finally, and most importantly, I would like to thank my wife, Leslie for being the constant, unwaivering support over the sometimes seemingly endless process this has been.

TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

This quantitative study focused on teacher perception of student engagement in a one-to-one technology initiative. Missouri teachers working in a district having implemented a one-to-one technology program were surveyed to determine their perception of engagement levels for middle and high school students. Teacher perceptions were analyzed to compare engagement between middle and high school students characterized as at-risk, traditional, and high achieving with data analyzed based on years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency.

Independent samples *t*-test suggest middle school teachers perceive higher engagement levels resulting from a one-to-one technology initiative than high school teachers for all student groups measured. These differences were greatest for traditional students and greater for at-risk students than for high-achieving students. Pearson's *r* values identified teacher perceptions of engagement levels were positively correlated with teacher self-rated technological proficiency and negatively correlated with time since implementation of a one-to-one initiative. Teacher years of service was not correlated with perceptions of engagement. Multiple regressions noted that self-rated technological proficiency positively predicted engagement levels for at-risk and traditional students while time since implementation negatively predicted engagement levels for at-risk and traditional students. Teacher years of service was not a predictive variable for perceptions of engagement among any of the student groups.

CHAPTER ONE

INTRODUCTON

The Missouri Department of Elementary and Secondary Education (DESE) includes student achievement and attendance as sources of data in determining school district accreditation within the Missouri School Improvement Program (MSIP). Both school attendance and academic achievement rely on student engagement within the school (Akey, 2006; Cano, 2015; Heller, Calderon, & Medrich, 2003). With student engagement and related attendance rates traditionally lowest at the secondary level (Cano, 2015; Eccles & Midgley, 1989), middle and high school administrators are under increasing pressure to develop programs and initiatives that will increase student engagement as a means of leading to improved attendance and achievement.

Additionally, educators are more often looking to the impact of increasing technology on the teaching and learning process. Access to the internet and technology at school as well as an ever increasing access to computing devices outside of the school day are providing greater educational opportunities to students with the, yet to be realized, promise to change the educational landscape (Picard, 2015). As technology is frequently identified as a means of connecting with students through a variety of channels and engaging students at a deeper level (Barnes, Marateo, & Ferris, 2007; Project Tomorrow, 2010; Pynos, 2016; Taylor & Parsons, 2011), schools are placing a greater emphasis on technology in the hopes that factors ranging from engagement to attendance to achievement will improve as a result (Greaves, Hayes, Wilson, Gielniak, & Peterson, 2012; Swayne, 2017).

Problem Statement

School districts across the nation struggle with the problem of low engagement leading to chronic absenteeism and poor academic achievement, especially as students reach the middle and high school levels and parents are less involved in student's education and day to day decisions (Burns Jermain, 2018; Noel, Stark, Redford, & Zukerberg, 2013). This educational disengagement and chronic absenteeism inevitably lead to poor academic performance and increased dropout rates (Whitworth, 2016). DESE, under the current edition of the Missouri School Improvement Program set achievement and attendance requirements for districts, which many are failing to meet, especially among their middle and high school students. As a result, in an increasing number of districts, in an attempt to improve attendance and achievement are looking to technology as a means of increasing student engagement (Cushing, 2018).

Purpose for Study

As district administrators attempt to improve district performance data, a variety of programs and initiatives have been implemented with the intention of improving factors ranging from attendance to engagement to performance on standardized tests. Recently, an increasing number of districts are moving towards one-to-one technology initiatives in hopes that the opportunity for students to engage with material through the use of a technological device will increase engagement and connection to school (Cushing, 2018). Railsback's (2004) research identifying engagement and connection to the school as important factors in increasing attendance and Akey's (2006) finding of a similar connection between engagement and academic achievement are supported by the notion that improved engagement in the learning process leads to a variety of improved educational outcomes and success (Cano, 2015; Janosz, 2012; Swayne, 2017; Trowler & Trowler, 2010). Higher levels of student engagement result in more consistent

attendance and allow schools a greater opportunity in influence the educational outcomes for students (Whitworth, 2016).

The quantitative study involves a combination of causal comparative research for RQ1 and correlational research for RQ2 and RQ3 for the purpose of testing the self-determination theory of motivation that compares the integration of one-to-one technology in the classroom to teacher perception of student engagement for middle and high school students in schools that have implemented one-to-one programs in Missouri Public Schools. The independent variable of one-to-one technology integration was defined as a previously implemented school initiative that provides each student with a technological device (e.g.-laptop, iPad, Chrome book) for use both in school and at home, twenty-four hours a day, seven days a week, for schoolwork. Other independent variables of interest include the grade level of students, teacher years of service, time since one-to-one implementation, and teacher self-rated technological proficiency. The dependent variable of student engagement was generally defined as willing, and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner, Kindermann, & Furrer, 2009).

Theoretical Framework

Ryan and Deci's work on self-determination theory builds on the first mentions of intrinsic motivation from Harlow (Harlow, Harlow, & Meyer, 1950) in the 1950s. Ryan and Deci's work has gradually developed since the early 1970s as the preeminent theory on motivation and their self-determination theory served as the theoretical underpinning of this study. Ryan and Deci (2000) describe motivation as persistence at the tasks of life and work and that this persistence can be sustained by passions, creativity, and continuous efforts. Ryan and Deci identify autonomy, competence, and relatedness as the conditions that most significantly

foster an individual's sense of motivation. It is this drive to engage through the use of technology in the classroom that served as the focus of this study.

The dramatic rise in school accountability measures over the last thirty plus years has lead educational leaders and policy makers to seek new solutions for new challenges. National attendance patterns saw declines in the late 1960s and 1970s (National Center for Education Statistics, 1993) and *A Nation at Risk* (Gardner, 1983) sent shockwaves across the nation concerning academic progress. The result has been a growing expectation for schools to increase performance in academics, attendance, and graduation rates, forcing leaders and policy makers to search for ways to motivate and engage students in an environment that increasingly draws their attention in other directions. Motivational theories ranging from Maslow to the more recent engagement Theory (Kearsley & Schneiderman, 1999) and self-determination theory (Ryan & Deci, 2000) attempt to inform schools on policies that will improve performance and school engagement. These theories have gained increasing focus as the potential solution to decreasing academic motivation and achievement (Fredricks, Blumenfeld, & Paris, 2004). Kearsley and Schneiderman pose that students are effectively engaged through meaningful learning activities that involve collaboration with others around worthwhile tasks. Kearsley and Schneiderman also note that while it is certainly possible to achieve this type of engagement in a traditional classroom, interaction with technology allows for engagement at levels difficult to achieve otherwise. For school administrators, this potential link between technology and higher levels of engagement holds hope for increased school connectedness and attendance that play such an important role in academic achievement.

Research Questions

This study attempted to measure teachers' perceptions of the impact of a technology rich environment on student engagement for middle and high school level students. Previous research by Balfanz and Byrnes (2012) has identified factors related to poor attendance and related achievement, each of which is tied to lower socio-economic status which can be measured by percentage of students that qualify for Federal Free and Reduced Lunch program. Since districts with higher rates of Free and Reduced Lunch traditionally have lower student attendance rates, greater increases in attendance rates are expected than in districts with fewer students eligible for the Free and Reduced Lunch program. Specifically, this study attempted to answer the following questions:

What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

RQ1a: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

RQ1b: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

RQ1c: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ2a: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ2b: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ2c: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ3a: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ3b: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ3c: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Null Hypotheses

This study was designed to test the following null hypotheses:

$H_0$1: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

$H_0$1a: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

$H_0$1b: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

$H_0$1c: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

$H_0$2: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

$H_0$2a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$2b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$2c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

$H_0$3: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri.

$H_0$3a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher

self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$3b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$3c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Limitations/Delimitations/Assumptions

Limitations. The following limitations were present for this study:

1. Limited psychometric analysis of the survey instrument was available from previous uses, potentially limiting the validity of the study.
2. This study focused on teacher perceptions of how technology relates to engagement and does not attempt to connect perceptions of engagement to measures of students' achievement or success.
3. Quantitative analysis of perceptions for RQ1 was limited to comparing the means of the groups and unable to demonstrate causality.
4. Quantitative analysis of perceptions for RQ2 and RQ3 was limited to finding relationships and unable to demonstrate causality.
5. The study was limited to those middle and high schools in the Missouri DESE that have implemented a one-to-one technology initiative potentially resulting in a limited

diversity of districts based on socio-economic factors and limiting generalization of results beyond Missouri.

6. Purposive sampling of those districts willing to allow teachers to participate in the study further limited the ability to extrapolate results across the desired population of middle and high school students nationwide.

Delimitations. The following delimitations were present for this study:

1. The study focused solely on the state of Missouri and, as a result, may not be generalizable to other national regions.
2. The study focused only on public middle and high school teacher perceptions and therefore may not be generalizable to private, parochial, or charter schools or to the perceptions of students, administrators, or parents.
3. The survey instrument used was a self-assessment of both their students' level of engagement and their own technological proficiency.
4. The scope of the research was limited to comparing the differences of the means and identifying relationships between stated variables to support the theoretical framework potentially missing other variables.
5. The theoretical objective of the study proposed that technology implementation, as a variable, was related to engagement.
6. The study focused on comparing the differences of the means of data for RQ1 and identifying relationships within the data for RQ2 and RQ3.

Assumptions. The following assumptions were present for this study:

1. The researcher assumed that participants were honest with their responses.

2. The researcher assumed that participants met the criteria of teaching public middle and high school student in a Missouri district with a previously implemented one-to-one initiative.
3. The study assumed that the increased engagement and connectedness perceived by teachers is related to increased use of technology and may be generalizable to larger populations of students.
4. Statistical assumptions for *t*-test included:
    a. measuring the dependent variable of engagement on a continuous scale.
    b. an independent variable with two categorical groups of middle school and high school teacher perceptions.
    c. independence of observations, outliers, normality of the independent variable, and homogeneity of variances were tested for using SPSS during data analysis with effect size calculated after testing ($p < 0.05$).
5. Statistical assumptions for Pearson's product-moment correlation included:
    a. equally spaced interval variables.
    b. outliers removed during data cleaning
    c. normality of data and linear relationship as tested in SPSS.
6. Statistical assumptions for multiple regression analysis included:
    a. measuring the dependent variable of engagement on a continuous scale.
    b. multiple, equally spaced interval variables.
    c. independence of observations, outliers, homoscedasticity, linear relationship, and normal distribution of residuals as tested in SPSS with effect size calculated after testing ($p < 0.05$).

Design Controls

Data for this study were collected by survey and included demographic information in addition to a scaled rating of teacher perception on student engagement. The construct of engagement was used rather than achievement data as a means of measuring teachers' beliefs on the impact of technology. A survey approach was used as it,

> provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. It includes cross-sectional and longitudinal studies using questionnaires or structured interviews for data collection—with the intent of generalizing from a sample to a population (Creswell, 2014, p. 41).

As a result of measuring teacher perceptions, causality cannot be determined. The study was limited to public middle and high schools with a one-to-one program in Missouri to make the scope of the study reasonable and to align with the purpose of measuring the relationship between technology implementation and perceptions of engagement.

The initial survey was sent to all public Missouri school superintendents with middle and high schools within their district to control for selective participation by district and school level administration that may more significantly affect results of a smaller survey population. Including all public middle and high schools in Missouri through purposive sampling aligns with the stated goal of measuring middle and high school teacher perceptions while focusing on a manageable and accessible population. Participating districts were then asked to forward the teacher survey to the appropriate schools within their district to control for only surveying schools that have implemented a one-to-one program. Superintendents and participating teachers were presented with a description of the survey and were provided the opportunity to decline participating, as well as an option to opt out of the research at any time. Participation was

voluntary with consent gained through completion of the survey instrument. Responses were collected through QuestionPro and deleted at the completion of the research. Participation involved little to no risk with information regarding the purpose of the study, participation, anonymity, and confidentiality provided in the initial invitation to participate. Appropriate descriptive and inferential statistics were used to analyze the data with outliers, normality of variables, homogeneity of variances, and effect size ($p < 0.05$) were tested for using SPSS during data analysis.

Definition of Terms

For the purposes of this study, the following terms are defined:

One-to-one. A school or district initiative that provides each student with a technological device (e.g.-laptop, iPad, Chromebook) for use both in school and at home for school work (Fiorillo, 2015).

Student engagement. Willing, and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner et al., 2009).

At-risk student. Students who are susceptible to academic failure and dropping out due to various circumstances due to socioeconomic, attendance, medical or behavioral issues, or classification in special populations such as special education, or English language learners (Williams, Ernst, & Kaui, 2015).

High achieving student. Students who perform at, or show the potential for performing at, an outstanding level of accomplishment in at least one domain when compared to other students of the same age, experience or environment (Schmitt & Goebel, 2015).

Effective implementation. Implementation of a technology initiative supported by professional development, technical support and positive teacher attitudes toward student technology use (Cordell, Eckhart, Hauser, & McGriff, (2012).

Teacher perception. A teacher's observations of students and their actions (Abrams & Weidler, 2015).

Technological proficiency. A teacher's self-assessment of their own skills and abilities in utilizing technology in the classroom using the following rating levels and descriptors (Fiorillo, 2015).

Novice. Still learning to use the device / little to no class use.

Beginner. Uses some apps and accesses the Internet.

Intermediate. Creates class materials and assigns some projects via technology; makes use of some apps.

Advanced. Regularly uses technology; can and has helped other staff with technology.

Expert. Ability to use technology for assessment and collaboration; makes use of multiple apps and platforms and can help teach others the technology.

Summary

As school districts face increasingly stringent standards for achievement and graduation rates, school administrators continue to search for strategies that will increase student engagement, especially at the secondary level (Ross, 2018). Many districts across Missouri have looked to improvements in instructional technology, including one-to-one initiatives as a means of increasing the level of engagement for secondary school students (Persinger, 2016). The belief is that the current generation of students develops, at a young age, the ability and preference for

engaging with information through technological devices such as computers, tablets and smart phones (Project Tomorrow, 2019). The hope is that if schools can provide these devices for students, they will increase their ability to actively engage students in the learning process and develop a stronger connection between the student and the school (Pynos, 2016). It is this connection that administrators expect will improve factors related to attendance and achievement. This study will attempt to identify teacher perceptions on the relationship between a one-to-one initiative and student engagement.

Chapter Two presents a thematic review of relevant literature on factors affecting secondary school student engagement and the impact of technology on education. The review of literature begins with a historical look at motivation and its connection to engagement and related factors. Chapter Two finishes with a review of technology in education and implementation strategies. Chapter Three details the methodology of this study. Chapter Four presents the results of the study and Chapter Five lists researcher's conclusions and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Motivational theories from Maslow to engagement theory (Kearsley & Schneiderman, 1999) and self-determination theory (Ryan & Deci, 2000) provide information to schools on policies that will improve performance and school engagement and have gained increasing focus as the potential solution to decreasing academic motivation and achievement (Fredricks et al., 2004). Kearsley and Schneiderman pose that students are effectively engaged through meaningful learning activities that involve collaboration with others around worthwhile tasks. Kearsley and Schneiderman also note that while it is certainly possible to achieve this type of engagement in a traditional classroom, interaction with technology allows for engagement at levels difficult to achieve otherwise. For school administrators, this potential link between technology and higher levels of engagement holds the hope for increased school connectedness and attendance that play such an important role in academic achievement.

Ryan and Deci's work on self-determination theory builds on the work of intrinsic motivation from Harlow (Harlow et al., 1950) in the 1950s. Ryan and Deci's work has gradually developed since the early 1970s as the preeminent theory on motivation and their self-determination theory served as the theoretical underpinning of this study.

Ryan and Deci (2000) describe motivation as persistence to the tasks of life and work and believe that this persistence can be sustained by passions, creativity, and continued efforts. Ryan and Deci identify autonomy, competence, and relatedness as the conditions that most significantly foster an individual's sense of motivation. It is this motivation to engage through the use of technology in the classroom that served as the focus of this study.

The success of individual teachers and schools in general in achieving academic goals has come to rely heavily on engaging students in quality academic tasks. While engagement in academic tasks fluctuates throughout a student's school career, research indicates levels of engagement among students begin to drop in sixth grade and continue to fall throughout middle and high school (Cano, 2015; Willms, Friesen, & Milton, 2009). Given this decline in student engagement, it has become a point of emphasis in research dating back to the early 1970's.

Initially research into student engagement in academics was conducted as a means of providing greater opportunities for disadvantaged students as inequities appeared throughout our educational system. Over time, the construct of engagement has seen a transition to a means of establishing and maintaining classroom control with the belief that students engaged in academic content would be less likely to participate in behaviors requiring disciplinary intervention. More recently, engagement has been studied as a means of providing ways to help students develop metacognitive skills and learn how to learn most effectively (Callahan, 2018; University of Alberta, 2011). The significant increase in research related to engagement can be traced to evidence that supports engagement as a fluid state that can be affected by schools, either positively or negatively, to impact learning, achievement, attendance and graduation (Fortney, 2016; Skinner & Pitzer, 2012). Research also indicates that engagement is a process that relies on the teacher's ability to meet a student's needs at the appropriate developmental level by providing a rich learning environment with the support needed to increase participation in the learning process (Gregory, Allen, Mikami, Hafen & Pianta, 2013; Halliday, 2018; Hamre & Pianta, 2001).

The review of literature begins with a historical look at motivation and its connection to engagement. Factors that influence students' engagement from student and school characteristics

to teacher and student perceptions are addressed. Implications of engagement or disengagement on factors like attendance and achievement are reviewed before addressing the relevant research on technology in education implementation strategies.

Motivation

Motivation serves as a precursor for student engagement (Reschly & Christie, 2012; Schutte et al., 2017) with key components of the social environment identified that elicit greater degrees of intrinsic motivation as autonomy competence, and relatedness (Ryan & Deci, 2000). It is these components and their connection to technology integration that are significant to the concept of motivation and student engagement, thus the reason the self-determination theory of motivation was the framework for this study.

Stipek (1996) describes early research on motivation as having a focus on extrinsic motivation with behaviors being the result of reinforcement. Referencing the work of B.F. Skinner, Stipek refers to the idea that behaviors are governed by reinforcers. Rewards, serving as positive reinforcers are those that increase the likelihood of a specific behavior. Negative reinforcers, on the other hand, increase a desired behavior by removing a negative stimulus with punishment referring to negative consequence of an undesirable behavior. Stipek (1996) notes that these concepts would seem to simplify the role of an educator to promoting positive behavior with positive praise and academic marks while diminishing negative behaviors with low marks and negative consequences. Stipek summarizes her thoughts in this area with the reminder that rewards and punishments do not serve equally well on all students or behaviors and that the benefits of extrinsic motivation, when realized, typically decrease over time.

As the limitations of Skinner's ideas on extrinsic motivation in the classroom became evident, new approaches to student motivation have developed. As an example, cognitive

behavior modification asked students set personal goals, track their own performance, and apply appropriate rewards for achieving their goals. Research into this approach identified that students tended to set easily achievable goals and avoid challenging work or apply rewards when they were not earned (Speidel & Tharp, 1980; Troughton, 2018).

Given the limitations of earlier approaches, research in the 1960s and 1970s trended toward a focus on cognition rather than consequences as the major determinant of motivation. Maslow's (1970) early theory of motivation connects drive displayed by individuals as a means of meeting an underlying psychological need. Bandura's (1982) similar notion, relating motivation to self-efficacy and the idea that a belief in a student's ability to complete a task affected motivation and served as the primary force that led to effort and persistence with a task has been supported by research consistently (Howard, 2016; Major, 2016; Morsy, 2018). Pintrich and DeGroot (1990) and Lambert (2018) have also found self-efficacy to lead to use of a wider range of cognitive strategies and greater academic achievement.

From Harlow's first mentions of intrinsic motivation in the 1950s, it became clear that not all actions could be linked to behavioral needs to correct homeostatic imbalances as in Hull's (1943) drive reduction theory. Comparisons of individuals acting from a sense of intrinsic motivation with those acting based on extrinsic motivation indicate that intrinsic motivation leads to more interest, excitement, and confidence and that the result is greater productivity and creativity (Deci & Ryan, 1991; Garon-Carrier et al., 2016; Trenshaw, Revelo, Earl, & Herman, 2016). Over the course of the last fifty years, Ryan and Deci have sought to better understand motivation through development of their self-determination theory of motivation. Self-determination theory begins with the belief that individuals have natural tendencies toward growth, mastery of challenges, and integration of experiences (Ryan & Deci, 2000). These

natural tendencies elicit varying degrees of motivation, which are subject to the interaction of the individual with the social contexts of the environment. Those activities or behaviors that promote intrinsic motivation spark interest, enjoyment, and inherent satisfaction (Deci & Ryan, 1985; Taylor et al., 2014). Ryan and Deci (2000) identify key components of the social environment that elicit greater degrees of intrinsic motivation as autonomy, competence, and relatedness.

Within self-determination theory, Deci and Ryan (1985) developed cognitive evaluation theory as a sub theory that focuses on individuals' needs for competence and autonomy. Cognitive evaluation theory states that individuals have a need to feel as though they either have the knowledge and skills to be successful or that they have the ability to build the necessary knowledge and skills and that this feeling of competence positively influences motivation (Ryan & Deci, 2000, Siegle, 2017). This sub theory notes that there are events within the social environment such as positive performance feedback that lead to enhanced intrinsic motivation and elicit greater degrees of interest or satisfaction with tasks (Deci, 1975; Koenka, 2015). Cognitive evaluation theory also notes that competence alone does not enhance intrinsic motivation, but that it must be accompanied by a sense of autonomy, or belief that the behavior, and ultimately success, is self-determined (Ahn, 2014; Ryan & Deci, 2000). Finally, self-determination theory identifies relatedness as the third factor that can further affect intrinsic motivation. Individuals that feel a sense of security and relatedness with individuals or groups demonstrate higher levels of intrinsic motivation in similar social contexts to those lacking these qualities (Ryan & Deci, 2000; Sparks, Dimmock, Lonsdale, & Jackson, 2016).

Beyond CET, Ryan and Deci have developed five additional sub theories to self-determination theory. Each of these sub theories attempts to provide a context for motivation along a continuum from amotivation to extrinsic motivation. Organismic integration theory

focuses on extrinsic motivation and delineates types of extrinsic motivation through focus on properties, determinants, and consequences of described behaviors as they affect the degree of autonomy realized and integration resulting from a source of motivation (Ryan & Deci, 2000). Causality orientations theory describes an individual's tendency towards self-determination in regulating behaviors based on specific environments while basic psychological needs theory focuses on an individual's behaviors as being related to meeting needs for psychological health and well-being. Goal contents theory highlights the difference between extrinsic goals such as success and popularity with those of intrinsic goals like personal growth and the connection to behavioral regulation. Finally, relationships motivation theory focuses on development of close personal relationships as a consequence of specific behaviors (Ryan & Deci, 2000). Each of these sub theories attempts to provide context for individual factors that play a role in determining the level of self-determination associated with motivation.

Motivation Theory in Education

More recent work connects motivation to schools and defines academic motivation as a student's feelings towards learning in school; their curiosity and determination as it relates to difficult academic tasks (Gottfried, 1990; Korpershoek, Kuyper & van, 2015). Weiner (1986), according to attribution theory of motivation, identified four types attribution (ability, effort, task, and luck) that play a role in an individual's level of motivation for a given task. Those that attribute success or failure to ability, task difficulty, or luck will experience less motivation as they feel success is outside of their control while those attributing success of failure to effort believe that they are the primary driver of their own success (Bradley, 2015; Weiner, 1986). In a similar fashion, Eccles and Wigfield (2002) and Aijaz and Aijaz (2014) identified locus of

control as a primary driver of motivation and similar to the work of Connell and Wellborn (1991) and German (2017) as a way of attaining competence or autonomy.

The early work of Maslow and others can be traced to more recent work that includes expectancy-value theories, intrinsic motivation theories, and self-determination theory (Broussard & Garrison, 2004; Howley, 2015). Eccles and Wigfield (2002) along with Federici and Skaalvik (2014), and Koh (2016) identified four separate incentives that determine the value of a task for students and, as a result, level of motivation. Those four components include cost, or potential negative outcomes of a task that may include chance of failure; utility value, or potential for leading to achievement of a specific goal; intrinsic value, or likelihood of having interest in a task; and attainment value, or desire to perform well on any given task. While the intrinsic value of a task can vary widely among individuals, research supports the notion that interest in a task, whether personal or situational, connects with greater achievement. Personal interest refers to interest with a specific topic, while situational interest might refer to a task, regardless of topic, that sparks an emotional connection for a student (Hidi & Harackiewicz, 2000; Knogler, Harackiewicz, Gegenfurtner & Lewalter, 2015; Otundo & Garn, 2016). Broussard and Garrison (2004), Skaalvik (2018), and Skaalvik and Federici (2016) also noted that a student's individual goals, both mastery and performance, can affect motivation. Mastery goals, most closely linked with intrinsic motivation, focus on growth and learning, while achievement goals, typically linked to extrinsic motivation, focus on greater achievement (Olguin, 2017; Stover, Hoffmann, de la Iglesia, & Fernandez Liporace, 2014). Eccles and Wigfield (2002) noted that mastery goals are those that typically connect to greater outcomes in persistence, self-regulation, and creative problem solving, and are linked to effort attribution.

Engagement

The gradual increase in research around student engagement as an important factor in education has led to a variety of definitions and characterizations of the construct (Ashwin & McVitty, 2015). Likewise, a number of different of metrics have been applied to provide support for the importance of engagement to include attendance, discipline, grades, and performance on standardized assessments (Cano, 2015; Meyer, 2007; Swayne, 2017). Given that student engagement declines as students pass from elementary grades to middle and high school, understanding the concept and factors that influence engagement becomes more significant as students age (Cano, 2015; Parsons, Nuland, & Parsons, 2014).

Mahatmya, Lohman, Matjas, & Feldman Farb (2012) and Aker (2016) have separated engagement into three distinct types: behavioral, emotional or affective, and cognitive. They describe behavioral engagement as relying on specific participation in school related activities. Academic activities can include in class attendance and task and homework completion. Social engagement may include participation in non-academic events both in and out of the school day from volunteering with school events to attendance at social activities like sporting events and dances. Behavioral engagement may also include participation in extracurricular activities to such as clubs and teams. Behavioral engagement can best be described as including positive efforts, concentration and persistence demonstrated through actions like involvement in academic tasks and asking questions in addition to a lack of disruptive behaviors in the classroom or absence from class.

Emotional engagement describes a student's affective state in the classroom, ranging from boredom to excitement, enjoyment to dislike, and a sense of calm to anxiety. These affective states are exemplified through a student's reaction to teachers, peers, and schoolwork and play a

significant role in a student's feeling of connectedness to school. Cognitive engagement refers to willingness to remain focused on challenging academic tasks and persist through difficulties to a successful conclusion (Aker 2016; Mahatmya et al., 2012) and may be referred to as persistence or, more recently, as grit.

More recent, additional research on student engagement has often added a fourth, and separate dimension of academic engagement to the three part construct (Furlong & Christenson, 2008). Academic engagement is specifically described as amount of time students spend on tasks directly related to classes such as homework or projects. At the secondary level, this may also be measured in number of credits a student earns as they progress towards graduation.

For the purposes of this study, the focus was on cognitive engagement using a definition of willing, and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner et al., 2009). Skinner and Pitzer (2012) and Yang (2014) have similarly portrayed engagement as a process of academic resilience that allows students to more effectively deal with stressors and challenges in the school environment. They have identified this kind of engagement as critical to student success for a number of reasons. Not only is a high level of cognitive engagement essential for students to learn, it also plays a significant role in their social and psychological experiences at school. Being able to attend to challenging tasks and to maintain that focus through the difficulties of cognitive strain are essential to academic progress. Additionally, engagement and the success that results creates more positive interactions with teachers and results in more instructional support as the student is viewed as being invested in their own success. Similarly, Schlechty (2001) and Chi (2014) noted that engaged students are involved in their own learning and that they demonstrate greater persistence to accomplish desired goals even when working on challenging tasks and they develop skills to work with

others and solve problems creatively. Conversely, Schlechty (2001) noted that tasks or environments that reduce engagement, such as repetitive or mindless work lead to ritual compliance or rebellion while providing meaningful choices increases engagement (Parker, Novak, & Bartell, 2017).

Engagement and Motivation

One of the long-standing questions around student engagement is connection to the broader concept of motivation and its relationship to achievement. Developing motivation as children progress through school is essential, as it has been identified as a predictor of motivation in adulthood (Broussard & Garrison, 2004; Lee, 2014). Research has also shown a link between motivation and intelligence and achievement in reading and math (Taylor et al., 2014; Gottfried, 1990) in addition to studies indicating that students working from a perspective of intrinsic motivation achieve at higher levels, demonstrate less anxiety, and form higher perceptions of competence and engagement (Garon-Carrier et al., 2016; Taylor et al., 2014; Wigfield & Eccles, 2002). Lange and Adler (1997), Garon-Carrier et al. (2016), and Taylor et al. (2014) noted that the relationship strengthens as students age, with motivation predicting higher achievement and self-efficacy as students progress through elementary grades.

At different periods, engagement and motivation have been viewed as both synonymous and as distinct but related concepts. This is especially true of emotional or affective engagement, seen as an internal state where positive affect would presumably lead to engagement. Current research describes motivation as the basis for engagement with motivation serving as intent and engagement as the action that follows from the intention (Reschly & Christie, 2012; Schutte et al., 2017), while Meyer and Turner (2006). Lambert (2018) identifies cognitive engagement and motivation as synonyms with key components being use of strategies like paying attention and

planning as examples of self-regulated learning strategies. Similar to Reschly and Christie, Appleton, Christenson, and Furlong (2008) and Trenshaw, et al. (2016) describe motivation as a measurement of one's energies and how they are directed while engagement as "energy in action." From this perspective, motivation is a necessary precursor to engagement, but in itself is not enough to ensure engagement.

The intrinsic value of a task connects to the idea of intrinsic motivation or that of integrated regulation that is part of self-determination theory, which has been shown to result in better learning outcomes than extrinsic motivation (Skinner et al., 1990; Taylor et al., 2014). Current research into self-determination theory is supported by Reeve (2012), Naughton (2016), and Orsini et al. (2016) who identify motivation as arising from a variety of sources ranging from basic needs to emotions and environmental effects. For the purposes of student engagement, Reeve subscribes to the needs-based perspective of self-determination theory posed by Ryan and Deci. Self-determination theory approaches motivation from the view that people, as individuals, have natural tendencies toward cognitive, social, and emotional growth, mastering challenges, and developing a sense of self from new experiences. Naughton (2016) identifies engagement as coming from a student's motivation derived from psychological need for satisfaction with one's self. A student that believes they have a strong sense of autonomy, competence, and relatedness to their teacher, peers, or class work will experience higher levels of motivation leading to cognitive engagement (Parker et al., 2017). Conversely, students lacking motivation due to gaps in one or more of these areas tend to demonstrate lower levels of engagement due to a lack of motivation. From Reeve's perspective, motivation is a private state, externally unobservable, while engagement is resultant observable behavior that manifest from motivation. Schlechty (2002) and Chi (2014) noted that students that indicated they were

working from a sense of intrinsic motivation demonstrated a higher degree of authentic engagement in the classroom while students working from a sense of extrinsic motivation demonstrated lower levels of engagement and even rebellious or retreatist behaviors.

A second and equally important point to self-determination theory is the understanding that there is a reciprocal relationship between the motivation level of students and their environment. Reeve (2012) and Naughton (2016) describe students as naturally having motivational resources that make them capable of displaying strong engagement with their learning. Conversely, the learning environment contains factors that affect student motivation and engagement. A teacher and learning environment that provides opportunities for students to experience autonomy, competence, and relatedness will create greater degrees of motivation and engagement while a learning environment lacking these qualities will naturally decrease motivation and engagement (Parker et al., 2017). While it is clear that motivation and engagement in academic activities share a close connection, moving forward, this study will focus on engagement, as a more observable phenomenon resulting from motivation.

Factors Affecting Student Engagement

Research indicates that there are wide varieties of factors, both in and outside of the school environment, that directly or indirectly affect student engagement. Meyer and Turner (2006), Cavanagh (2015), and Parsons et al. (2014) found that maintaining a high level of student engagement in the learning process relies on providing positive emotional experiences in order to promote a positive classroom climate that can serve as the basis for teacher-student interactions and relationships needed to create motivation for learning. Similarly, Furlong and Christenson (2008) and Cavanagh (2015) describe engagement as a state that is significantly affected by environmental factors and the degree to which they provide support for learning. These factors

can range from student perceptions to student-teacher relationships and from parental to peer support. These findings are based on the assumption that all students have an innate source of motivation that is neither created nor destroyed, but can be nurtured or extinguished by their environment (Skinner & Pitzer, 2012). Johnson (2014) and Fredricks et al. (2004) noted that while many factors affect engagement, it is a malleable state that is both responsive to the environment and adaptable to environmental change.

Student Characteristics. Student cognitive and motivational-affective characteristics have been identified as strong indicators of engagement and prerequisites for producing successful learning outcomes (Jurik, Gro¨schner, & Seidel, 2014). Jurik, Gro¨schner, and Seidel (2013) along with Hughes, Hee Im, and Allee (2015) also noted that these positive cognitive and motivational-affective attributes correlate with higher levels of verbal engagement in the classroom, especially for girls. One of the motivational-affective factors that can affect a student's level of motivation and engagement is their own mindset (Brooks, Brooks, & Goldstein, 2012; Goodman, 2017; Tang, Wang, Guo, & Salmela-Aro, 2019). While Lietaert, Roorda, Laevers, Verschueren, and de Fraine (2015) and Rogers, DeLay, and Marting (2016) noted that boys were typically less engaged than girls in school tasks and Hughes et al. (2015) found that conforming to traditional masculine roles predicted decreased engagement for both boys and girls in middle school, Brooks et al. (2012) found that motivated students shared five specific characteristics that led to higher levels of engagement. These students felt that their teachers genuinely cared about them and about their success. These students also reported both a comfort level with seeking assistance from their teacher, and more importantly, they viewed this as a requisite step in their learning, rather than a weakness. A third characteristic reported by Brooks et al. is the student belief that their learning can be directly attributed to their own levels

of motivation and effort. Finally, these students recognized that mistakes and gradual progress were natural parts of the learning process rather than a problem and these students had developed an understanding of their own strengths and weaknesses through metacognitive practices. Additionally, students that displayed high levels of motivation and engagement also tended to treat peers with greater respect and avoided negative behaviors like bullying as they viewed them as detrimental to an overall positive school climate.

Teacher Relationships and Perceptions. Similar to the impact of student mindset, teacher mindset can affect student engagement. Urhahne (2015) noted that students who's ability was underestimated by their teacher showed lower motivation and emotion than peers who's performance was overestimated indicating that a teacher's perception and resulting relationship with students can impact engagement and performance. Similarly, Zee and de Bree (2017) found that how students feel their teacher perceives them impacts motivation and engagement. If students perceived that their teacher had a positive relationship with them and saw their potential, they exhibited higher degrees of engagement in the classroom.

Brooks et al. (2012) and Glos (2018) identified a number of teacher held beliefs that had a positive impact on student engagement. Teachers that understand the long-range impact they can have on students, believe that student motivation is a key factor in learning, and believe that all students desire to be successful typically elicit higher levels of engagement. Similarly, teachers that see value in supporting students' social-emotional needs, understand the importance of developing relationships with students, parents, and colleagues and see discipline as a teaching process that helps students develop their own self-discipline experience higher levels of engagement. Additionally, teachers that help students develop a sense of ownership over their learning, understand that fear of humiliation can be a deterrent to learning, and build off

students' strengths have higher levels of engagement (Brooks et al., 2012; Glos, 2018). Diseth, Danielsen, and Samdal (2012) noted that teachers that supported students' achievement goals and overall life satisfaction goals created higher levels of engagement and achievement.

In addition to teachers' perceptions of students and beliefs about education, research supports the notion that their relationship with students play a significant role in engagement. Engels et al. (2016) found that positive teacher-student relationships correlated with increased behavioral engagement and that negative teacher-student relationships correlated with less behavioral engagement. Similarly, Košir and Tement (2014) noted that students reporting positive relationships with teachers experienced greater academic success. Berman-Young (2014) and Wentzel (1997) noted that students reported that teachers with whom they had positive relationships made class interesting, and were viewed as fair while those teachers viewed as uncaring were more likely to embarrass students or refuse to clarify misunderstandings and that those teachers described as caring elicited greater motivation and engagement from students.

Student Perceptions. Students' perceptions around motivation also play a significant role in engagement. In addition, while there are limited studies pertaining to student perception of teacher leadership style and personality (Eryilmaz, 2014). Berman-Young (2014) and Appleton and Lawrenz (2011) noted that student and teacher perceptions often did not match, with teachers typically reporting higher levels of engagement than students. It was also noted that teacher perceptions of student engagement were more closely aligned with perceptions of outside observers than student perception. Students reported that disengagement in the classroom was typically related to academic tasks that lacked connection to their lives and developmental needs (Pianta, Hamre & Allen, 2012). Those activities that failed to elicit engagement were

described as irrelevant and lacking in meaningful academic challenge. Reports of instructional activities that fit these descriptions were significantly higher in those populations in low income and rural communities and for those students demonstrating patterns of low achievement or disruptive behaviors. Conversely, students that reported supporting relationships and interactions with teachers that led to personal connections demonstrated significantly higher cognitive engagement (Kelly & Zhang, 2016; Parsons et al., 2014; Pianta et al., 2012). Again, these characteristics, as reported by students, had a greater impact for students from low-income communities and those students with a pattern of poor academic and social development. Students also identified specific instructional practices that they perceived correlated with higher measures of student engagement. Instructional practices that increased engagement included those that allowed for interaction with peers, encouraged discussion or allowed for expression of student viewpoint (Day, 2016; Finn & Zimmer, 2012). Other instructional practices that increased engagement included strategies that promoted inquiry and metacognition.

Instructional Practices and Approaches. Research independent of student perception has identified instructional practices that promote increased levels of motivation and engagement among students. In addition, while it is not reasonable to expect every student to work from a source of intrinsic motivation at all times, Williams and Williams (2011), along with Pennington (2016) and Day (2016) identified that a balanced approach to instruction in the classroom will include aspects that elicit both intrinsic and extrinsic motivation and result in greater engagement. Meyer (2010) and Alexander (2017) noted that, while no single teacher or classroom characteristic can alone determine a student's level of motivation, if we desire to know our students and create these engaging classrooms for them, then we must listen to what they have to say.

Erz (2018) identified learning tasks and environments that students and teachers could manipulate to suit their own needs with degrees of challenge as an important aspect and being key to increased engagement while Glassman (2016) identified tasks that are relevant to students and contain variety, novelty, and diversity as important in promoting engagement. Additionally, cumulative use of choice, challenge, feedback, collaboration, and real-life significance correlated with student engagement (Glassman, 2016). Engaging tasks are those with a moderate level of challenge, that allow for a degree of student control and utilize short term goals for tracking progress (Guthrie & Klauda, 2014) Guthrie and Klauda noted that classrooms with a high degree of engagement and self-regulated learning utilized instructional tasks that were complex and allowed students to make choices in how they addressed multiple goals extending over greater periods of time and resulting in creation of a variety of products to demonstrate learning. Guthrie and Klauda also noted that tasks that focused on a narrow range of information and led to predetermined solutions decreased student engagement. These tasks were found to be even more impactful in creating engagement for low achieving students (Glassman, 2016).

In addition to specific instructional tasks, research has identified classroom characteristics identified with increased motivation. Skinner and Pitzer (2012) and Erz (2018) identified that classrooms containing a degree of structure promoted engagement while instructional practices that provided authentic and challenging tasks that were relevant to students' lives also had a positive impact on engagement. Hands on projects, that required thought across curricular areas and connected with students' experiences in addition to project based activities and those that allowed for a degree of student choice or to work in collaborative groups were all shown to increase engagement in learning (Guthrie & Klauda, 2014; Skinner & Pitzer, 2012). Similarly, Lam, Wong, Yang, & Liu. (2012) identified six aspects of engaging instruction including

challenging work with real-life significance that promoted curiosity and autonomy and was supported by recognition and evaluation. Pianta et al., (2012) noted that instructional practices that included frequent feedback, social discourse among students, a variety of learning formats, and high degrees of productivity were also correlated with increased engagement.

Motivation and engagement in the classroom has also been linked to classroom learning environment and teacher behaviors. Specifically, Eversgerd (2014) found that teachers that adapted instruction to the needs of their students and regularly provided scaffolding for students as they approached challenges faced fewer avoidance behaviors. Additionally, Inda-Caro, Maulana, Fernandez-Garcia, Pena-Calvo, and Helms-Lorenz (2018) and Parsons et al. (2014) noted that specific instructional practices that promoted student motivation and engagement. Practices included providing clear expectations and motivational messages, providing feedback and promoting effective strategies, and displaying positive emotions about the learning process and students (Parson et al., 2014). Shirley-Brown (2018) noted that teachers that used a variety of methods and took a student centered approach that built on student interests and skills and focused on depth of coverage and problem solving realized greater student motivation and engagement.

Peer Relationships. While Kiuru et al. (2014) and Schnell (2014) noted that students' task focus and academic performance can be improved by increasing supportive relationships with peers, parents, and teachers, Juvonen, Expinoza and Knifsed (2012) identified a strong relationship between peer relationships and engagement, especially in secondary schools. Their findings showed that a greater sense of belonging and school community led to higher levels of school satisfaction and engagement. Juvonen et al., also noted that a student's' friendships in school tended to amplify behaviors. For students experiencing success, friendships tended to

create a higher level of engagement, whereas students struggling in school tended to become more disengaged as a result of peer relationships. What is unclear is whether the effects are related to friend selection or pressure exerted by friends. Research has also shown that students that associated with high performing groups of students tended to increase their own levels of achievement while students associating with students that had lower levels of achievement tended to see a decrease in their own achievement (Davis, 2016; Juvonen et al., 2012). Additionally, middle school students that reported having close friends that they perceived as successful became more engaged in school themselves while those middle school students that reported having friends that they viewed as disruptive displayed more of their own disruptive behaviors as the year progressed. Engels et al. (2016) also noted that students identified as having higher likeability and higher popularity demonstrated lower levels of behavioral engagement over time. Finally, Juvonen et al., (2012) and Davis (2016) showed a link between negative peer interaction and increased absenteeism and truancy in secondary schools as well as finding a link between students that reported being bullied and a decrease in academic achievement throughout middle school.

Parental Impact. Parents serve as the first and most significant educators in a student's life, and serve as guides for their children as they navigate through the educational system. As result, they have a great ability to either mitigate or exacerbate the risk factors related to disengagement and low achievement that their child will face. Bempechat and Shern (2012) and Palmer (2016) noted that the beliefs of parents profoundly affect a student's own perceptions about their intellectual abilities and the importance of education. Additionally, the socialization that parents provide will help to foster the skills that will increase chances of success in school. These practices can range from asking questions about assignments to promote thinking skills to

the motivational strategies parents employ to increase persistence and develop an understanding of the concept of delayed gratification. Palmer, along with Mac Iver et al. (2015) also note that the degree to which parents are involved in and support their child's education can impact factors from effective transition to upper grades, GPA and test scores, attendance, graduation and general engagement in the educational process. While a students' academic performance is improved by the support they receive from peers, parents, and teachers, their student's sense of relatedness to their parents was identified as more significant to engagement and success (Kiuru et al., 2014).

School Climate and Engagement. In addition to research on engagement, research into school climate continues to gain in popularity as improved school climate is seen as another potential approach to improving educational outcomes for students. More recently, research on the relationship between school climate and engagement has grown in popularity. Growth in this area of research may be linked to results that showed that students' perceptions of classroom environment and level of teacher to student and student to student support (Jia et al., 2009; Lewis, 2015; Ryan & Patrick, 2001) in addition to the teachers promotion of positive interaction (Gauley, 2017; Patrick, Ryan, & Kaplan, 2007) were related to positive motivation and engagement. Results of studies like that of Bear, Gaskins, Blank and Chen (2011) and Yang, Sharkey, Reed, Chen, and Dowdy (2018) showed a negative correlation between school climate and suspension rates and a positive correlation with academic achievement have likely also brought school climate to the forefront.

Research on the role of school climate indicates that student perception of a positive school climate is related to increased behavioral and cognitive engagement and academic achievement and reduced victimization (Konold, Cornell, Shukla, & Huang, 2017; Wang &

Holcombe, 2010; Yang et al., 2018). Additional research indicates that students participating in social-emotional learning report improved school climate and experience positive outcomes in behavior and academic achievement (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Gauley, 2017). Cornell, Shukla, and Konold (2016) reported that schools with a more authoritarian climate in which rules are strict but fairly enforced and student supports are in place experienced greater engagement and higher grades.

Implications of Engagement and Disengagement

The impact of engagement, in both behavioral and affective realms, has far-reaching implications for students ranging from academic achievement to social and emotional wellbeing (Washor & Mojkowski, 2014). Clark (2017) noted a relationship between engagement and school wide achievement while Manwaring (2017) noted that engagement was associated with desired outcomes such as academic achievement, retention, and graduation. Chen, Yang, Bear, and Zhen (2013) noted a strong positive correlation between overall engagement and academic achievement with further correlation noted between all three domains of engagement (behavioral, emotional, and cognitive) and levels of achievement. Finn and Zimmer (2012) and Revelas-Nichols (2015) noted that engaged behaviors from paying attention to homework completion to arriving at school prepared increased academic achievement across grade levels when compared with less engaged peers. Additionally, they noted that the relationship between engagement behaviors and achievement was even more pronounced for students from high poverty areas or families with English as a second language. Gettinger and Walt (2012) and Revelas-Nichols (2015) describe the importance of active engagement time (AET) as a predictor of academic achievement even while identifying patterns that point to a lack of AET in many classrooms. For many students, as much as half of each school day is spent in activities that do

not involve engagement in learning activities resulting in AET figures ranging from 28-56% of a school year. Additionally, in many classrooms, the level of on-task behaviors may be as low as 45% resulting in alarmingly small amount of true engagement over the course of a school year. Engagement behaviors were also correlated with development of traits like persistence that provided benefits ranging from an ability to work through difficult problems to continuing education through high school graduation to entering into postsecondary education (Finn & Zimmer, 2012; Manwaring, 2017). These higher levels of engagement behaviors had a cyclical effect of leading to more engagement behaviors while disengaged students achieved at lower rates leading to lower levels of engagement. Engagement behaviors have immediate implications for current levels of academic achievement in addition to affecting long-term outcomes from future achievement to an ability to overcome obstacles both in and outside of school.

In addition to behavioral engagement, affective engagement, often described as connectedness to school, has been linked to a number of significant outcomes for students. Abubakar and Dimitrova (2016) noted that students reporting a feeling connectedness to their school demonstrated higher levels of motivation and behavioral engagement than their less connected peers. Yang et al. (2018) and Griffiths, Lilles, Furlong, & Sidhwa (2012) noted that affectively engaged students were less likely to bully others or be victims of bullying themselves and were less likely to carry weapons. This factor was more pronounced for engaged students from diverse backgrounds. Yang et al. (2015) and Griffiths et al. (2012) also identified higher levels of student engagement to be correlated with a variety of healthy behaviors, especially in teens, ranging from safer sex to higher levels of physical activity and healthier eating habits and nutrition. Students reporting a feeling of connectedness to their school also tended to report a better overall level of mental health as well as lower risks for depression and suicidal ideation.

Similar to positive impacts of engagement, disengagement, whether behavioral or affective has been linked to a variety of negative consequences for students both in and outside of school. Most notably, behavioral disengagement has been correlated to lower rates of academic achievement in the short term, leading to significantly higher dropout rates in the long term (Chi, 2014; Day, 2016; Gauley, 2017). Additionally, Finn and Zimmer (2012) and Yang et al. (2018) noted that students with lower levels of affective engagement or connectedness displayed significantly higher rates of negative behaviors both in school and in the community. These students reported beliefs that their teachers and peers did not view them in a positive light and felt that school culture actively rejected them (Griffiths et al., 2012) Disengaged students were more likely to possess or use alcohol or drugs on school ground in addition to displaying antisocial or delinquent behaviors at school (Finn & Zimmer, 2012; Jackson, 2015). Griffiths et al. (2012) and Jackson (2015) noted that disengaged students or those that felt alienated from school were more likely to engage in negative behaviors such as conduct problems or fighting while at school and were more likely to actively resist teacher directives when compared with their engaged peers. In addition to engaging in a higher rate of negative behaviors in school, disengaged students were also more likely to have problems outside of school (Robinson, 2016). Disengaged students had higher rates of substance abuse and were more likely to participate in aggressive behaviors outside of school. Additionally, teenage girls that did not feel connected to their school had an increased likelihood of pregnancy (Griffiths et al., 2012). Perhaps the most significant impact of low levels of affective engagement is chronic absenteeism. Students that feel disconnected from their school have lower rates of attendance and, as a result, lower achievement (Finn & Zimmer, 2012; Yang et al., 2018). Engaging students in the schooling process and developing a connectedness to the school community plays a vital role in increasing

attendance to allow students to leverage greater attendance towards more positive academic outcomes for students.

Student Attendance as an Indicator of Engagement

The success of the American educational system is based on the idea that students will be in attendance on a regular basis (Osborne, 2015). This concept is supported by compulsory attendance laws in addition to school funding formulas based on average daily attendance and accreditation reviews that include attendance as a measure of an effective school (Balfanz & Byrnes, 2012). Every school, district and state measures attendance rate of their students as a population, but few, until recently, have made a point of looking beyond attendance as a single value representing the portion of students in attendance for a given day or school year. Statistically, a school could boast an overall attendance rate of ninety percent while having more than a third of their students identified as chronically absent (Bruner, Discher, & Chang, 2011). Recently, more states, including Missouri, have begun to look at attendance at a deeper level. Under current Missouri School Improvement Program, a school's attendance is measured as percentage of students that maintain at least ninety percent attendance (Missouri Department of Elementary and Secondary Education, N.D.). So, while it is becoming more commonplace to look at attendance for individual students, only a handful of states collect data on students that are chronically absent and these states tend to define chronic absenteeism differently. As a result, identifying rates of chronic absenteeism across the nation is difficult due to both a lack of data and a lack of consensus on what constitutes chronic absenteeism (Balfanz & Byrnes, 2012). Conservative national estimates for chronic absenteeism, based on extrapolation of available data, indicate that ten to fifteen percent of students are not regularly attending school. The rate is nearly three times as high for students eligible for the federal free or reduced lunch program

(Balfanz & Byrnes, 2012) with Tafelski, Hejnal, Maring, McDowell, and Rencher (2016) and Brandon (2016) noting that reduced attendance is the most significant indicator of student disengagement and Helms (2016) noting that attendance is a major component in success of a student.

Balfanz and Chang (2013) identified three primary categories that described why students do not regularly attend school. In the first category, identified as discretion, either students or parents fail to realize the importance of attending daily and choose instead to set other activities as greater priorities over school. Under the second category, known as aversion, students choose to avoid school due to reasons ranging from poor academic success to bullying or anxiety. In the third category, barriers related to the student's family situation prevent attendance. These barriers may include poor health due to a lack of access to health care, family responsibilities, lack of dependable housing or transportation, a need to contribute to the family financially, or participation in the juvenile justice system. In each of these circumstances, students and families fail to realize the importance of daily attendance and its role in long-term success.

Factors that Affect Attendance for Middle and High School Students

As students enter middle and high school, it is common for many parents, especially in lower socioeconomic areas, to decrease their direct involvement in the schooling process. The result is that students now play a more significant role in the decision on whether or not to attend school. Given this information, it is essential to identify those factors that students consider when deciding to attend (Balfanz, Herzog & MacIver, 2014; Chang, 2014; Chang, 2016). Henry (2007) identified that the most common predictors of absenteeism for eighth and tenth graders were the level of education attained by parents, amount of unsupervised time outside of school, drug use, and general school disengagement factors. Benner and Wang (2014) noted that students with

lower attendance rates or generally less success in middle school typically saw greater decreases in their attendance in high school making it even more important to address attendance concerns early.

Chang (2016) found that those students with regular attendance typically shared different characteristics than those with a history of chronic absenteeism. Students that missed a significant number of school days, typically had a lower view of their own academic abilities, perceived that they came from less cohesive families with less parental acceptance and inconsistent discipline, and engaged in higher rate of behaviors described as antisocial. Blevins (2009) found that students identified as chronically absent had higher rates of substance abuse, felt as though their teachers did not care if they attended, and most often preferred to stay home when not in attendance. The only factor Blevins identified as positively affecting attendance decisions was a student's involvement with a truancy court or officer.

School Specific Factors that Affect Attendance

Students often identify factors that are specific to their school or individual situation as key in determining attendance; many of these factors are directly related to the degree of engagement with the school community and learning process. Students that report enjoying the relationship they share with their teacher or their teaching style have significantly higher attendance rates (Glos, 2018; Košir & Tement, 2014). Factors ranging from class and school schedule to specific learning environments and relationships with peers as key components in the decision (Engels et al., 2016). Perzigian (2015) and Hallam and Rogers (2008) identified quality of the learning environment as another factor to impacted students attendance. Van Eck, Johnson, Bettencourt, and Johnson (2017) noted that the overall school climate is related to the rate of chronic absenteeism in schools among adolescents. Classrooms with inviting, supportive

teachers that maintained high expectations for their students and use a broad range of strategies to engage students had a positive impact on student attendance. Additionally, administrative factors such as punishment for poor attendance and even a strict dress code can have a negative impact on as student's decision to attend. Fort (2004) also discovered that implementation of strict attendance policies with punitive measures typically did not have a positive impact on an individual student's decision to attend. Stempel et al. (2017) noted that childhood exposure to adverse childhood experiences increased the likelihood of chronic absenteeism and was associated with reduced graduation rates and poorer long-term health.

Epstein and Sheldon (2002), Stoudenmire (2015), and Smith (2018) noted that a variety of family and community partnerships have been identified at related to increased attendance rates and decreased chronic absenteeism. Maynard (2010) found that parental involvement programs, when paired with a behavioral component for the student showed more affects attendance than a behavioral program without a parent component.

The Impact of Technology on Education

Today's students exist in a technology-filled world. Project Tomorrow (2011) found that among middle school students, more than a third had access to a smart phone and approximately 60% had personal access to a laptop. The numbers at the high school level jump to 44% with a smart phone and 67% with access to a laptop. Proponents of increased technology in education have long espoused the notion that increasing a student's access to technology as a part of the learning process provides significant dividends as teachers develop a greater variety of means with which to reach students (Pynos, 2016; Steiner, 2017). This notion is supported by parents, with eighty-three percent endorsing use of technological tools in the classroom and two-thirds supporting the notion that these tools will help develop skills for the future (Evans, 2018).

However, Thompson (2017) notes that perceived value of educational technology varies among racial and ethnic groups.

Darling-Hammond, Zielezinski, and Goldman (2014) and Smink and Reimer (2005) identified technology as a way of creating a greater level of interest and engagement for students and reducing educational disparities and thereby improving the learning process. Similarly, the majority of research supports the notion that technology associated with a one-to-one environment correlates with increased student engagement (Bebell & Kay, 2010; Dunleavy, Dexter & Heinecke, 2007; Greaves et al., 2012; Grimes & Warschauer, 2008; Penuel, 2006; Project Tomorrow, 2019; Pynos, 2016; Silvernail, 2011; Silvernail & Lane, 2004; Suhr, Hernandez, Grimes, & Warschauer, 2010; Zucker & McGhee, 2005) with increased improvements beyond the first year of implementation (Glaze, 2018; Sauers & McLeod, 2012). As a result, an increasing number of districts are implementing technology initiatives that range from interactive whiteboards in classrooms to wireless connectivity to one-to-one device initiatives in which all students are provided with a personal device used to enhance instruction both at school and at home.

Greaves et al. (2012) and Glaze (2018) reported that a one-to-one initiative with proper implementation can improve a wide range of educational factors including discipline, achievement on standardized tests, dropout rates and graduation rates. While Culver (2017) noted that teacher's perception of technology and its impact plays a significant role in the implementation process and Heath (2017) noted that teacher self-efficacy is correlated with increasing student engagement. Yeldell (2017) identified years of service and tenure status as factors that correlate with levels of concern in the implementation process.

In a 2008 policy brief, the International Society for Technology in Education (ISTE) noted that increasing a student's access to technology showed increased achievement in math, science, communication arts and foreign language. Additionally, Evans (2018) and Diemer, Fernandez, and Streeply (2012) found that students reporting higher levels technology integration also reported higher levels of engagement. Students incorporating technology into learning experienced increases in positive feedback and optimism, an increased belief that their learning had improved, and increases in their own perceptions of motivation and self-efficacy (Kyanka-Maggart, 2013).

While Morris and Parker (2014) and Glaze (2018) found that using technology in the classroom was alone not enough to improve student engagement, a report from a task force created by ISTE, State Educational Technology Directors Association and Partnership for 21st Century Skills (2007) concluded that a properly implemented technology program can increase learning productivity and student engagement in addition to providing a financial savings to a district. In a 2013 report, the Hanover Research group found that the New Tech school model, in which, one-to-one technology is a key component, experience higher levels of achievement and attendance in addition to lower dropout rates than traditional high schools.

Technology and Diverse Learners

Inclusion of educational technology, as in one-to-one programs, has been identified as a means of facilitating academic growth for high-performing students (Abernathy, 2019) through offering opportunities to explore advanced content and express creativity (Siegle, 2017). Similarly, technology provides opportunities to create equity in schools for at-risk students through access to learning materials outside of the classroom, tools to personalize learning, and data to make informed decisions (Anderson, 2019). Lewis, Whiteside, and Dikkers (2014) found

that at-risk students could find success in technology based learning programs while Warschauer, Zheng, Niiya, Cotten, and Farkas (2014) noted that an effective one-to-one program could close equity gaps by providing resources both at school and at home. Zheng, Warschauer, Lin, and Chang (2016) found that at-risk learners often used their devices as much or more than traditional students and used them in ways that met their individual needs. Both Koenig (2018) and Miller (2017) found that use of educational technology helped at-risk students realize equivalent gains with more traditional counterparts (Koenig, 2018; Miller, 2017).

While those that support greater technology in education champion the idea that increased access provides significant educational dividends (Pynos, 2016), perceptions on the value of educational technology vary among racial and ethnic groups (Thompson, 2017). Warschauer and Matuchniak (2010) noted the effects of technology often varied by learner population with low-socioeconomic status schools favoring ineffective drill and practice techniques leading to less effective results while high- socioeconomic status schools tended to achieve more positive results. Clarke, (2016) noted that lack of access to Wi-Fi, ability level of students, and content-area concerns were potential barriers to effective implementation of technology in the learning process for at-risk students.

The Impact of Effective Technology Implementation Strategies

In order to realize the positive dividends of a one-to-one initiative and avoid criticism that purchased devices are being underused or used ineffectively, proper implementation is essential (Glaze, 2018). Bolkan (2014) noted that while teachers increased use of technology given time after implementation, only a limited number felt it positively affected student achievement with a lack of training identified as a significant barrier. Morelock (2015) noted that perceptions of

technology implementation varied by role and that implementation also varied by gender, age, and experience.

Bailey, Henry, McBride and Puckett (2011) identified the need to overcome not only shortfalls in infrastructure, but, more significantly, shortfalls that exist in current educational practices. Bebell and Kay (2010) and Glaze (2018) found that teacher's pedagogical and philosophical beliefs related to technology integration can impact how often and how effectively they implement technology while Coerdt (2018) found that leaders at all levels struggled with staff learning to use technology regardless of the principal's leadership. Perkins-Jacobs (2015) noted that principals felt inadequately prepared and that professional development necessary to fully carry out the role of technology leader was lacking. However, Cordell et al. (2012) identified that, when proper implementation occurs, schools will realize benefits in transitioning to Common Core Standards, increase graduation rates, and better prepare students for post-secondary endeavors. Vockley (2007) has identified key components of a technology initiative. The available technology must be used to teach students 21st century skills to be successful outside of the K-12 setting. Additionally, technology should support innovation in the teaching and learning process, and provide support and opportunities for growth among a school's students, staff and instructional leaders both inside and outside of the school environment.

Penuel (2006) has identified three major components of an effective technology implementation strategy. First, the technology initiative must be supported by considerable professional development, not only in the operation of the technology, but also in the instructional incorporation of the technology. In addition, effective implementation requires appropriate technical support to maintain both individual computing devices and the network.

Finally, Penuel notes that staff member attitudes towards student technology use must support integration of greater levels of connectivity.

Teachers that lack professional development, support, or desire to integrate technology see it as more of a burden than a gift. The resulting conclusion is clear that quality professional development that includes sharing and discussion of best practices supported by training at various levels of technological proficiency is essential to successful implementation of a one-to-one initiative (Coerdt, 2018; Glaze, 2018; Higgins, Xiao, & Katsipataki, 2012; National Survey on Mobile Technology for K-12 Education, 2013; Penuel, 2006). Mukhlis (2018) identified effective professional conversations without judgement or evaluation around the use of technology as essential for effective implementation while Slusher (2018) noted that teacher perception on effectiveness of implementation improves as more positive student outcomes are experienced.

Given increased engagement noted by Bebell and Kay (2010) that is possible with effective implementation, schools are more frequently looking to technology initiatives to improve a range of factors that relate to academic achievement. By increasing engagement and connectedness, schools can potentially increase attendance and opportunities to learn in order to promote academic success.

Summary

Over the course of the last seventy plus years, work around theories of motivation has grown both in terms of supporting theories and in application of those theories to a variety of fields, including education. As Ryan and Deci (2000) apply self- determination theory of motivation to education, they identify a student's need for autonomy, competence, and relatedness as vital to promoting effective intrinsic motivation. Teachers and schools

increasingly seek to create classroom environments with these characteristics that will promote increased intrinsic motivation and convert it into engagement defined as willing and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner et al., 2009). With research supporting positive impact of a classroom environment with rich technology resources and effective implementation (Bebell & Kay, 2010; Coerdt, 2018; Dunleavy et al., 2007; Glaze, 2018; Greaves et al., 2012), districts are increasingly looking to one-to-one initiatives as a potential means of increasing student engagement to promote positive outcomes of increased attendance, achievement, and graduation rates (Bebell & Kay, 2010). This research will connect perceptions of classroom teachers responsible for implementing initiatives of school leaders around the effectiveness of technology in increasing engagement and resulting positive outcomes for students while providing a gap in the literature of differences that may exist in the effectiveness of technology on improving engagement as students grow from middle to high school levels.

Chapter Two outlined the research on student engagement and motivation beginning with historical research into motivation and current research on self-determination theory of motivation and its relationship to student engagement and moving to research on the impact of engagement on factors like attendance and achievement. In addition, Chapter Two reviewed impacts of technology on educational processes and outcomes as well as current research on effective implementation of a one-to-one technology plan. This study will fill a gap in the research literature on teacher perceptions of engagement with technology as students progress from middle to high school as well as how technology may be related to engagement for students at differing levels of achievement. Chapter Three details the methodology of this study. Chapter

Four presents analysis of data and results of the study. Chapter Five lists researcher's conclusions and recommendations for further research.

CHAPTER THREE

METHODOLOGY

This study attempted to measure teachers' perceptions of the correlation between technology and student engagement in Missouri public middle and high schools through the use of a survey on technology attitudes. Teachers' perceptions of student engagement may affect implementation and utilization of technology and access for students. The survey measures teachers' perceptions of how the devices affects student engagement.

Chapter Three presents the methodology used to analyze the data collected from districts concerning the connection between technology and student engagement. The chapter outlines the methodology to be used in collecting survey data for analysis to include the following sections: Purpose of the Study, Participants, Selection/Sampling, Research Setting, Research Design, and Instrumentation.

Purpose of the Study

The purpose of this quantitative study was to test the self-determination theory of motivation that compares the integration of one-to-one technology in the classroom to teacher perception of student engagement for middle and high school students in schools that have implemented one-to-one programs in Missouri public schools. The independent variable of one-to-one technology integration was generally defined as a previously implemented school initiative that provides each student with a technological device (e.g.-laptop, iPad, Chrome book) for use both in school and at home, twenty-four hours a day, seven days a week, for schoolwork. Other independent variables of interest include the grade level of students, teacher years of service, time since one-to-one implementation, and teacher self-rated technological proficiency.

The dependent variable of student engagement was generally defined as willing, and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner et al., 2009).

Participants

The participants targeted for this study included middle and high school teachers in the Missouri DESE. The Missouri DESE enrollment is approximately 883,000 students divided across 518 districts serving students from K-12. This includes 583 high schools employing more than 20,000 teachers and an additional 354 schools that identify as middle schools or Jr. high schools employing nearly 12,000 teachers. This study attempted to compare implementation of a one-to-one technology initiative with teacher perceptions of student engagement in middle and high school students while determining the relationship among engagement perceptions and teacher years of service, time since implementation, and teacher self-rated technological proficiency.

Specifically, this study attempted to answer the following questions:

What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

RQ1a: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

RQ1b: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

RQ1c: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ2a: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ2b: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ2c: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ3a: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers'

perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ3b: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ3c: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Null Hypotheses

This study was designed to test the following hypotheses:

$H_0$1: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

$H_0$1a: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

$H_0$1b: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

$H_0$1c: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

$H_0$2: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

$H_0$2a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$2b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$2c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

$H_0$3: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri.

$H_0$3a: There will be no statistically significant relationship between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$3b: There will be no statistically significant relationship between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$3c: There will be no statistically significant relationship between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Selection/Sampling

Missouri school districts, which had the identifying criteria for a one-to-one technology program, were asked to participate in the survey through single stage, purposive, sampling. Sample size calculations for the independent *t*-test sample in RQ1 indicate a required return of 51 surveys per group (middle school and high school) with n=102 based on alpha = .05, power of .8 and medium effect size (Faul et al., 2009). Pearson's product-moment coefficient calculations in RQ2 indicate a required return of 84 surveys per group (at-risk, traditional, high achieving), based on alpha = .05, power of .8 and medium effect size (Faul et al., 2009). Sample size calculations for the multiple regression analysis in RQ3 indicate a required return of 77 surveys per group (at-risk, traditional, high achieving), based on alpha = .05, power of .8 and medium

effect size (Faul et al., 2009). Total sample size to support data analysis for all stated research questions was *n*=240.

The superintendent, or designee of identified districts were asked to participate in the study by forwarding an electronic survey link to teachers working in the district's middle and high schools. Once the superintendent agreed to participate in the study, all middle and high school teachers working in the school district were asked to complete the survey. The number of teachers working within identified one-to-one technology programs was calculated and sample size was based upon the overall rate of return. A four-week time-line was set up to complete all aspects of questionnaire, survey distribution and acquisition. Missouri superintendents were sent the initial questionnaire and given two weeks to respond. A follow-up email was sent to districts not responding to email requests. Teachers in districts agreeing to participate in the survey were given two weeks to complete the survey. A follow-up survey request was sent after one week to all districts participating in the survey. Selection was limited to Missouri public school districts in DESE.

Research Setting

The research setting was limited to public middle and high schools, to include, vocational and alternative schools in the state of Missouri DESE. The Missouri DESE is comprised of 518 districts with 583 high schools and an additional 354 schools that identify as middle schools or Jr. high schools. Approximately 71% of Missouri public school students select White as their primary demographic group, with another 16% selecting Black as their primary demographic group. Nearly 51% of Missouri public school students qualify for the federal Free and Reduced Lunch program. Only those schools that have previously implemented a one-to-one technology

initiative are considered for this study. The research setting included a participation sample of 172 middle school or junior high school teachers and 77 high school teachers.

Research Design

This study was designed to examine teachers' perceptions concerning the relationship between implementation of a one-to-one technology initiative and student engagement at middle and high school levels in Missouri public schools. Given the comparison of perceptions between middle and high school teacher groups in relation to implementation of technology, this study was a non-experimental, quantitative research study (Creswell, 2014). The independent variable of one-to-one technology integration was generally defined as an initiative that provides each student with a technological device (e.g.-laptop, iPad, Chrome book) for use both in school and at home, twenty-four hours per day, seven, days per week, for schoolwork. Survey participants were limited to those teachers serving in a school that has implemented a one-to-one initiative. Other variables of interest include grade level of students, teacher years of service, time since one-to-one implementation, and teacher self-rated technological proficiency. These variables were reported by participating teachers as a part of the survey instrument. The dependent variable of student engagement was measured continuously using a rating scale for students categorized as at-risk, traditional, and high-achieving and was generally defined as willing and cognitively focused participation in learning activities (Connell & Wellborn, 1991; Skinner et al., 2009) measured through teacher perception with the intervening variable being increased motivation resulting from technology implementation.

RQ1 involves a causal-comparative design to compare differences in perceptions of engagement between middle and high school teachers resulting from implementation of a one-to-one program. The survey instrument was used, with analysis through independent samples *t*-test,

for RQ1 to determine if a difference existed between perceptions of engagement for middle and high school students. RQ2 involves a correlational test to identify associations and the degree of correlation between any of the independent variables and perceptions of engagement. For RQ2, analysis of survey data through Pearson's product-moment correlation was used to identify association and the degree of correlation between any of the independent variables and perceptions of engagement. RQ3 also involves a correlational test to determine predictive value of independent variables on perceptions of engagement. Data were analyzed through multiple regression for RQ3 to determine the predictive value of independent variables on perceptions of engagement in addition to overall fit of the model and relative contribution of each variable.

Procedures

The survey instrument was modified with the author's consent and used to assess perceptions of teachers concerning their beliefs about the relationship between implementation of a one-to-one technology initiative and student engagement. Additionally, qualitative questions included on the original survey were not included.

Approval for this research was given by the Research Review Board. After receiving approval, a questionnaire was sent to superintendents of Missouri school districts to determine if the school district had implemented a one to one technology program as defined by the study. The questionnaire gave superintendents the study definition and asked them to determine if the district met the criteria of a one to one technology program. Superintendents were then asked if they would forward the survey link to teachers in their district working in the one-to-one program and to return the email when completed with the survey.

Only teachers within the identified middle and high schools working in the one-to-one technology program were asked to complete the teacher survey. The teacher survey was

electronic and a link to the survey was emailed to superintendents in districts meeting the one-to-one technology definition. Superintendents agreed to forward the survey to teachers. An introductory message for teachers was included in the email forwarded by superintendents. The message introduced the survey, explained the purpose, and asked teachers to take the survey. Teachers agreeing to complete the survey did so online and submitted electronically.

Consent to be questioned was given with receipt of the returned email questionnaire from the superintendents indicating whether the district met the criteria for a one-to-one technology implementation. A completed survey was recorded as the teacher's agreement to participate in the study. The teacher survey contained no identifiable information and teachers were informed their responses were anonymous. Survey results were grouped as a whole and it was not possible to identify individual school districts, grade levels, content areas, or respondents. Participants were informed that by completing the survey, they were giving consent. Teachers were also notified their completed survey was consent to be surveyed and they could withdraw from the survey at any time

A four week time-line was set up to complete all aspects of questionnaire and survey distribution and acquisition. Missouri superintendents and middle and high school principals were sent the questionnaire and given two weeks to respond. A follow-up email was sent to districts not responding to email requests. Teachers in districts agreeing to participate in the survey were given two weeks to complete the survey. A follow-up survey request was sent after one week to all districts participating in the survey. Data received from the survey was then cleaned and analyzed.

Instrumentation

The instrument for this study was an on-line teacher perception survey utilized with permission received via email from a survey developed for use as a part of a previous doctoral dissertation (Fiorillo, 2015). The survey was developed as a tool to assess teachers' attitudes toward the use of educational technology and was used as a part of a study of *One-to-One Laptops in a High School Environment Final Report* (Great Maine Schools Project, 2004). Participants rated perceptions of student engagement on a three point agreement type Likert scale (declined, no effect, improved) with a minimum score of twelve and a maximum score of thirty-six for each of three different student groups (at-risk, traditional, high-achieving) on twelve engagement related behaviors. The reliability of the survey was investigated in a small pilot study before and after the pilot group received training in technology usage. Construct validity was not established or published by the author after an exhaustive search. Ideally, Cronbach's alpha would be presented for each of the three groups. True validity measures for the instrument proved difficult to identify with validity simply reported as high, with the note that results supported the survey as a reliable and valid measure of teachers' attitudes towards technology.

The survey was disseminated through QuestionPro using a link sent to district superintendents and building principals. Superintendents and principals were asked to forward the survey to teachers in buildings that fit the study definition of a one-to-one program. A three point, Likert agreement rating scale with scores ranging from twelve to thirty-six was used within the survey to measure teacher perception in relation to technology in the classroom and ranged from declined to no effect to improved to rate teacher perceptions of how implementation of a one-to-one technology initiative has impacted engagement related student behaviors for at-risk, traditional, and high achieving students. In addition, participants were asked to provide

information regarding their grade level taught, years of service, years since implementation, and self-assessment of technological proficiency.

Data Analysis

The implementation of a one-to-on technology initiative was evaluated as a non-experimental quantitative study. The desired sample size for this study was *n*=240 (Faul et al., 2009) with alpha level of .05, medium effect size and a power of .8. Sample size calculations for the independent *t*-test sample in RQ1 indicate a required return of 51 surveys per group (middle school and high school) with *n* = 102 based on alpha = .05, power of .8 and medium effect size (Faul et al., 2009). Sample size calculations for the Pearson's product-moment coefficient calculations in RQ2 indicate a required return of 84 surveys per group (at-risk, traditional, high achieving), based on alpha = .05, power of .8 and medium effect size (Faul et al., 2009). Sample size calculations for the multiple regression analysis in RQ3 indicate a required return of 77 surveys per group (at-risk, traditional, high achieving), based on alpha = .05, power of .8 and medium effect size (Faul, Erdfelder, Buchner, & Lang, 2009). Demographic data reported from the survey includes grade levels taught, years of service, years of service since implementation of a one-to-one technology initiative, and self-rating of technological proficiency. In addition to the above demographic data, percent return for the survey was reported. Data were exported to excel and cleansed for missing cases and outliers. Descriptive statistics were used to identify trends in survey responses including measures of central tendency and standard deviation for all demographic data collected. Independent samples *t*-tests were used to identify statistical differences in RQ1, Pearson's *r* for RQ2, and multiple regressions for RQ3 to determine if relationships exist and determine predictive value between the independent variables and teacher

perception of student engagement (Creswell, 2012). Post hoc analysis was conducted for each test to determine and report effect size with the null hypothesis tested at the $p < 0.05$ level.

RQ1 attempts to identify differences in teacher perceptions of student engagement between middle and high school students. Since RQ1 attempts to identify differences between two groups, in addition to descriptive statistics, independent samples *t*-tests was used to compare mean survey responses for middle and high school groups and determine effect size of those differences (Creswell, 2014). Researcher expects to find statistically significant differences between middle and high school teacher perceptions of student engagement as a result of a one-to-one program. The following assumptions were tested for independent *t*-test sample calculations for RQ1:

1. dependent variable of engagement is measured on a continuous scale.
2. independent variable is comprised of two categorical groups of middle school and high school teacher perceptions.
3. there is no relationship between observations in each group, satisfying the assumption of independence.
4. outliers, normality of the independent variable, homogeneity of variances, and effect size ($p < 0.05$) were tested for using SPSS during data analysis.

Cohen's *d* effect size was calculated to determine both the direction and effect size of identified differences between the statistical means in the independent samples *t*-test. The value for Cohen's *d* measures the difference between statistical means in number of standard deviations, so a Cohen's *d* of 1.0 indicates that statistical means of two groups vary by one standard deviation. A Cohen's *d* value of 0.2 is considered a small effect size with values of 0.5 and 0.8 generally considered medium and large effects (Cohen, 1988).

RQ2 two attempts to determine a relationship between teacher years of service, time since implementation of a one-to-one program, and teacher self-rated proficiency with perceptions of student engagement for middle and high school students. Since RQ2 attempts to identify relationships, in addition to descriptive statistics, three separate Pearson's product-moment correlations were used to identify whether there was an association and the degree of correlation (correlation coefficient) between any of the independent variables (teacher years of service, time since implementation, and teacher self-rated technological proficiency) and perception of engagement (Creswell, 2014). Pearson's *r* correlation values range from -1 indicating a strong indirect relationship between variables to 0 indicating no relationship to +1 indicating a strong direct relationship between variables. A correlation matrix was used to display correlation coefficients for the included variables. SPSS was used to measure effect size ($p < 0.05$). Cohen's *d* effect size was calculated to determine both the direction and effect size of correlations in Pearson's *r* values with *r* varying from 0 to 1 and values closer to 1 indicating a greater effect. The following assumptions were met for Pearson's product-moment calculations for RQ2:

1. equally spaced, interval variables.
2. linear relationship between variables with no significant outliers and normality of variables was tested using SPSS.

RQ3 involves a correlation analysis and attempts to predict teacher perceptions of middle and high school student engagement based on teacher years of service, time since implementation of a one-to-one initiative, or teacher self-rated technological proficiency. Since RQ3 attempts to identify the predictive value of relationships among multiple variables, in addition to descriptive statistics, multiple regression analysis was used to analyze data. Multiple

regression analysis was used to determine predictive value of the independent variables on engagement in addition to determining overall fit of the model and relative contribution of each variable (Creswell, 2014). Cohen's f^2 effect size ($p < 0.05$) was calculated to determine both the direction and effect size of correlations among variables in multiple regression. Cohen's f^2 allows for determining effect size of the relationship between two variables in a multiple regression analysis while controlling for other variables. Cohen (1988) identifies $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ as small, medium, and large effect sizes. The following assumptions were met for multiple regression calculations for RQ3:

1. variables measured on a continuous scale.
2. multiple independent variables (engagement, years of service, time since implementation, and self-rated technological proficiency).
3. independence of observations.
4. independence of residuals, linear relationship between variables, homoscedasticity, multicollinearity, and outliers were checked using SPSS.

Summary

In this chapter, the researcher provided a brief overview detailing the objective of the study and detailed the methodology of this study. This included the three primary research questions and sub research questions in addition to associated hypotheses. RQ1 focused on identifying differences in perceptions through use an independent samples *t*-test as a part of a causal-comparative study. RQ2 and RQ3 focused on correlational research using Pearson's product-moment correlation to identify relationships among variables and RQ3 used multiple regression analysis to determine predictive value of independent variables. Chapter Three also identified participants, selection and purposive sampling procedures in addition to identifying the

required sample size for statistical analysis. Finally, Chapter Three described the research setting and design, the instrumentation, reliability and validity, and data analysis for each research question as described above. In Chapter Four, the researcher analyzes the collected survey data and reveals the findings of the study. Chapter Five presents a summary of the study findings and conclusions from the causal comparative study. Additionally, Chapter Five offers recommendations from the study and topics for future study.

CHAPTER FOUR

DATA ANALYSIS

This quantitative study set out to identify and determine differences in how teachers perceive engagement for middle and high school students in Missouri public schools as they relate to the implementation of a one-to-one technology initiative. Results will help to fill a gap in research literature on teacher perceptions of engagement with technology as students progress from middle to high school as well as how technology may be related to engagement for students at differing levels of achievement. The theoretical framework for this study is based on Ryan and Deci's (2000) self-determination theory of motivation as it describes task persistence sustained by passions, creativity, and continuous efforts. Self-determination theory identifies autonomy, competence, and relatedness as conditions that most significantly foster an individual's sense of motivation. It is this drive to engage through the use of technology in the classroom that served as the focus of this study.

Chapter Three, presented the methodology of this quantitative, causal comparative and correlational research study and described the participants, research setting, research design, sampling selection, instrumentation, and data analysis. Chapter Four presents the research questions and null hypotheses of this study, the demographic data, data cleaning process, and research findings related to each of the research questions. Data are presented in this chapter to identify if a statistically significant difference existed between middle and high school teachers' perceptions of engagement in a one-to-one environment in addition to attempting to identify relationships and predictive values between perceptions of engagement and, years of service, time since implementation of a technology initiative, and self-rated technological proficiency.

Quantitative data analysis was used to investigate answers to the research questions and corresponding null hypotheses based upon the surveys distributed by the researcher. Descriptive and inferential statistics were used to analyze the items in the survey and were presented in this chapter to address the questions and hypotheses of this study. Descriptive statistics were used to present the data while inferential statistics were used to infer what the data revealed about participants' perceptions of student engagement as it related to implementation of a technology initiative.

Research Questions

This study attempted to answer the following research questions:

What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

RQ1a: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

RQ1b: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

RQ1c: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ2a: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ2b: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ2c: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ3a: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ3b: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ3c: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Null Hypotheses

This study was designed to test the following null hypotheses:

$H_0$1: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

$H_0$1a: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

$H_0$1b: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

$H_0$1c: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

$H_0$2: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

$H_0$2a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$2b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$2c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

$H_0$3: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri.

$H_0$3a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher

self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$3b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$3c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Demographics

Participants for the study included Missouri public middle and high school teachers in districts that had previously implemented a one-to-one technology program. Information on current district superintendents and middle and high school principals was obtained using DESE's database, Missouri Comprehensive Data System (MCDS). The MCDS database was used to generate a School District List report that provided superintendent and principal contact emails for all public middle and high schools in Missouri.

Requests for participation were sent to each district superintendent as well as building principals. Within the request for participation, district and building leaders were asked to determine if their buildings met the qualifying criteria of a one-to-one technology program. If their building met the criteria, they were asked to forward the survey instrument to staff.

As a part of the survey, respondents were asked to provide demographic information for the study. Respondents provided information on grade level(s) taught, years of teaching service,

and time since implementation of a one-to-one technology program. Additionally, respondents were asked to provide a self-rating on their own technological proficiency with the district provided one-to-one platform.

Survey responses included 172 middle school teachers and 77 high school teachers. Responses were more common from teachers with more years of service, with the 13-19 year and 20 plus year ranges accounting for 61% of responses (See Table 1). Responses in the four categories comprising those with 12 years or teaching service or less accounted for the remaining 39%. Similarly, time since implementation skewed toward four or more years since implementation with the two highest categories (4 years and 5 plus years) accounting for 62% of responses (See Table 2). Self-ratings on technological proficiency were concentrated in the Intermediate and Advanced ranges, comprising 76% of responses. Only 6% of responses fell in the Novice and Beginner ranges with the remaining 18% identifying as Expert (See Table 3).

Table 1

Survey Demographics-Years of Teaching Service

Years of Teaching Service	0-3	4-6	7-9	10-12	13-19	20+
Responses	17	27	25	27	80	73

Table 2

Survey Demographics-Time Since Implementation

Years Since Implementation	1	2	3	4	5+
Responses	29	22	44	60	94

Table 3

Survey Demographics-Self-Rated Technological Proficiency

Self-Rated Proficiency	Novice	Beginner	Intermediate	Advanced	Expert
Responses	8	10	97	92	42

Data Cleaning

Teacher survey responses were collected using the QuestionPro survey distribution website and saved in Microsoft Excel format. Survey responses identifying grade levels taught (6-12) were combined into a single column identifying middle school teachers with a 0 and high school teachers with a 1. Responses rating engagement level for each of the three identified groups (at-risk, traditional, high-achieving) were converted to scores on a 1 to 3 scale and summed in excel with total possible scores on the twelve items ranging from 12 to 36. The scores were then uploaded and analyzed in SPSS for statistical analysis. One-hundred one teacher survey responses were dropped from the study as the survey was opened but never finished. An additional 16 surveys were removed from the study during data cleaning due to missing data points within the Likert scale portion of the survey leaving 249 completed surveys with useable data. Teachers completed the survey at a 72.4% rate with an average completion time of 4 minutes.

Research Findings

The analysis of data revolved around three research questions, each containing three subordinate research questions to focus specifically on the student categories of at-risk, traditional, and high-achieving. Missouri public, middle and high school teachers were surveyed for demographic data and their perceptions on student engagement for three separate groups of students: at-risk, traditional, and high-achieving. Respondents included 172 middle school

teachers and 77 high school teachers. Demographic data for respondents included years of teaching service, time since implementation of a one-to-one program, and self-rated technological proficiency. Mean scores fell between the 10-12 and 13-19 year ranges for years of teaching service, in the 3-4 year range for time since implementation, and in the intermediate to advanced range for self-rated technological proficiency.

Research Question 1. What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

RQ1a: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

RQ1b: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

RQ1c: What is the difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

For RQ1, this study was designed to investigate the following null hypotheses:

$H_0$1: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school students in the Missouri public schools?

$H_0$1a: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between at-risk middle and high school students in the Missouri public schools?

$H_0$1b: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between traditional middle and high school students in the Missouri public schools?

$H_0$1c: There will be no statistically significant difference in teacher perceptions of student engagement resulting from implementation of a one-to-one technology initiative between high achieving middle and high school students in the Missouri public schools?

Survey respondents totaled 249 participants including 172 middle school teachers and 77 high school teachers. An independent-samples *t*-test was run to determine if there was a difference in the perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school teachers. Outliers, normality of the independent variable, and homogeneity of variances were tested for using SPSS during data analysis with effect size calculated after testing ($p < 0.05$). SPSS identified no significant outliers. Teacher perceptions of engagement scores were normally distributed for traditional high school students and at-risk high school students, but not for at-risk middle school students, traditional middle school students, or high-achieving middle school or high school students, as assessed by Shapiro-Wilk's test ($p > .05$) as shown in Table 4. Independent-samples *t*-test was used in spite of violations, as the test is robust to non-normality. There was homogeneity of variances, as assessed by Levene's test for equality of variances for engagement of at-risk students (*p=.136)* and traditional students (*p=.773).* Engagement for high-achieving students

violated Levene's test for equality of variances (*p=.013*), requiring the use of the result from the Welch *t*-test in this case.

Table 4

RQ1 Tests of Normality

	Grade Level	Kolmogorov-Smirnov			Shapiro-Wilk		
	Taught	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Engagement	Middle School	.059	172	.200*	.979	172	.011
At-Risk	High School	.084	77	.200*	.979	77	.222
Engagement	Middle School	.085	172	.004	.965	172	<.001
Traditional	High School	.076	77	.200*	.980	77	.270
Engagement	Middle School	.073	172	.024	.965	172	<.001
High-Achieve	High School	.197	77	<.001	.911	77	<.001

Descriptive Statistics. Teacher perceptions of student engagement were measured for both middle and high school teachers for at-risk, traditional, and high achieving students. Results are shown in Table 5.

Table 5

RQ1 Descriptive Statistics

	Grade Level				Std. Error
	Taught	*N*	Mean	Std. Deviation	Mean
Engagement of At-Risk	Middle School	172	26.76	5.182	.395
Students	High School	77	25.12	4.493	.512
Engagement of	Middle School	172	28.73	4.334	.330
Traditional Students	High School	77	26.52	4.538	.517
Engagement of High	Middle School	172	28.63	4.435	.338
Achieving Students	High School	77	27.44	3.719	.424

Survey responses indicate that teachers perceive a one-to-one technology program is more impactful on engagement levels for high-achieving students than for traditional students and lowest for at-risk students. Perceptions of engagement were higher for middle school teachers (*M=26.76, SD=5.182)* than high school teachers (*M=25.12, SD=4.493)* for at-risk

students, higher for middle school teachers (*M=28.73, SD=4.334)* than high school teachers (*M=26.52, SD=4.538)* for traditional students, and higher for middle school teachers (*M=28.63, SD=4.435)* than high school teachers (*M=27.44, SD=3.719)* for high-achieving students.

Inferential Statistics. An independent-samples *t*-test was run to determine if there were statistically significant differences between middle and high school teacher perceptions of student engagement in a one-to-one technology environment with results displayed in Table 6.

Table 6

RQ1 Independent Samples t-Test

		t-test for Equality of Means						
		t	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Engagement of At-Risk Students	Equal variances assumed	2.400	247	.017	1.639	.683	.294	2.984
Engagement of Traditional Students	Equal variances assumed	3.660	247	<.001	2.207	.603	1.020	3.395
Engagement of High-Achieving Students	Equal variances not assumed	2.188	172.531	.030	1.186	.542	.116	2.257

RQ1a. This study found statistically significant differences in levels of engagement between middle and high school teachers for at-risk students (26.74 to 25.12), $t(247) = 2.400$, $p = .017$ through independent samples *t*-test. Effect size was calculated to determine the strength of the relationship between the variables. Cohen (1988) categorized effect size as < 0.2, very small; 0.2, small; 0.5, medium; and 0.8, large. Effect size for the difference in at-risk students

was small at $d = 0.329914$. The statistically significant difference between means ($p < .05$) lead the researcher to reject the null hypothesis for RQ1a.

RQ1b. This study also found statistically significant differences in levels of engagement between middle and high school teachers for traditional students (28.46 to 26.62), $t(247) = 3.660$, $p < .001$ through independent samples *t*-test. Effect size for the difference in traditional students was medium at $d = 0.498065$. The statistically significant difference between means ($p < .05$) lead the researcher to reject the null hypothesis for RQ1b.

RQ1c. This study found statistically significant differences in levels of engagement between middle and high school teachers for high-achieving students (28.55 to 27.44), $t(172.5) = 2.188$, $p = .030$ through a Welch *t*-test based on violating Levene's test for equality of variances. Effect size for the difference in high-achieving students was small at $d = 0.290762$. There was a statistically significant difference between means ($p < .05$), and therefore, the researcher rejects the null hypothesis for RQ1c.

Research Question 2. What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ2a: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ2b: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological

proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ2c: What is the relationship between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

For RQ2, this study was designed to investigate the following null hypotheses:

$H_0$2: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri?

$H_0$2a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$2b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$2c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, and teacher self-rated technological proficiency with teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Survey respondents totaled 249 participants including 172 middle school teachers and 77 high school teachers. Independence of observations, outliers, normality of the independent variable, and homogeneity of variances were tested for using SPSS during data analysis with effect size calculated after testing ($p < 0.05$). Outliers were removed during data cleaning, but the data violated the test of normality with values ranging from $p < .001$ to $p = .005$ as shown in Table 7. Pearson's Product-moment correlation is robust to violation of assumptions and was used in spite of violation of normality, but should be interpreted with caution (Havlicek & Peterson, 1976).

Table 7

RQ2 Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Years Taught	.277	249	<.001	.835	249	<.001
Time Since Implement	.220	249	<.001	.831	249	<.001
Self Rated Proficiency	.219	249	<.001	.855	249	<.001
Engage At-Risk	.062	249	.021	.983	249	.005
Engage Traditional	.078	249	.001	.979	249	.001
Engage High-Achieve	.115	249	<.001	.962	249	<.001

Descriptive Statistics. Years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency in addition to teacher perceptions of student engagement were measured for at-risk, traditional, and high achieving students. Results are shown in Table 8.

Table 8

RQ2 Descriptive Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Years Taught	249	4.38	1.612	.102
Time Since Implementation	249	3.73	1.325	.084
Self Rated Proficiency	249	3.65	.853	.054
Engagement of At-Risk Students	249	26.25	5.028	.319
Engagement of Traditional Students	249	28.04	4.506	.286
Engagement of High-Achieving Students	249	28.26	4.255	.270

Survey responses indicate that teachers perceive a one-to-one technology program is more impactful on engagement levels for high-achieving students than for traditional students and lowest for at-risk students. Mean scores for demographic data fell between the 10-12 and 13-19 year ranges for years of teaching service, in the 3-4 year range for time since implementation, and in the intermediate to advanced range for self-rated technological proficiency.

Inferential Statistics. A Pearson's product-moment correlation was run to assess the relationship between the perceptions of student engagement resulting from implementation of a one-to-one technology initiative with respect to years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. Results of the Pearson's product-moment correlation identified several statistically significant ($p < .05$), correlations among measured variables as shown in Table 9.

Table 9

RQ2 Pearson's Product-Moment Correlation

	Engagement of At-Risk Students	Engagement of Traditional Students	Engagement of High-Achieving Students
Years of Teaching	.005	-.017	-.105
	.934	.793	.098
Time Since Implementation	-.185*	-.154*	-.115
	.003	.015	.069
Self-Rated Technological Proficiency	.190**	.186**	.154*
	.003	.003	.015

**. Correlation is significant at the .01 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).

RQ2a. A Pearson's product-moment correlation was run to assess the relationship between years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency with engagement for at-risk students. Two-hundred-forty nine survey responses were included. Preliminary analyses showed the relationship to be linear with both variables not normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$), and there were no outliers. There was no statistically significant correlation between years of teaching service and engagement for at-risk students, $r(247) = .01$, $p = .934$, with teacher years of service accounting for .01% of the variation in at-risk student engagement. There was a small, statistically significant correlation between time since implementation and engagement for at-risk students $r(247) = -.19$, $p = .003$, with teacher years of service accounting for 3% of the variation in at-risk student engagement. There was a small, statistically significant correlation between self-rated technological proficiency and engagement for at-risk students

$r(247) = .19$, $p = .003$, with teacher years of service accounting for 4% of the variation in at-risk student engagement. Statistically significant results lead the researcher to reject the null hypothesis for RQ2a.

RQ2b. A Pearson's product-moment correlation was run to assess the relationship between years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency with engagement for traditional students. Two-hundred-forty nine survey responses were included. Preliminary analyses showed the relationship to be linear with both variables not normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$), and there were no outliers. There was no statistically significant correlation between years of teaching service and engagement for traditional students, $r(247) = -.02$, $p = .793$, with teacher years of service accounting for .02% of the variation in traditional student engagement. There was a small, statistically significant correlation between time since implementation and engagement for traditional students $r(247) = -.154$, $p = .015$, with teacher years of service accounting for 2% of the variation in traditional student engagement. There was a small, statistically significant correlation between self-rated technological proficiency and engagement for traditional students $r(247) = .19$, $p = .003$, with teacher years of service accounting for 3% of the variation in traditional student engagement. Statistically significant results lead the researcher to reject the null hypothesis for RQ2b.

RQ2c. A Pearson's product-moment correlation was run to assess the relationship between years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency with engagement for high-achieving students. Two-hundred-forty nine survey responses were included. Preliminary analyses showed the relationship to be linear with both variables not normally distributed, as assessed by Shapiro-

Wilk's test ($p > .05$), and there were no outliers. There was no statistically significant correlation between years of teaching service and engagement for high-achieving students, $r(247) = -.11$, $p = .098$, with teacher years of service accounting for 1% of the variation in high-achieving student engagement. There was no statistically significant correlation between time since implementation and engagement for high-achieving students $r(247) = -.115$, $p = .069$, with teacher years of service accounting for 1% of the variation in high-achieving student engagement. There was a small, statistically significant correlation between self-rated technological proficiency and engagement for high-achieving students $r(247) = .15$, $p = .015$, with teacher years of service accounting for 2% of the variation in high-achieving student engagement. A lack of statistically significant results lead the researcher to fail to reject the null hypothesis for RQ2c.

Research Question 3. How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement in public middle and high schools in Missouri?

RQ3a: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

RQ3b: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

RQ3c: How does teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

For RQ3, this study was designed to investigate the following null hypotheses:

$H_0$3: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency with teachers' perceptions of student engagement in public middle and high schools in Missouri.

$H_0$3a: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for at-risk students in public middle and high schools in Missouri?

$H_0$3b: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for traditional students in public middle and high schools in Missouri?

$H_0$3c: There will be no statistically significant correlation between teacher years of service, time since implementation of a one-to-one technology initiative, or teacher self-rated technological proficiency predict teachers' perceptions of student engagement for high achieving students in public middle and high schools in Missouri?

Survey respondents totaled 249 participants including 172 middle school teachers and 77 high school teachers. Multiple regression analysis was run to determine the predictive value in

the perceptions of student engagement resulting from implementation of a one-to-one technology initiative between middle and high school teachers with respect to years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency for each of the three student groups: at-risk, traditional, and high-achieving. Independence of observations, outliers, homoscedasticity, linear relationship, and normal distribution of residuals as tested in SPSS with effect size calculated after testing ($p < 0.05$). Linearity was visually assessed by partial regression plots with greater degrees of linearity for the independent variables of years of teaching service, time since implementation, and self-rated technological proficiency with at-risk students and with traditional students than with high-achieving students. There was an independence of residuals, as assessed by a Durbin-Watson statistic of 1.784 for at-risk student engagement, 1.906 for traditional student engagement, and 2.043 for high-achieving student engagement as show in Tables 10, 13, and 16 respectively. The Durbin-Watson statistic can range from 0 to 4 with values close to 2 indicating that there is no correlation between residuals. Homoscedasticity was assessed by visual inspection of partial regression plots (see Appendix C) of studentized residuals versus unstandardized predicted values with greater homoscedasticity for the independent variables of years of teaching service, time since implementation, and self-rated technological proficiency with at-risk students and with traditional students than with high-achieving students. There was no evidence of multicollinearity for any of the regressions, as assessed by tolerance values greater than 0.1 (see Tables 12, 15, 18). This indicates that the independent variables are not highly correlated and allows for better understanding of the impact of each independent variable on the dependent variable. There were no studentized deleted residuals greater than ±3 standard deviations, no leverage values greater than 0.2, and values for Cook's distance above 1. These values indicate

that there are no data points that negatively effected the regression equation used to predict the value of the dependent variables based on the independent variables. The assumption of normality was met, as assessed by P-P Plots (see Appendix D). Distribution of plots along the diagonal line indicates that residuals are close enough to normal to proceed with analysis.

Inferential Statistics.

*RQ3a***.** A multiple regression was run to predict engagement of at-risk students from years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. Table 10 provides a model summary that provides data on how well the multiple regression model fits the data. Table 11 provides data on the statistical significance of the overall model with Table 12 providing the coefficients of the regression model.

Table 10
RQ3a Model Summary At-Risk [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.308[a]	.095	.084	4.812	1.748

Note: a. Predictors: (Constant), Self Rated Proficiency, Years Taught, Time Since Implement
b. Dependent Variable: Engage At-Risk

Table 10 shows an adjusted R^2 of 8% indicating that the proportion of variance in engagement of at-risk students explained by the independent variables of years of teaching service, time since implementation, and self-rated technological proficiency is 8%. An adjusted R^2 of 8% results in an effect size of $f = .105$, identified as very small (Cohen, 1988).

Table 11
RQ3a ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	594.795	3	198.265	8.561	<.001
	Residual	5673.767	245	23.158		
	Total	6268.562	248			

Table 11 shows that years of teaching service, time since implementation, and self-rated technological proficiency statistically significantly predicted engagement of at-risk students, $F(3, 245) = 8.561$, $p < .001$, adj. R^2 of 8%. This indicates that the regression model fits the data better than a model with no independent variables.

Table 12

RQ3a Summary of Multiple Regression Analysis-At-Risk

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model	*B*	Std. Error	Beta	*t*	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	23.960	1.570		15.264	<.001	20.869	27.052		
Years Taught	.129	.195	.041	.662	.509	-.255	.514	.942	1.062
Time Since Implement	-.973	.244	-.257	-3.989	<.001	-1.454	-.493	.893	1.119
Self Rated Proficiency	1.466	.370	.249	3.962	<.001	.737	2.194	.937	1.067

Table 12 shows time since implementation ($B = -.973$, $p < .001$) was assessed at a statistically significant slope coefficient, indicating that each year of increase in time since implementation resulted in a -.973 decrease in teacher perception of engagement. Self-rated technological proficiency ($B = 1.466$, $p < .001$) was assessed at statistically significant slope coefficient, indicating that each categorical increase in self-rated proficiency resulted in a 1.466 increase in teacher perception of engagement. Teaching service ($B = .129$, $p = .509$) was not assessed at a statistically significant slope coefficient for at-risk students. As the variable of engagement was measured on a consistent scale, across student groups, unstandardized coefficients were used for analysis. Statistically significant results for time since implementation

and self-rated technological proficiency lead the researched to reject the null hypothesis for RQ3a.

RQ3b. A multiple regression was run to predict engagement of traditional students from years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. Table 13 provides a model summary that provides data on how well the multiple regression model fits the data. Table 14 provides data on the statistical significance of the overall model with Table 15 providing the coefficients of the regression model.

Table 13

RQ3b Model Summary-Traditional[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.278[a]	.077	.066	4.355	1.906

Note: a. Predictors: (Constant), Self Rated Proficiency, Years Taught, Time Since Implement
b. Dependent Variable: Engage Traditional

Table 13 shows an adjusted R^2 of 7% indicating that the proportion of variance in engagement of traditional students explained by the independent variables of years of teaching service, time since implementation, and self-rated technological proficiency is 7%. An adjusted R^2 of 7% results effect size of $f = .08$, identified as very small (Cohen, 1988).

Table 14

ANOVA[a]

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	390.210	3	130.070	6.859	< .001
	Residual	4646.304	245	18.965		
	Total	5036.514	248			

Note: a. Dependent Variable: Engage Traditional
b. Predictors: (Constant), Self-Rated Proficiency, Years Taught, Time Since Implement

Table 14 shows that years of teaching service, time since implementation, and self-rated technological proficiency statistically significantly predicted engagement of traditional students, $F(3, 245) = 6.859$, $p < .001$, adj. R^2 of 7%. This indicates that the regression model fits the data better than a model with no independent variables.

Table 15

Summary of Multiple Regression Analysis-Traditional

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model	B	Std. Error	Beta	*t*	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	26.044	1.420		18.335	<.001	23.246	28.842		
Years Taught	.030	.177	.011	.169	.866	-.318	.378	.942	1.062
Time Since Implement	-.733	.221	-.215	-3.318	.001	-1.168	-.298	.839	1.119
Self Rated Proficiency	1.260	.335	.239	3.764	<.001	.601	1.919	.937	1.067

Table 15 shows time since implementation ($B = - .733$, $p < .05$) was assessed at a statistically significant slope coefficient, indicating that each year of increase in time since implementation resulted in a -.733 decrease in teacher perception of engagement. Self-rated technological proficiency ($B = 1.260$, $p < .05$) was assessed at statistically significant slope coefficient, indicating that each categorical increase in self-rated proficiency resulted in a 1.260 increase in teacher perception of engagement. Teaching service ($B = .030$, $p < .05$) was not assessed at a statistically significant slope coefficient for traditional students. Statistically significant results for time since implementation and self-rated technological proficiency lead the researched to reject the null hypothesis for RQ3b.

RQ3c. A multiple regression was run to predict engagement of high-achieving students from years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. Table 16 provides a model summary that provides data on how well the multiple regression model fits the data. Table 17 provides data on the statistical significance of the overall model with Table 18 providing the coefficients of the regression model.

Table 16

RQ3c Model Summary High-Achieving[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.238[a]	.057	.045	4.158	2.043

a. Predictors: (Constant), Self-Rated Proficiency, Years Taught, Time Since Implement
b. Dependent Variable: Engage High-Achieve

Table 16 shows an adjusted R^2 of 5% indicating that the proportion of variance in engagement of high-achieving students explained by the independent variables of years of teaching service, time since implementation, and self-rated technological proficiency is 5%. An adjusted R2 of 5% results effect size of $f = .06$, identified as very small (Cohen, 1988).

Table 17

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	253.826	3	84.609	4.893	.003[b]
	Residual	4236.206	245	17.291		
	Total	4490.032	248			

a. Dependent Variable: Engage High-Achieve
b. Predictors: (Constant), Self-Rated Proficiency, Years Taught, Time Since Implement

Table 17 shows that years of teaching service, time since implementation, and self-rated technological proficiency statistically significantly predicted engagement of high-achieving

students, $F(3, 245) = 4.893$, $p < .05$, adj. R^2 of 5%. This indicates that the regression model fits the data better than a model with no independent variables.

Table 18

Summary of Multiple Regression Analysis-High-Achieving

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
Model	B	Std. Error	Beta	*t*	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	27.409	1.356		20.208	<.001	24.737	30.080		
Years Taught	-.240	.169	-.091	-1.419	.157	-.572	.093	.942	1.062
Time Since Implement	-.458	.211	-.143	-2.174	.031	-.874	-.043	.839	1.119
Self Rated Proficiency	.989	.320	.198	3.093	.002	.359	1.618	.937	1.067

Time since implementation ($B = -.458$, $p < .05$) was assessed at a statistically significant slope coefficient, indicating that each year of increase in time since implementation resulted in a -.458 decrease in teacher perception of engagement. Self-rated technological proficiency ($B = .989$, $p < .05$) was assessed at statistically significant slope coefficient, indicating that each categorical increase in self-rated proficiency resulted in a .989 increase in teacher perception of engagement. Teaching service ($B = -.240$, $p < .05$) was not assessed at a statistically significant slope coefficient for high-achieving students. Statistically significant results for time since implementation and self-rated technological proficiency lead the researched to reject the null hypothesis for RQ3c.

Summary

Results indicate that middle school teachers perceived higher levels of engagement in a one-to-one technology environment than high school teachers across all student categories (at-risk, traditional, and high-achieving) with greater differences evident for at-risk and traditional students. Results also indicate a lack of significant relationship between years of teaching service and perceptions of engagement for all three student groups. Time since implementation of a one-to-one program correlates negatively to perceptions of engagement for at-risk and traditional students, but shows no relationship for high-achieving students while self-rated technological proficiency correlates positively to perceptions of engagement for all student groups measured. Finally, results indicate that no predictive value exists for year of teaching service on perceptions of engagement in any of the student groups, while increasing time since implementation predicts a decrease in perceptions of engagement for all student groups, and increasing self-rated technological proficiency predicts an increase in perceptions of engagement for all student groups. Table 19 identifies null hypotheses that have been rejected and those that the researcher failed to reject.

Table 19

Null Hypotheses Tested

RQ1	$H_0$1a	Reject
	$H_0$1b	Reject
	$H_0$1c	Reject
RQ2	$H_0$2a	Reject
	$H_0$2b	Reject
	$H_0$2c	Fail to Reject
RQ3	$H_0$3a	Reject
	$H_0$3b	Reject
	$H_0$3c	Reject

Chapter One identified the need to continue seeking means of engaging students to produce successful future outcomes. Chapter Two summarized the historical research on motivation and engagement; identified factors that affect student engagement from student and teacher characteristics to school and instructional factors and peer and parent relationships; connected research on engagement and attendance; and reviewed the impact of technology on educational practices and learning. Chapter Three outlined the research process, instrumentation, and data analysis for this study. Chapter Four presented the findings of the study and Chapter Five will summarize the findings of the research and present the implications of the study.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This quantitative study set out to identify and determine differences in how teachers perceive engagement for middle and high school students in Missouri public schools as they relate to the implementation of a one-to-one technology initiative. Results will help to fill a gap in research literature on teacher perceptions of engagement with technology as students progress from middle to high school as well as how technology may be related to engagement for students at differing levels of achievement. Finally, this study will provide insights on how perceptions of engagement relate to years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. The theoretical framework for this study is based on Ryan and Deci's (2000) self-determination theory of motivation as it describes task persistence sustained by passions, creativity, and continuous efforts. Self-determination theory identifies autonomy, competence, and relatedness as conditions that most significantly foster an individual's sense of motivation. It is this drive to engage through the use of technology in the classroom that served as the focus of this study. This chapter presents the findings of this quantitative, causal comparative and correlational research.

Chapter Two presented a review of related literature beginning with a historical look at motivation and its connection to engagement. Factors that influence students' engagement from student and school characteristics to teacher and student perceptions were addressed. Implications of engagement or disengagement on factors like attendance and achievement were reviewed before addressing the relevant research on technology in education implementation strategies. The review of literature supports the notion that improving engagement in the learning process is essential to producing successful student outcomes (Chen et al., 2013; Clark, 2017;

Manwaring, 2017). Additionally, research supports implementation of technology programs as a means of improving student engagement (Darling-Hammond et al., 2014; Pynos, 2016; Steiner, 2017). The purpose of this study was to fill a gap in the literature on how technology implementation relates to engagement across secondary student age levels and for students at varying levels of achievement.

Chapter Three presented the methodology of the study and described the participants, research setting, research design, sampling selection, instrumentation, and data analysis. After receiving approval form the Research Review Board, survey responses were collected using QuestionPro. Middle and high school principals were asked to forward the survey to teachers in their buildings that fit the study's definition of a one-to-one technology environment. Survey data were collected and analyzed using IBM SPSS software. Descriptive and inferential statistics were used to analyze the items in the. Descriptive statistics were used to present the data while inferential statistics were used to infer what the data revealed about participants' perceptions of student engagement as it related to implementation of a technology initiative. Independent samples *t*-test was used to identify differences in perceptions of engagement between middle and high school teachers in Research Question One. Pearson's product-moment correlation was used to assess relationships between teacher and program characteristics (years of teaching service, time since implementation, and self-rated technological proficiency) and engagement of students at varying levels of achievement (at-risk, traditional, and high-achieving). Multiple regressions were used to assess the predictive value of these teacher and program characteristics on engagement for students at the identified achievement levels.

Chapter Four presented data to identify if a difference existed between middle and high school teachers' perceptions of engagement in a one-to-one environment in addition to

attempting to identify relationships and predictive values between perceptions of engagement and, years of service, time since implementation of a technology initiative, and self-rated technological proficiency. Quantitative data analysis was used to investigate answers to the research questions and corresponding null hypotheses based upon the surveys distributed by the researcher.

This chapter summarizes the findings of the research and provides insights from analyzed results. Additionally, this chapter presents implications for current and future educators to consider when implementing and evaluating one-to-one technology programs. This chapter also provides recommendations for future research in technology integration and improved student engagement.

Summary of Findings

Research Question 1 Conclusions. Research Question 1 attempted to determine if there was a statistically significant difference in perceptions of engagement in a one-to-one technology environment between middle and high school teachers for at-risk, traditional, and high-achieving students. Data revealed that middle school teachers perceived higher levels of student engagement in a one-to-one environment than high school teachers for each of the three student groups identified. While differences between middle school teachers (*M=28.73, SD=4.334)* and high school teachers (*M=26.52, SD=4.538)* were greatest for traditional students, similar differences existed for at-risk students (*M=26.76, SD=5.182)* and (*M=25.12, SD=4.493)* and high-achieving students (*M=28.63, SD=4.435)* and (*M=27.44, SD=3.719).*

Independent samples *t*-test was used to determine statistically significant differences in mean scores for each student group. Statistical difference in means for at-risk students noted in

RQ1a was $t(247) = 2.400$, $p = .017$, leading the researcher to reject the null hypothesis for RQ1a. Effect size of the difference was assessed at a small effect size of $d = 0.329914$ (Cohen, 1988).

While the result indicates a statistically significant difference, the effect size indicates that the true difference in perceptions of engagement between middle and high school teachers for at-risk students is limited in scope. Koenig (2018), Miller (2017), and Zheng et al. (2016) noted greater potential for positive impacts with at-risk students in a technology rich environment. Additionally, Storz and Hoffman (2012) noted improved outcomes for middle school students with one-to-one programs. The results of this study disagree with those results and indicate that the improvements are limited in scope by comparison to students in other grade levels and other achievement levels. Ryan and Deci's self-determination theory identifies autonomy, competence, and relatedness as essential factors for improved engagement. At-risk students likely experience greater difficulty in perceiving tasks, whether technology related or not, as providing these characteristics and see less significant results from simply implementing technology.

Results of independent samples *t*-test indicated the greatest statistically significant difference for traditional student engagement $t(247) = 3.660$, $p < .001$, leading the researcher to reject the null hypothesis for RQ1b. The effect size of the difference for traditional students was assessed at Cohen's (1988) medium threshold of $d = 0.5$ with a measured effect size of $d = 0.498065$. This result indicates that there is a statistically significant difference between engagement levels of traditional middle and high school students in a technology rich environment. With an effect size at Cohen's (1988) medium threshold, the results support the notion that implementing technology improves perceptions of engagement for the general student population at the middle school level more than at the high school level, when compared

to students in at-risk and high-achieving groups. While research into the specific impact of technology on traditional students is lacking, improved engagement levels for middle school students (Storz & Hoffman, 2012) in technology rich environments as well as traditional students are supported by research into the impact of technology on student outcomes in general (Project Tomorrow, 2019; Pynos, 2016; Silvernail, 2011). Traditional students fall within the range of students that can experience greater impact from changes in practice. As traditional students, they hover in the average range for achievement and may respond more quickly to minor adjustments that create greater feelings of autonomy and competence while at-risk students likely require more significant interventions to experience similar improvements.

Mean difference for high-achieving students, identified in RQ1c was lowest at $t(247) = 2.188$, $p = .030$ as measured by a Welch's *t*-test based on data violating Levene's test for equality of variances as a statistical assumption. This result led the researcher to reject the null hypothesis for RQ1c. Effect size of this difference was also lowest of the measured groups at $d = 0.290762$, approaching Cohen's (1988) threshold of very small effects. While the results are statistically significant, the limited effect size indicates that the impact of the difference is minimal. These results are in contrast to Abernathy (2019), who noted that technology provided means for greater results for high-achieving students and Siegle (2017), who noted enhanced opportunities for high-achieving students to explore advanced content and express creativity. These results likely hold true for high-achieving students across grade levels and explain the minimal difference in engagement between middle and high school.

The results for RQ1 indicate that middle and high school teachers perceive engagement differently in a technology rich environment, though the differences are limited in their effect size. Generally declining engagement from middle to high school fits with expectations from

research Mathewson (2019). However, differences in perceptions of engagement between middle and high school teachers may indicate that teachers perceive a greater impact for middle school students with the implementation of a one-to-one technology initiative across all student types. Results indicating the smallest difference among high-achieving students supports this idea, as teachers are likely to perceive these students as disengaged at any age and across instructional practices. Developmental differences present in early adolescents may make traditional school models increasingly difficult to maintain in an environment where significant access to technology is available both in and out of school. Access to technology in general, and greater resources and media specifically, are likely to become more of a prerequisite to engagement as students progress through grade levels with the presumption of access to technology. As a result, as students mature through adolescence, engagement may be less dependent on specific practices like technology integration and more dependent on specific implementation strategies and instructional goals and practices. Additionally, greater differences in perceptions of engagement for traditional and at-risk middle and high school students than for high-achieving middle and high school students point to a greater need to find engaging approaches to learning for these students in general. High-achieving students are perceived by both middle and high school teachers to be more engaged in the learning process regardless of the instructional approach.

The theoretical framework for this study indicates that increased autonomy, competence, and relatedness will lead to task persistence sustained by passions, creativity, and continuous efforts. This study hypothesized that integration of technology would provide the necessary autonomy, competence, and relatedness within classrooms to further engage students in the learning process. While statistically significant results were noted, small effect sizes limit the transferability of the results. The results point to increased engagement in a technology rich

environment; results also highlight the need to continue to seek a variety of engaging approaches as means of achieving successful outcomes for students.

Research Question 2 Conclusions. Research Question 2 attempted to determine if there was a statistically significant relationship in perceptions of engagement in a one-to-one technology environment for at-risk, traditional, and high-achieving students with teacher years of service, time since implementation of a one-to-one technology initiative, or self-rated technological proficiency. Pearson's product-moment correlation analysis was used to identify relationships among identified variables. Data revealed statistically significant relationships, both positive and negative, for several of the variables.

Results for RQ2a indicate statistically significant correlations between two of the three measured variables and perceptions of engagement for at-risk students. Perceptions of at-risk student engagement showed no correlation with years of teaching service (r = .01, p = .934), with r^2 = .000025 indicating that teacher years of service statistically explained only a small fraction of a percent of the variability in at-risk student engagement. Yeldell (2017) noted correlations between years of service and levels of concern with technology implementation, indicating that similar results may have been expected with perceptions of engagement. However, given that years of teaching service does not directly relate to factors associated with technology integration, lack of a correlation with engagement in a technology rich environment, separate from other noted variables, is consistent with findings that gains in student success are greatest in the first few years of teaching service (Kini & Podolsky, 2016).

Perceptions of engagement for at-risk students showed a slight negative correlation with time since implementation of a technology initiative (r = -.19, p = .003), with r^2 = -.034 indicating that time since implementation statistically explained only 3% of the variance in

perceptions of engagement for at-risk students with perceptions decreasing as time since implementation increased. While statistically significant, given that the results account for only 3% of the variance, results indicate little correlation between time since implementation and engagement. Glaze (2018) noted improvements in student engagement beyond the first year of implementation, with improvement reliant on effective professional development. Results of this study indicating a negative correlation with time since implementation are likely indicative of a lack of effective professional development and support as time since implementation passes.

Perceptions of engagement for at-risk students showed a positive correlation with teacher self-rated technological proficiency (r = .190, p = .003), with r^2 = .0361 indicating self-rated proficiency statistically explained only 4% of the variance in engagement indicating a minimal impact for students. Heath (2017) identified teacher self-efficacy and agency with technology as correlated with improved student outcomes, noting more impactful results than those identified is this study. Teachers with positive feelings towards technology implementation and the belief that technology can improve student performance are more likely to transfer those feelings of autonomy and competence to their students, resulting in positive outcomes. Statistically significant correlations for two of the three identified variables for at-risk students led the researcher to reject the null hypothesis for RQ2a.

Results for RQ2b indicate statistically significant correlations between two of the three measured variables and perceptions of engagement for traditional students. Similar to the results for at-risk students, teacher years of service showed no correlation with engagement for traditional students (r = -.017, p = .793), with r^2 = .0002 indicating that teacher years of service statistically explained only .02% of the variance in traditional student engagement. As noted for RQ2a, years of service was found to previously correlate with teacher concerns over

implementation (Yeldell, 2017), but results for improved student outcomes are found greatest in the first few years of teaching (Kini & Podolsky, 2016). Lack of a connection between teacher years of service and factors related to technology implementation explain the lack of correlation noted in this study.

Perceptions of engagement for traditional students showed a slight negative correlation with time since implementation of a technology initiative (r = -.154, p = .015), with r^2 = .0237 indicating that time since implementation statistically explained only 2% of the variance in traditional student engagement with engagement decreasing as time since implementation increased. Similar to the results for at-risk students, these results contradict those noted by Glaze (2018). However, Glaze noted the importance of effective professional development and support in the continued positive impact of a one-to-one initiative, which was not a focus of this study.

Perceptions of engagement for traditional students showed a positive correlation with teacher self-rated technological proficiency (r = .186, p = .003), with r^2 = .0345 indicating that self-rated proficiency statistically explained 3% of the variance in traditional student engagement. Heath (2017) noted the importance of teacher self-efficacy to engagement at higher levels. Slightly lower correlation values for self-rated proficiency with traditional student engagement than for at-risk student engagement likely reflects teacher beliefs that positive impact on autonomy, competence, and relatedness in the classroom has a greater effect on students more in need of support than on those that achieve at a near expected level. Statistically significant correlations for two of the three identified variables for at-risk students led the researcher to reject the null hypothesis for RQ2b.

Results for RQ2c indicate statistically significant correlations between one of the three measured variables and perceptions of engagement for high-achieving students. Similar to the

results for at-risk and traditional students, teacher years of service showed no correlation with engagement for high-achieving students (r = -.105, p = .098), with r^2 = .011 indicating that teacher years of service accounted for only 1% of the variance in student engagement. Similarly, time since implementation showed no correlation with perceptions of engagement for high-achieving students (r = -.115, p = .069), with r^2 = .013 indicating that time since implementation statistically explained only 1% of the variability in high-achieving student engagement.

This result differs in statistical significance from the results assessing the relationship between time since implementation and engagement for at-risk and traditional students. While Glaze (2018) noted increased positive effects of technology beyond the first year of implementation, this study shows no relationship. The difference in results compared to the negative relationship noted for at-risk and traditional students likely owes to teacher positive perceptions of high-achieving students in general. Abernathy (2019) and Siegle (2017) noted enhanced opportunities for high-achieving students, with these students' experiences making them better equipped to take advantage of these opportunities. The lack of a negative relationship likely also indicates that being high-achieving students provides a buffer against the negative impacts that may be present if there is a lack of effective professional development and support.

Perceptions of engagement for high-achieving students showed a positive correlation with teacher self-rated technological proficiency (r = .154, p = .015), with r^2 = .0237 indicating that self-rated proficiency statistically explained only 2% of the variability in high-achieving student engagement. While statistically significant, self-rated proficiency has a minimal, at best, relationship with engagement. Differing results for high-achieving students from at-risk and traditional students again likely point to characteristics and skills present for these students that create greater perceptions of engagement regardless of environment or instructional approach.

Lack of statistically significant results for two of the three variable for high-achieving students led the researcher to fail to reject the null hypothesis for RQ2c.

Results for RQ2 can also be summarized in relation to the identified variables of teacher years of service, time since implementation, and teacher self-rated technological proficiency. Teacher years of service did not correlate at statistically significant levels for any of the three student groups. This result is in contrast to Yeldell's (2017) research noting that teacher years of service correlated with concerns over implementation, but fits more with Kini and Podolsky's 2016) finding that improved outcomes are greatest in the first few years of teaching service and taper over time. The lack of correlations found in this study between teacher years of service and engagement indicate that other factors are at play. Results noting a lack of correlation may also be owed to the reliance on perceptual results of engagement. These results may not be related to technology as a specific instructional approach and are more likely an indication of engagement in a specific classroom.

Time since implementation showed a slight negative correlation with engagement for at-risk and traditional students, but no correlation for high-achieving students. Results showing that time since implementation accounted for only 3% of the variance for at-risk students and 4% of the variance for traditional students provides minimal evidence of an impact on engagement. The researcher expected to note a positive correlation between time since implementation and engagement across all student groups in line with results noted in the research (Glaze, 2018). Negative correlations, though slight, may indicate dwindling professional development and support over time for survey respondents.

Results indicate that as time passes after initial implementation of a one-to-one technology initiative, perceptions of student engagement resulting from the technology decrease

slightly. These negative correlations may be indicative of waning support for teachers as they implement technology. Typically, a new initiative is paired with significant professional development and support in its early stages. The level of professional development and support typically decreases as districts continue to look for additional means of improving outcomes and district and building leadership expect previous initiatives to develop a self-sustaining characteristic. Stronger negative correlations for at-risk students may also indicate that teachers are effective at using new approaches to engage these students, but that there is a declining impact on engagement as the newness of an approach wears off. While research clearly indicated the importance of supported professional development in technology implementation (Bolkan, 2014), the importance of ongoing support beyond the first years of implementation is clearly just as significant given the negative, though small, correlations noted in this study.

Teacher self-rated technological proficiency showed statistically significant correlations with engagement for all student groups, though at levels that indicate minimal impact. Self-rated proficiency accounted for only 4% of the variance in engagement for at-risk students, dwindling to 2% of the variance for high-achieving students. While statistically significant results are in line with expectations from the research (Heath, 2017), the researcher expected results at a higher effect size. Limited impact of results may be a result of proficiency being self-rated rather than assessed using a proficiency measure. Additionally, responses for the self-rating question of the survey skewed heavily towards greater proficiency with expert and advanced accounting for 54% of responses while novice and beginner accounted for only 6%. The skewed variation in responses to the self-rated proficiency questions likely limited findings of stronger correlations.

This result clearly indicates that a teacher's own perceptions of their ability to use technology effectively in the classroom are a key ingredient in utilizing technology to engage

students. This result may also indicate that teacher self-efficacy is a key component to engagement in any environment and that self-efficacy may mitigate shortfalls in proficiency with any instructional approach. Increased teacher self-efficacy, whether related to technology or not, likely connects with increased autonomy, competence, relatedness in students, increasing engagement.

Correlations for each independent variable were strongest for at-risk students and weakest for high-achieving students. These results continue to indicate that perceptions of engagement in an environment with technology are more significant for at-risk students. Teachers perceive less of a relationship between technology and engagement for high-achieving students, likely indicating high perceptions of engagement for high-achieving students regardless of the environment. High-achieving students are more likely to express feelings of autonomy and competence in their school performance in general and, as a result experience less of an impact from specific instructional approaches. This may indicate that perceptions of engagement are more related to the overall perceptions of the student than they are to the specifics of the instructional environment.

Research Question 3 Conclusions. Research Question 3 attempted to determine if the independent variables of teacher years of service, time since implementation of a one-to-one technology initiative, or self-rated technological proficiency statistically significantly predicted perceptions of engagement in a one-to-one technology environment for at-risk, traditional, and high-achieving students. Multiple regression analyses were used to identify predictive relationships among identified variables. Data revealed statistically significant relationships, both positive and negative, for several of the variables.

RQ3a attempted to determine whether teacher years of service, time since implementation, or self-rated proficiency predicted engagement for at-risk students. The independent variables showed a statistically significant overall fit for predicting engagement for at-risk students (R^2 = .084). This indicates that the independent variables accounted for 8% of the variance in the dependent variable of engagement for at-risk students with a very small effect size of f = .105. Self-rated technological proficiency (B = 1.466, p < .001) and time since implementation (B = -.973, p < .001) were assessed at statistically significant slope coefficients, while years of teaching service (B = .129, p = .509) was not. These results indicate that self-rated technological proficiency positively predicts student engagement while time since implementation negatively predicts engagement for at-risk students. Years of teaching service does not predict engagement of at-risk students. While statistically significant slope coefficients were noted for two of three measured variables, the very small effect size associated with an f value of .105 indicates a minimal influence of those variables on at-risk student engagement. Minimal impact of the correlations limits the transferability of the results. Multiple regressions results match the correlations noted for at-risk students in RQ2a and led the researcher to reject the null hypothesis for RQ3a.

These results, similar to Heath (2017) indicate that self-rated technological proficiency plays a role in increasing student engagement in a technology rich environment and that school leaders must continue to find new ways to incorporate technology to avoid decreased engagement as the technology use becomes more commonplace in lessons. Similar to the results for RQ2a, these results, while limited in their effect, indicated that variables specifically related to implementation of a technology initiative are more impactful for at-risk students than for other

student groups. Greater impact for at-risk students likely relates to increased autonomy and relatedness available through technology use.

RQ3b attempted to determine whether teacher years of service, time since implementation, or self-rated proficiency predicted engagement for traditional students. The independent variables showed a statistically significant overall fit for predicting engagement for traditional students (R^2 = .066). This indicates that the independent variables accounted for 7% of the variance in the dependent variable of engagement for traditional students with a very small effect size of f = .08. Self-rated technological proficiency (B = 1.260, p < .001) and time since implementation (B = -.733, p = .001) were assessed at statistically significant slope coefficients, while years of teaching service (B = .030, p = .866) was not. These results indicate that self-rated technological proficiency positively predicts student engagement while time since implementation negatively predicts engagement for traditional students. Years of teaching service does not predict engagement of traditional students. While statistically significant slope coefficients were noted for two of three measured variables, the very small effect size associated with an f value of .08 indicates a minimal influence of those variables on traditional student engagement. Minimal impact of the correlations limits the transferability of the results

These results match the correlations noted for traditional students in RQ2b and led the researcher to reject the null hypothesis for RQ3b. These results show that variables specifically related to implementing a technology initiative are minimally impactful for traditional student engagement, though more of an influence than variables not related to technology implementation. Teacher years of service, which is not directly related to implementing a technology initiative does not influence student engagement as it relates to technology. As teacher perceptions of student engagement proceed along a continuum from at-risk to traditional

to high-achieving, perceptions of student autonomy, competence, and relatedness that influence engagement are likely to be higher. As a result, improvements in engagement from specific instructional approaches, to include technology integration, are likely to be less significant.

RQ3c attempted to determine whether teacher years of service, time since implementation, or self-rated proficiency predicted engagement for high-achieving students. The independent variables showed a statistically significant overall fit for predicting engagement for high-achieving students (R^2 = .045). This indicates that the independent variables accounted for 5% of the variance in the dependent variable of engagement for high-achieving students with a very small effect size of f = .06. Self-rated technological proficiency (B = .989, p = .002) and time since implementation (B = -.458, p = .031) were assessed at statistically significant slope coefficients, while years of teaching service (B = .169, p = .157) was not. These results indicate that self-rated technological proficiency positively predicts student engagement while time since implementation negatively predicts engagement for high-achieving students. Years of teaching service does not predict engagement of high-achieving students. A statistically significant slope coefficient was noted for only one of three measured variables, the very small effect size associated with an f value of .06 indicates a minimal influence of those variables on high-achieving student engagement. Minimal impact of the correlations limits the transferability of the results.

These results match the correlation noted for high-achieving students in RQ2c for self-rated proficiency only. The lack of significant results for time since implementation and teacher years of service led the researcher to fail to reject the null hypothesis for RQ3c. These results indicate that those factors identified as significant with engagement for at-risk and traditional students are less impactful for high-achieving students.

Self-rated technological proficiency served as a statistically significant, positive predictive variable for at-risk and traditional students. While still indicating a positive relationship, the predictive nature for high-achieving students was not statistically significant. The strongest positive predictive value exists for at-risk students, though the effect size is still considered very small (Cohen, 1988). Given the very small effects size, the impact of self-rated proficiency on student engagement can be described as minimal. While Heath (2018) noted that teacher self-efficacy and agency were vital components in technology implementation, results did not transfer in a substantial way to the results of this study. So, while the results of this study continue to support the notion that teacher comfort level with technology is an important factor in implementing strategies that engage students, more research is needed to identify the specific factors related to teacher proficiency that greatly impact student success. Additionally, results of this study support the previous notion that implementing instructional approaches and practices to improve engagement are more impactful for at-risk students.

Time since implementation served as a statistically significant, negative predictive variable for at-risk and traditional students. While still indicating a negative relationship, the predictive nature for high-achieving students was not statistically significant. As with self-rated technological proficiency, the strongest positive predictive value exists for at-risk students, though the effect size is also considered very small, indicating a minimal impact on engagement. Regardless of the limited effect size, the results are in contrast to researcher expectations given that Glaze (2108) found that greater benefits are realized after the first year of implementation. Most initiatives experience a decrease in measured variables during the first year, often referred to as the implementation dip, so an initial decrease in engagement may be expected. However, as initial obstacles are identified and overcome, increases in variables like engagement would be

expected over time. Negative correlations with limited effect size, indicate that factors like professional development and support are likely more impactful for the survey results than time since implementation.

Teacher years of service did not serve as a statistically significant predictive variable for any of the student groups. Data indicate a slight positive relationship for at-risk students and a slight negative relationship for traditional and high-achieving students. These results align with the lack of a statistically significant relationship between teacher years of service and student engagement identified in RQ2. Kini and Podolsky (2016) found that teacher years of service did correlate with greater educational outcomes for students as teacher develop skills necessary to provide instructional approaches that support the autonomy, competence, and relatedness necessary to increase engagement. However, Kini and Podolsky found that the greatest increases were found during the first few years of teaching and that improvements decline as service time increases. Given that Kini and Podolsky's work was not specific to technology, there may be limited transferability of the results. Lack of correlation between years of service and engagement in a technology rich environment simply indicates that, while more service generally leads to greater impact on students, that relationship is not true for technology implementation. Similar to results from RQ2, these results demonstrate that differences in perceptions of student engagement do exist based on how teachers view students (at-risk, traditional, high-achieving) and on teacher demographics.

Both time since implementation and self-rated proficiency are variables that directly relate to the technology being implemented, lending credibility to their impact on engagement in a technology rich environment. Teacher years of service, conversely, does not directly relate to technology implementation. While it may seem common to assume that younger teachers are

more likely to be digital natives and therefore more comfortable integrating technology as an instructional approach, the results of this study support the idea that factors not directly related to technology, like teacher years of service, are not as significant in improving student engagement associated with implementation of a technology initiative.

Discussion

One-to-one technology integration in schools has been seen as a means of improving education in one form or another since the late 1990s. However, the last decade has seen a tremendous increase in schools implementing these programs as a means of improving educational outcomes for students in an era of increased accountability. This study attempted to identify how factors such as the age of students, teacher self-rated technological proficiency, time since implementation of a technology initiative, and teacher years of service related to perceptions of student engagement. For this study, engagement was viewed through the lens of increased autonomy, competence, and relatedness as described by Ryan and Deci (2000). Results of this study will help to fill a gap in the literature on the relationship between technology and engagement for students as they progress from middle to high school as well as how technology relates to engagement for students from varied levels of academic success.

Typically speaking, high school students report slightly higher engagement levels than middle school students (Lee, 2014). However, in this study, middle school students were perceived to have slightly higher engagement levels in a technology rich environment. While these results were true for all student groups, the differences were greatest for traditional students and higher for at-risk students than for high-achieving students. Greater differences for traditional and at-risk students are indicative of higher perceptions of engagement for high-achieving students in general. As a result, implementation of a technology initiative had a

smaller impact on engagement for these high-achieving students. A difference in levels of engagement as students aged was expected, but previous research indicated that the difference would show a higher level of engagement for high school students. The results of this study point to improvements in engagement in a technology rich environment and are likely a result of lower perceptions of engagement for middle school students in general leading to greater improvements in engagement with technology.

In addition to comparing differences in perceptions of engagement for middle and high school students, this study attempted to identify relationships and predictive values between specific teacher and program characteristics with engagement levels. Of the variables considered, teacher self-rated technological proficiency had the greatest correlation and predictive value with respect to engagement. Teacher self-rated technological proficiency positively correlated with and predicted student engagement at statistically significant levels with r^2 values ranging from .02 for high-achieving students to .04 for at-risk students. These values indicate that only 2-4% of variance in engagement results from teacher self-rated proficiency. It is important to note that, while these results represent the strongest relationship, they were assessed at a limited effect size and do not indicate a substantial impact. As teacher perceptions of their own proficiency increased from novice to expert, their perceptions of engagement increased as well. These results were expected as they align with Hattie's (2012) work on teacher efficacy as it relates to students achievement. These results also highlight the importance of providing effective support for teachers as they prepare to implement technology in their classrooms. Simply helping teachers develop a level of comfort with technology provides the confidence necessary to create higher levels of engagement in the classroom. Similar to differences in overall engagement perceptions, the relationship between self-rated proficiency and engagement was highest for at-risk and

traditional students. As with other instructional practices designed to engage struggling students, familiarity and confidence with the approach is a significant factor in its implementation.

Time since implementation of a technology initiative showed a negative correlation with student engagement at statistically significant levels with r^2 values ranging from .01 for high-achieving students to .03 for at-risk students. These values indicate that only 1-3% of variance in engagement results from increases in time since implementation, evidence of a weak relationship between the variables. Research into the effectiveness of one-to-one programs has found generally positive results over time (Zheng, 2016), so results indicating a negative correlation between perceptions of engagement and time since implementation was an unexpected result. However, the very small effect sizes noted in this study limit the ability to compare results with other studies. The correlation was strongest for at-risk students with results for high-achieving students not at a significant level. Stronger correlation for at-risk students again points to more challenges in creating and maintaining high engagement levels for struggling students. Negative correlation overall, may point to an increased need to provide support to teachers in continuing implementation with new approaches as well as the need to provide evidence of the impact of technology in the classroom for teachers. Providing evidence of impact has the potential to counter decreases in perceptions of engagement.

Both self-rated technological proficiency and time since implementation showed statistically significant correlations with perceptions of engagement, though, at small effect sizes. Teacher years of service did not correlate with or predict perceptions of engagement. Higher teacher years of service showed only a minimal positive relationship, though not statistically significant, with engagement of at-risk students. Conversely, higher years of service showed minimal negative relationships with engagement of traditional and high-achieving students.

Neither relationship was statistically significant. Traditional expectations may indicate that younger teachers, earlier in their career, would be more open to engaging with new technologies and implementing them to improve engagement in classrooms than teachers with greater years of service. However, these results fit with research indicating that years of teaching service does not correlate with perceptions on professional development related to one-to-one technology (Gallamore, 2016).

In general, based on statistically significant results, this study supports the notion that implementation of a one-to-one technology initiative supports student engagement. However, the effect sizes are generally small for at-risk and high-achieving students. Results in the medium effect size range were noted for traditional students as assessed in research question one. Greater effect size for the difference in traditional student engagement points to perceptions of these students as being more susceptible to improvements in the teaching and learning process. At-risk students are often perceived as less engaged across instructional environments and high-achieving students are likewise perceived as more engaged across instructional environments. Students that are viewed as moving through a variety of states of engagement depending on factors such as the instructional approach and relationships within the classroom will fit a teacher's model of traditional. These students, as evidenced by the results of this study are more likely to respond to differing approaches, including technology integration. Results also point to improvements in engagement being greater for those students that are traditionally less engaged, whether that be middle school students as a whole, or at-risk students across grade levels. Given that these student groups are typically less engaged, either based on developmental level or past academic experiences, the results provide encouragement for educators when considering technology as a means of improving engagement for these groups. Results also highlight the

importance of considering whether any, singular approach to improving outcomes is appropriate to implement across all student groups. Students that are typically more engaged in school may require different instructional approaches to support their learning needs than those of students in at-risk groups.

The results of this study provide educators with important factors to consider when implementing a one-to-one technology initiative to improve student success. However, due to limitations of the study, results should be utilized with caution. The survey instrument was utilized with permission from a previous author that reported high reliability and validity. Limited psychometric data available on the survey instrument leaves true reliability and validity in question. Additionally, results from this study reflect only perceptions of engagement for those teachers in Missouri public middle and high schools that were forwarded the survey by building and district administrators. As result, this study does not include student perceptions or true measures of student engagement and cannot demonstrate causality between technology and engagement. Most importantly, while the researcher noted statistically significant results for many of the research questions, the effect sizes of the results were minimal. The largest effect size noted in the study was in Cohen's (1988) medium range with most values falling in the very small to small range. These results highlight the importance of implementing engaging instructional techniques to move students from the proficient to advanced levels of achievement. The limited impact of the results, while statistically significant, indicates that the measured variables of grade level taught, teacher years of service, time since implementation, and self-rated technological proficiency did not provide strong evidence for decision-making around technology initiatives. While the methodology, results, and conclusions provide important

considerations for future research and technology implementations strategies, the researcher recommends utilizing this study in conjunction with additional research in this area.

Implications

Results of this study point to the need for educators and educational leaders to consider the goals they wish to achieve through the implementation of a technology initiative. While technology can be a means of creating greater access for students, it is important to consider the potential impact on achieving successful outcomes. At the classroom level, teachers should carefully consider how and when technology is utilized. Consistent with the results of this study, over utilization may result in decreased engagement over time. Instead, implementing technology as an instructional practice only when it creates a learning opportunity that would otherwise not be available may extend increases in engagement realized through technology. Additionally, teachers should consider that implementing technology into a lesson may not make sense for all students at any given time. As results indicate, teachers perceive that high-achieving students see less of an impact with technology. Providing these students with technology free options to engage with content may provide greater levels of engagement. Similarly, activities that may not have traditionally required the use of technology may prove to be more engaging for students with previous academic struggles. For teachers that teach homogenous classes at either end of the achievement scale, this means that technology implementation in classroom lessons will look different for these groups. Lower achieving student groups may benefit from more frequent, shorter doses of technology, even if it is used for learning focused more on basic skills. Likewise, high-achieving students may benefit from less frequent technology integration where usage is focused more on extending learning. For teachers in heterogeneous classrooms,

implementation may require student grouping or utilizing a workshop models that allow for portions of a lesson to be technology based while others are not.

Given that this study has identified slight differences in teacher perceptions of engagement between middle and high school students, school leaders should carefully consider the most appropriate strategies for implementation. Leaders must have clear goals regarding how technology can enhance instruction for students at different ages and consider whether full implementation of a one-to-one technology initiative is the appropriate strategy for achieving that goal. With time since implementation demonstrating a negative relationship with engagement, leaders may consider whether a full one-to-one program, where students have access throughout the school day and at home is the best approach. It may be that providing teacher directed access for younger students followed by full one-to-one implementation is more effective at maintaining high engagement levels.

Similarly, the degree of implementation for varying student groups should also be considered. Given that the results of this study show a greater relationship between perceptions of engagement for at-risk students than traditional and high-achieving students, leaders should consider how to provide access so that teachers might implement technology in classrooms that may contain a wide variety of students. This consideration will be just as important in classrooms that may contain a disproportionate number of at-risk students, such as an alternative setting, or high-achieving students, such as advanced placement and honors classes.

Regardless of the timing and degree of implementation, if technology is seen as a means of improving outcomes for students, district and building leaders must ensure that it is supported by ongoing professional development and that leaders identify ways to support teachers at all levels of proficiency. Providing only entry-level development runs the risk of alienating teachers

that have previously developed technology skills. Likewise, providing only advanced development may lead to an otherwise strong teacher that is a beginner with technology being resistant to implementation. Leaders must be thoughtful in planning initial professional development that meets each teacher at the appropriate level and include initial assessment of technological proficiency as a part of that planning. Initial assessment will provide dual benefits of placing teachers at the appropriate level of support and helping them to self-identify and realize their own level of proficiency to better engage with their own professional development. Additionally, professional development and support must be continuous and provide teachers with options at their current level that also provide the opportunity for accelerated growth in technology implementation. As schools and districts move past initial implementation, it will be vital to provide access to resources and learning that help teachers grow in their implementation from initial substitution of technology for traditional means to utilizing technology to transform learning into opportunities not previously available to students.

As schools and districts continue to look towards technology to support student learning, results from this study provide information that may aid in decision-making. Results align with the theoretical framework of the study by indicating that technology implementation correlates with higher levels of engagement, especially for those students that typically experience lower engagement levels. However, given that the relationships noted were assessed at small effect sizes, educational leaders should take caution in utilizing these results for middle and high school programming and planning purposes in the absence of other sources of information. Additionally, as districts continue to look at providing technology rich environments for younger students, care should be taken in extrapolating any results to elementary levels. Students at

younger ages will certainly need greater support in all areas related to technology and may not be ready for full one-to-one initiatives given their stage of development.

Recommendations for Future Research

This quantitative study set out to identify and determine differences in how teachers perceive engagement for middle and high school students as they relate to the implementation of a one-to-one technology initiative. Additionally, this study attempted to provide insights on how perceptions of engagement relate to years of teaching service, time since implementation of a one-to-one technology initiative, and self-rated technological proficiency. The information gathered may be of value to educators and school leaders when planning for implementation of a one-to-one technology initiative and how to ensure effective support for the teachers responsible for implementing at the classroom level. To continue and improve the research in this area, the researcher recommends the following:

1. Replicate this study across a greater range of grade levels in schools that have implemented technology initiatives below the middle school level.
2. Conduct a study that compares teacher professional development and support programs for those teachers present for initial implementation versus those hired after initial implementation.
3. Conduct a qualitative study to identify specific differences in teacher perceptions of engagement in a one-to-one environment for students in different groups (at-risk, traditional, high-achieving).
4. Conduct a longitudinal study that measures teacher perceptions of student engagement prior to and after implementation of a one-to-one technology initiative.

5. Conduct a study to identify specific reasons for the negative relationship shown between time since implementation of a technology initiative and teacher perceptions of student engagement.

Conclusions

The goal of this study was to increase the body of research in the state of Missouri regarding teacher perceptions of how implementing a one-to-one technology initiative related to student engagement at different grade levels and for different student groups. Ryan and Deci's (2000) self-determination theory of motivation served as the theoretical underpinning of this study. The researcher proposed that integrating technology into classroom instruction would increase autonomy, relatedness, and connectedness to learning that increases motivation and resulting engagement. An independent samples *t*-test was used to compare teacher perceptions of engagement in a technology rich environment for middle and high school students. In addition, Pearson's *r* and multiple regression analyses were used to assess engagement for at-risk, traditional, and high-achieving students as it related to teacher and program variables including teacher self-rated technological proficiency, time since implementation, and teacher years of service.

The findings provide insight into how the classroom teachers most responsible for the day-to-day instruction and implementation of technology, perceive the impact of these practices on student success. Deciding whether to implement a one-to-one technology initiative in a school or district requires significant consideration of variables ranging from cost to expected outcomes that are intended be affected. Understanding the potential barriers at the classroom level can provide school and district leaders with information necessary to plan for using technology in a manner that most benefits students.

This study fills a gap in the literature on how engagement in a technology rich environment changes as students progress from middle to high school. Additionally, this research fills a gap in the literature on how engagement in a technology rich environment varies based on levels of student achievement and demonstrates that implementing a technology initiative may not provide the same level of expected results across all grade levels and student groups.

Results of the *t*-test identified differences in perceptions of engagement between middle and high school students with greater increases noted at the middle school level, though the results were assessed at small effect sizes, limiting their usefulness. Additionally, results of the Pearson's *r* and multiple regressions identified stronger relationships between measured the variables of self-rated technological proficiency, time since implementation, and teacher years of service with engagement for at-risk students than for high-achieving students. Again, while results for some variables were statistically significant, all fell within the very small to small effect size range, limiting their usefulness and transferability. The results indicated that those students at greater risk for disengagement, by developmental level or previous academic success, experience greater increases in engagement resulting from technology than those students not at risk. The implication is that creating a technology rich environment provides the necessary ingredients for motivation and engagement at the levels where they are most needed.

Perceptions of engagement demonstrated slight positive correlations with self-rated proficiency and slight negative correlations with time since implementation. While limited in effect, these results highlight the importance of effective and sustained professional development and support of a technology initiative. To realize more significant results, leaders must provide initial support during implementation at the level of current teacher proficiency and then provide

continued development and support that meets individual teachers at their level and provides for a wide variety of professional development in degree and scope of implementation.

When considering all of the results of this study, it is important to note that, while statistically significant, results were of limited effect size. The greatest effect size noted in the study approached Cohen's (1988) threshold for medium effect with most results in the very small to small range. Therefore, the impact of the measured variables on student engagement should be considered minimal and requires further study to identify variables that are more impactful. The most significant conclusion that may be drawn from these results is that it is the teacher in the classroom that most significantly influences student engagement. Brooks (2012) noted that individual student characteristics and previous performance affect student engagement. It has also been noted that factors from teacher characteristics (Zee & de Bree 2017) to peer relationships (Kiuru et al. 2014; Schnell, 2014) and parental factors (Palmer, 2016) can positively influence engagement. However, it is the approach of the teacher within the classroom that most significantly influences engagement (Alexander, 2017; Day, 2016; Erz, 2018; Pennington, 2016).

The lack of results with substantial effect size indicates that the integration of technology in and of itself is not the determining factor in engaging students. Teachers that connect with students and provide learning opportunities that create feelings of autonomy, competence, and relatedness, regardless of the learning platform or specific instructional technique will realize the greatest increases in engagement and accompanying success. Additionally, the lack of noteworthy results meets with the wide variety of success measures related to technology. Successes with technology integration are frequently noted for specific populations or for specific tasks or contents. However, broad successes in improved student outcomes over time

continue to be elusive. The lack of conclusive results may be a result of continuing experimentation with new platforms and instructional applications as districts continue to seek out current best practices and teachers utilize individual license to test out the latest application. With technology growth and change occurring at an ever-increasing rate, realizing significant impacts from implementation will require district leaders to have clear goals for how technology will enhance student learning and clear plans for providing the professional development and support necessary to help teachers at the classroom level implement the technology in alignment with district and building goals.

REFERENCES

Abernathy, C. S. (2019). *The use of digital devices with high-performing students in elementary schools* (Order No. 13810248). Available from ProQuest Dissertations & Theses Global. (2272212550). Retrieved from https://search.proquest.com/docview/2272212550?accountid=14196

Abubakar, A., & Dimitrova, R. (2016). Social connectedness, life satisfaction and school engagement: Moderating role of ethnic minority status on resilience processes of roma youth. *European Journal of Developmental Psychology, 13*(3), 361-376. doi:http://dx.doi.org/10.1080/17405629.2016.1161507

Abrams, R. A., & Weidler, B. J. (2015). How far away is that? It depends on you: Perception accounts for the abilities of others. *Journal of Experimental Psychology: Human Perception and Performance*, *41*(4), 904-908. DOI:10.1037/xhp0000070

Ahn, I. (2014). *Relations between teachers' motivation and students' motivation: A self-determination theory perspective* (Order No. 1564800). Available from ProQuest Dissertations & Theses Global. (1615868838). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1615868838?accountid=14196

Aijaz, A. G., & Aijaz, R. (2014). A study to investigate the relationship between locus of control and academic achievement of students. *I-Manager's Journal on Educational Psychology*, *8*(1), 1-9. Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1693778717?accountid=14196

Aker, L. B. (2016). *A meta-analysis of middle school science engagement* (Order No. 10157330). Available from ProQuest Dissertations & Theses Global. (1837110561). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1837110561?accountid=14196

Akey, T. M. (2006). School context, student attitudes and behavior, and academic achievement: An exploratory analysis. New York: MDRC. Retrieved September 28, 2014 from http://www.mdrc.org/publications/419/full.pdf

Alexander, B. G. (2017). *Student voice initiative: Exploring implementation strategies* (Order No. 10641948). Available from ProQuest Dissertations & Theses Global. (1973128624). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1973128624?accountid=14196

Anderson, K. (2019). *How access to technology can create equity in schools.* Digital Promise: Accelerating Innovation in Education. Retrieved from https://digitalpromise.org/2019/04/29/equity-in-schools-access-technology/

Appleton, J. J. & Lawrenz, F. (2011). Student and teacher perspectives across mathematics and science classrooms: The importance of engaging contexts. *School Science and Mathematics, 111*(4), 143-155.

Ashwin, P. & McVitty, D. (2015). *The meanings of student engagement: Implications for policies and practices*. In A. Curaj et al. (eds) The European Higher Education Area, pp. 343–59. Springer International Publishing.

Bailey, A., Henry, T., McBride, L., & Puckett, J. (2011). *Unleashing the potential of technology in education.* Boston, MA: Boston Consulting Group. Retrieved from http://net.educause.edu/ir/library/pdf/CSD6149.pdf

Balfanz, R. & Byrnes, V. (2012) *The importance of being in school: A report on absenteeism in the nation's public schools.* Retrieved from https://new.every1graduates.org/the-importance-of-being-in-school/

Balfanz, R. & Chang, H. N. (2013). *A focus on attendance is key to success*. Middle Level Leadership, *2013*(Jan). Retrieved from http://nassp.org

Balfanz, R., Herzog, L., & MacIver, D. J. (2014*). Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools*. Baltimore, MD: John Hopkins University Center for Social Organization of Schools.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122-147.

Barnes, K., Marateo, R. C., & Ferris, S. P. (2007). Teaching and learning with the net generation. *Innovate: Journal of Online Education, 3*(4). Retrieved from https://nsuworks.nova.edu/innovate/vol3/iss4/1

Bear, G. G., Gaskins, C., Blank, J., & Chen, F. F. (2011). Delaware School Climate Survey—Student: Its factor structure, concurrent validity, and reliability. *Journal of School Psychology, 49*(2), 157–174. https://doi.org/10.1016/j.jsp.2011.01.001

Bebell, D. & Kay, R. (2010). One to one computing: A summary of the quantitative results from the berkshire wireless learning initiative. *Journal of Technology, Learning, and Assessment, 9*(2).

Benner, A. D. & Wang, Y. (2014) Shifting attendance from middle to high school: Influences of school transitions and changing school contexts. *Developmental Psychology, 50(4),* 1288-1301.

Bempechat, J., & Shern, D. J. (2012). Parental influences on achievement, motivation, and student engagement. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 3, Section 15). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Berman-Young, S. (2014). *Teacher-student relationships: Examining student perceptions of teacher support and positive student outcomes* (Order No. 3635091). Available from ProQuest Dissertations & Theses Global. (1614471854). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1614471854?accountid=14196

Blevins, S. M. (2009). *A Study of Student Perceptions Regarding Attendance in a Rural East Tennessee High School*. Retrieved from https://dc.etsu.edu/etd/1845

Bolkan, J. (2014). Research: Most teachers use technology, few see improvements in achievement. *The Journal*. Retrieved from http://thejournal.com/Articles/2014/04/21/Research-Most-Teachers-Use-Technology-Few-See-Improvemnts-in-Achievement.aspx?p=1.

Bradley, P. A. (2015). *Attributional motivators on reading assignment compliance in a community college developmental reading course* (Order No. 3689485). Available from ProQuest Dissertations & Theses Global. (1679278547). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1679278547?accountid=14196

Brandon, A. J. (2016). *Student engagement in a public high school setting and its effect on student attendance, achievement, and attachment* (Order No. 10144234). Available from ProQuest Dissertations & Theses Global. (1825684057). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1825684057?accountid=14196

Brooks, R., Brooks, S., & and Goldstein, S. (2012). The power of mindsets: Nurturing engagement, motivation, and resilience in students. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 4, Section 26). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Broussard, S. C., & Garrison, M. E. B. (2004). The relationship between classroom motivation and academic achievement in elementary school-aged children. *Family and Consumer Sciences Research Journal, 33*(2), 106-120.

Bruner, C., Discher, A., & Chang, H. (2011). *Chronic Elementary Absenteeism: A Problem Hidden in Plain Sight.* Child and Family Policy Center and Attendance Works. Retrieved from https://www.edweek.org/media/chronicabsence-15chang.pdf

Burns Jermain, C. (2018). *Chronic absenteeism in rhode island public schools: A crisis in the making* (Order No. 10937947). Available from ProQuest Dissertations & Theses Global. (2132051179). Retrieved from https://search.proquest.com/docview/2132051179?accountid=14196

Callahan, J. (2018). *The efficacy of problem-based teaching strategies on facilitating student engagement in a flipped learning module* (Order No. 10746580). Available from ProQuest Dissertations & Theses Global. (2028098355). Retrieved from https://search.proquest.com/docview/2028098355?accountid=14196

Cano, D. R. (2015). *The effect of engagement on at risk student achievement: A correlational investigation* (Order No. 3712155). Available from ProQuest Dissertations & Theses Global. (1707944557). Retrieved from https://search.proquest.com/docview /1707944557?accountid=14196

Cavanagh, R. F. (2015). A unified model of student engagement in classroom learning and classroom learning environment: One measure and one underlying construct. *Learning Environments Research, 18*(3), 349-361. doi:http://dx.doi.org/10.1007/s10984-015-9188-z

Chang, H. (2014). *Attendance in the Early Grades: Why It Matters for Reading*. Attendance Works. Retrieved from: www.attendanceworks.org/wordpress/wp/ 09Absenses-Add-Up_090114-1-1.pdf.

Chang, H. (2016). *Every Student, Every Day: Attendance Works*. San Francisco, CA.

Chen, D., Yang, C., Bear, G., & Zhen, S. (2013). *School engagement as mediator between school climate and achievement.* Paper presented at the annual convention of the National Association of School Psychologists, Seattle, WA, USA. Retrieved from https://www.researchgate.net/publication/324183400_Relationships_between_student_engagement_and_academic_achievement_A_meta-analysis

Chi, U. J. (2014). *Classroom engagement as a proximal lever for student success in higher education: What a self-determination framework within a multi-level developmental system tells us* (Order No. 3616092). Available from ProQuest Dissertations & Theses Global. (1526020481). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1526020481?accountid=14196

Clark, J. G. (2017). *Engagement's mediation of the relationship between personalized learning and achievement* (Order No. 10826056). Available from ProQuest Dissertations & Theses Global. (2050719569). Retrieved from http://eagle.sbuniv.edu :2048/login?url=https://search.proquest.com/docview/2050719569?accountid=14196

Clarke, E. J. (2016). *One-to-one laptops in a public secondary school: Students' usage and the impact on achievement* (Order No. 10241466). Available from ProQuest Dissertations & Theses Global. (1857474248). Retrieved from https://search.proquest .com/docview/1857474248?accountid=14196

Coerdt, M. A. (2018). *A case study of experiences and challenges of students, faculty and staff regarding instructional technology* (Order No. 13425506). Available from ProQuest Dissertations & Theses Global. (2175695646). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2175695646 ?accountid=14196

Cohen, J. E. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self processes in development: Minnesota symposium on child psychology* (Vol. 23, pp. 167-216). Chicago, IL: University of Chicago Press.

Cordell, D., Eckhart, S., Hauser, J., & McGriff, N. (2012). *Educational technology in schools.* Report of the American Association of School Librarians. Retrieved from http://www.ala.org/aasl/sites/ala.org.aasl/files/content/aaslissues/positionstatements/AAS L_Ed_Tech_WhitePaper.pdf

Cornell, D., Shukla, K., & Konold, T. R. (2016). Authoritative school climate and student academic engagement, grades, and aspirations in middle and high schools. *AERA Open, 2*(2). https://doi.org/10.1177/2332858416633184

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating Quantitative and Qualitative Research.* Boston, MA: Pearson.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* Los Angeles, CA: Sage.

Culver, B. L., Jr. (2017). *Technology in education: Technology integration into the school's curriculum* (Order No. 10263363). Available from ProQuest Dissertations & Theses Global. (1884348372). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1884348372?accountid=14196

Cushing, M. (2018). *Implementing one-to-one technology to improve student achievement in selected Illinois high school districts* (Order No. 10928377). Available from ProQuest Dissertations & Theses Global. (2100024895). Retrieved from https://search .proquest.com/docview/2100024895?accountid=14196

Darling-Hammond, L., Zielezinski, M. B., & Goldman, S. (2014). *Using Technology to Support At-Risk Students' Learning*. Retrieved from https://edpolicy.stanford.edu/sites/default/files/scope-pub-using-technology-report.pdf

Davis, A. L. (2016). *Risk-taking behavior in adolescence: Exploring the roles of family, peers, and school* (Order No. 10587558). Available from ProQuest Dissertations & Theses Global; Psychology Database; Public Health Database. (1885057814). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1885057814 ?accountid=14196

Day, K. L. (2016). *Teacher self-efficacy, instructional practices, and student achievement in mathematics: A correlational study* (Order No. 10248996). Available from ProQuest Dissertations & Theses Global. (1855473481). Retrieved from http://eagle.sbuniv .edu:2048/login?url=https://search.proquest.com/docview/1855473481?accountid=14196

Deci, E. L. (1975). *Intrinsic motivation*. NY: Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (pp. 237-288). NE: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

Diseth, A., Danielsen, A. G., & Samdal, O. (2012). A path analysis of basic need support, self-efficacy, achievement goals, life satisfaction and academic achievement level among secondary school students. *Educational Psychology*, *32*(3), 335–354. doi:10.1080/01443410.2012.657159

Diemer, T. T., Fernandez. E., & Streeply, J. W. (2012). Student perceptions of classroom engagement and learning using iPads. *Journal of Teaching and Learning with Technology, 1*(2), 13-25.

Dunleavy, M., Dexter, S., & Heinecke, W. F. (2007). What value added does a 1:1 student to laptop ratio bring to technology-supported teaching and learning? *Journal of Computer Assisted Learning*, *23*(5), 440-452.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405– 432. Retrieved from http://dx.doi.org/10.1111/j .1467-8624.2010.01564.x

Eccles, J., & Midgley, C. (1989). Stage/environment fit: Developmentally appropriate classrooms for early adolescents. In R. E. Ames & C. Ames (Eds.), *Research on Motivation in Education, 3*, 139-186. NY: Academic.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*, 109-132.

Engels, M. C., Colpin, H., van Leeuwen, K., Bijttebier, P., van den Noortgate, W., Claes, S., Verschueren, K. (2016). Behavioral engagement, peer status, and teacher-student relationships in adolescence: A longitudinal study on reciprocal influences. *Journal of Youth and Adolescence, 45*(6), 1192–1207. doi:10.1007/s10964-016-0414-5

Epstein, J. L. & Sheldon, S. B. (2002). Present and accounted for: Improving student attendance through family and community involvement. *The Journal of Educational Research, 96(*5*)*, 308-318.

Eryilmaz, A. (2014). Perceived personality traits and types of teachers and their relationship to the subjective well-being and academic achievements of adolescents. *Educational Sciences: Theory and Practice, 14*(6), 2049-2062.

Erz, S. L. (2018). *Impact and implications of the flexible learning environment in the at-risk secondary classroom* (Order No. 10932256). Available from ProQuest Dissertations & Theses Global. (2103945987). Retrieved from http://eagle.sbuniv.edu:2048/login ?url=https://search.proquest.com/docview/2103945987?accountid=14196

Evans, J. A., (2018). *The educational equity imperative: Leveraging Technology to empower learning for all.* Irvine, CA. Project Tomorrow. Retrieved from https://tomorrow .org/speakup/speakup_data_findings.html

Eversgerd, W. (2014). *An exploration of teacher behaviors that most affect student learning: A student perspective case study* (Order No. 3579643). Available from ProQuest Dissertations & Theses Global. (1508480854). Retrieved from http://eagle .sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1508480854?accountid =14196

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160.

Federici, R. A., & Skaalvik, E. M. (2014). Students' perception of instrumental support and effort in mathematics: The mediating role of subjective task values. *Social Psychology of Education: An International Journal, 17*(3), 527-540. doi:http://dx.doi.org/10.1007/s11218-014-9264-8

Finn, J. D. & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 1, Section 5). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Fiorillo, M. (2015). *Teacher Perception of Student Engagement in a One-to-One Computing Environment*. Retrieved from https://search.proquest.com/results /DCF7908D861B429APQ/1?accountid=14196

Fort, D. A. (2004). *A study of the effectiveness of a modified attendance policy at a medium-sized high school in the Midwest.* Retrieved from http://eagle.sbuniv.edu

Fortney, V. J. (2016). *An exploration of factors that influence student engagement in science* (Order No. 10228494). Available from ProQuest Dissertations & Theses Global. (1868414270). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1868414270?accountid=14196

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement. Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59-109.

Furlong, M. J. & Christenson, S. L. (2008). Engaging students at school and with learning: A relevant construct for all students. *Psychology in the Schools, 4*(5), 365-368.

Gallamore, H. J. (2017). *High school teacher perceptions of professional learning, focused on classroom instruction, needed during a one-to-one technology initiative* (Order No. 10686222). Available from ProQuest Dissertations & Theses Global. (1977414049). Retrieved from https://search.proquest.com/docview/1977414049?accountid=14196

Gardner, D. P., And Others, & National Commission on Excellence in Education, E. W. D. (1983). A Nation At Risk: The Imperative For Educational Reform. *An Open Letter to the American People.* A Report to the Nation and the Secretary of Education. Retrieved from https://www2.ed.gov/pubs/NatAtRisk/risk.html

Garon-Carrier, G., Boivin, M., Guay, F., Kovas, Y., Dionne, G., Lemelin, J-P., Séguin, J., Vitaro, F., & Tremblay, R. E. (2016). Intrinsic motivation and achievement in mathematics in elementary school: A longitudinal investigation of their association. *Child Development, 87*(1), 165-175. doi: 10.1111/cdev.12458

Gauley, J. (2017). *Pathways to student engagement in school: Exploring the effects of school climate on school engagement* (Order No. 10277195). Available from ProQuest Dissertations & Theses Global. (1896975493). Retrieved from http://eagle.sbuniv .edu:2048/login?url=https://search.proquest.com/docview/1896975493?accountid=14196

German, R. (2017). *The impact of home and school environmental consistency on academic motivation and outcomes* (Order No. 10601324). Available from ProQuest Dissertations & Theses Global. (1937564385). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1937564385?accountid=14196

Gettinger, M., & Walt, M. J. (2012). Classroom strategies to enhance academic engaged time. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 4, Section 31). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Glassman, S. J. (2016). *The relationship between observed task characteristics and the pattern of seventh grade students' situational engagement during a science unit* (Order No. 10246566). Available from ProQuest Dissertations & Theses Global. (1873102177). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com /docview/1873102177?accountid=14196

Glaze, R. (2018). *The relationship between professional development and the implementation of 1:1 technology in the middle school classroom* (Order No. 10975750). Available from ProQuest Dissertations & Theses Global. (2160661818). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2160661818 ?accountid=14196

Glos, K. S. (2018). *Exploring the relationship between teacher self-efficacy and mindset in high school teachers* (Order No. 10838413). Available from ProQuest Dissertations & Theses Global. (2071735366). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/2071735366?accountid=14196

Goodman, S. G. (2017). *The strategic mindset model: An integrative approach to motivation and performance* (Order No. 10288006). Available from ProQuest Dissertations & Theses Global. (1941585327). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1941585327?accountid=14196

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82*(3), 525-538.

Great Maine Schools Project. (2004). *One-to-one laptops in a high school environment: Piscataquis community high school study final report.* Maine; Mitchell Institute. Retrieved from https://www.maine.gov/mlti/articles/research/PCHSLaptopsFinal.pdf

Greaves, T. W., Hayes, J., Wilson, L., Gielniak, M. & Peterson, E.L. (2012) *Revolutionizing education through technology.* Washington, DC: International Society for Technology in Education.

Gregory, A., Allen, J., Mikami, A., Hafen, C., & Pianta, P. (2013). Effects of a professional development program on behavioral engagement in middle and high school. *Psychology in the Schools*. *51*(2), 143-163. Retrieved from http://wileyonlinelibrary.com/journal/pits

Griffiths, A. J., Lilles, E. Furlong, M. J., & Sidhwa, J. (2012). The relations of adolescent student engagement with troubling and high-risk behaviors. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 4, Section 27). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Grimes, D., & Warschauer, M. (2008). Learning with laptops: A multi-method case study. *Journal of Educational Computing Research, 38*(3), 305-332.

Guthrie, J. T., & Klauda, S. L. (2014). Effects of classroom practices on reading comprehension, engagement, and motivations for adolescents. *Reading Research Quarterly, 49*(4), 387-416.

Hallam, S. & Rogers, L. (2008). *Improving attendance and behavior at school.* Berkshire, England: McGraw-Hill.

Halliday, S. E. (2018). *Learning engagement across the transition to school: Investigating the measurement of learning engagement and the effects of early emotion regulation* (Order No. 10977659). Available from ProQuest Dissertations & Theses Global. (2213430999). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com /docview/2213430999?accountid=14196

Hanover Research. (2013). *New tech schools and student achievement.* Washington DC: Hanover Research. Retrieved from: http://www.newtechnetwork.org/about/data/new-tech-schools-and-student-achievement

Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625-638.

Harlow, H. F., Harlow, M. V. and Meyer, D, R. (1950). Learning motivated by a manipulation drive. *Journal of Experimental Psychology*, *40*(2), 228-234.

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London: Routledge.

Havlicek, L. L., & Peterson, N. L. (1976). Robustness of the Pearson Correlation against Violations of Assumptions. *Perceptual and Motor Skills, 43*(3), 1319-1334. Doi 10.2466/pms.1976.43.3f.1319

Marie K. Heath (2017) Teacher-initiated one-to-one technology initiatives: How teacher self-efficacy and beliefs help overcome barrier thresholds to implementation. *Computers in the Schools*, 34(1-2), 88-106, DOI10.1080/07380569.2017.1305879

Heller, R., Calderon, S., & Medrich, E. (2003). *Academic achievement in the middle grades: What does research tell us?* A review of the literature. Atlanta, GA: Southern Regional Education Board. Retrieved from http://publications.sreb.org/2002/02V47 _AchievementReview.pdf

Helms, J. A. (2016). *School engagement perceptions influencing attendance reported by ninth grade students at a high performing rural school* (Order No. 10242894). Available from ProQuest Dissertations & Theses Global. (1858810703). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1858810703 ?accountid=14196

Henry, K. L. (2007). Who's skipping school: Characteristics of truants in 8th and 10th grade. *Journal of School Health*, 77(1), 29-35. Retrieved from http://eagle.sbuniv.edu :2087/eds/pdfviewer/pdfviewer?vid=2&sid=1fa5d3d3-5b3d-4c32-aa10-6cb5eb82b8b4%40sessionmgr4004&hid=4110

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research, 70*(2), 151-179.

Higgins, S.E., Xiao, Z., & Katsipataki, M. (2012). The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation.

Howard, D. M. B. (2016). *Self-efficacy may be a prequel, sequel, or bidirectional to the math academic performance of fifth grade black males* (Order No. 10103695). Available from ProQuest Dissertations & Theses Global. (1785369680). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1785369680?accountid=14196

Howley, I. (2015). *Leveraging educational technology to overcome social obstacles to help seeking* (Order No. 3746518). Available from ProQuest Dissertations & Theses Global. (1763814175). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1763814175?accountid=14196

Hughes, J. N., Hee Im, M., & Allee, P. J. (2015). Effect of school belonging trajectories in grades 6-8 on achievement: Gender and ethnic differences. *Journal of School Psychology, 53*(6), 493-507.

Hull, C. L. (1943). *Principles of behavior: an introduction to behavior theory*. Oxford, England: Appleton-Century. Retrieved from http://s-f-walker.org.uk/pubsebooks/pdfs/Principles%20of%20Behavior%20-%20Clark%20Hull.pdf

Inda-Caro, M., Maulana, R., Fernández-García, C., Peña-Calvo, J., del, C. R., & Helms-Lorenz, M. (2018). Validating a model of effective teaching behaviour and student engagement: Perspectives from spanish students. *Learning Environments Research, 22*(2), 1-23. doi:http://dx.doi.org/10.1007/s10984-018-9275-z

International Society for Technology in Education. (2008). *Technology and student achievement-The indelible link.* Washington, DC: ISTE.

Jackson, D. (2015). *A retrospective study of student engagement among at-risk elementary students with and without disabilities* (Order No. 3687691). Available from ProQuest Dissertations & Theses Global. (1671779397). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1671779397?accountid=14196

Janosz, M. (2012). Outcomes of engagement and engagement as an outcome: Some consensus, divergences, and unanswered questions. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 4, Section 33). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Jia, Y., Way, N., Ling, G., Yoshikawa, H., Chen, X., Hughes, D., Ke, X., Lu, Z. (2009). The influence of student perceptions of school climate on socioemotional and academic adjustment: A comparison of Chinese and American adolescents. *Child Development, 80*. Retrieved from 1514 –1530. http://dx.doi .org/10.1111/j.1467-8624.2009.01348.x

Johnson, P. M. (2014). *The role of network position for peer influences on adolescents' academic engagement* (Order No. 1553811). Available from ProQuest Dissertations & Theses Global. (1524266282). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1524266282?accountid=14196

Jurik V., Gro¨schner A., & Seidel T. (2013). How student characteristics affect girls' and boys' verbal engagement in physics instruction. *Learning and Instruction, 23,* 33-42. https://doi.org/10.1016/j. learninstruc.2012.09.002

Jurik V., Gro¨schner A., & Seidel T. (2014). Predicting students' cognitive learning activity and intrinsic learning motivation: How powerful are teacher statements, student profiles, and gender? *Learning and Individual Differences, 32,* 132–139.

Juvonen, J., Expinoza, G., & Knifsed, C. (2012). The role of peer relationships in student academic and extracurricular engagement. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 3, Section 18). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Kearsley, G. & Schneiderman, B. (1999). *Engagement theory: A framework for technology-based learning and teaching.* Retrieved from http://home.sprynet.com/~gkearsley /engage.htm.

Kelly, S., & Zhang, Y. (2016). Teacher support and engagement in math and science: Evidence from the high school longitudinal study. *The High School Journal, 99*(2), 141-165. Retrieved from http://www.jstor.org/stable/44075288

Kini, T., & Podolsky, A. (2016). *Does Teaching Experience Increase Teacher Effectiveness? A Review of the Research.* Palo Alto: Learning Policy Institute.

Kiuru, N., Pakarinen, E., Vasalampi, K., Silinskas, G., Aunola, K., Poikkeus, A.-M., Metsapelto, M-K., & Nurmi, J. E. (2014). Task-focused behavior mediates the associations between supportive interpersonal environments and students' academic performance. *Psychological Science*, *25*(4), 1018-1024. doi:10.1177/0956797613519111

Knogler, M., Harackiewicz, J. M., Gegenfurtner, A., & Lewalter, D. (2015). How situational is situational interest? investigating the longitudinal structure of situational interest. *Contemporary Educational Psychology, 43*, 39-50. doi:http://dx.doi.org /10.1016/j.cedpsych.2015.08.004

Koenig, B. A. (2018). *Effects of blended learning on at-risk youth: A quantitative study* (Order No. 10981950). Available from ProQuest Dissertations & Theses Global. (2155338508). Retrieved from https://search.proquest.com/docview/2155338508?accountid=14196

Koenka, A. C. (2015). *Grade expectations: An investigation of performance feedback, classroom goal structures, and the motivational consequences of their dynamic interplay* (Order No. 3700145). Available from ProQuest Dissertations & Theses Global. (1678619838). Retrieved from https://search.proquest.com/docview/1678619838?accountid=14196

Koh, J. (2016). *When choice is motivating: The moderating effects of contextual and individual factors* (Order No. 10014575). Available from ProQuest Dissertations & Theses Global. (1767228324). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1767228324?accountid=14196

Konold, T., Cornell, D., Shukla, K., & Huang, F. (2017). Racial/ethnic differences in perceptions of school climate and its association with student engagement and peer aggression. *Journal of Youth and Adolescence, 46*(6), 1289-1303. http://dx.doi.org/10.1007/s10964-016-0576-1

Korpershoek, H., Kuyper, H., & van, d. W. (2015). Differences in students' school motivation: A latent class modelling approach. *Social Psychology of Education : An International Journal, 18*(1), 137-163. doi:http://dx.doi.org/10.1007/s11218-014-9274-6

Košir, K., & Tement, S. (2014). Teacher-student relationship and academic achievement: A cross-lagged longitudinal study on three different age groups. *European Journal of Psychology of Education, 29*(3), 409-428. doi:10.1007/s10212-013-0205-2

Kyanka-Maggart, J. (2013). *iPads, motivation, self-efficacy, engagement in upper elementary school mathematics* (Unpublished doctoral dissertation). Baker University, Baldwin City, Kansas.

Lam, S., Wong, B., Yang, H., & Liu, Y. (2012). Understanding student engagement with a contextual model. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 3, Section 19). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Lambert, R. S. (2018). *Assessing the influence of self-regulated learning strategies on academic self-efficacy within a first-year experience workshop* (Order No. 10830306). Available from ProQuest Dissertations & Theses Global. (2075791629). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2075791629?accountid=14196

Lange, G. W., & Adler, F. (1997, April 3-6). *Motivation and achievement in elementary children* [Paper presentation]. 62nd Biennial Meeting of the Society for Research in Child Development, Washington, DC, United States. Retrieved from https://files.eric.ed.gov/fulltext/ED413059.pdf

Lee, J. A. (2014). *The development of mastery motivation in young children* (Order No. 3616023). Available from ProQuest Dissertations & Theses Global. (1526000631). Retrieved from https://search.proquest.com/docview/1526000631?accountid=14196

Lee, J. (2014) The relationship between student engagement and academic performance: Is it a myth or reality?, *Journal of Educational Research, 107*(3), 177-185, DOI: 10.1080/00220671.2013.807491

Lewis, G. (2015). Motivational classroom climate for learning mathematics: A reversal theory perspective. *For the Learning of Mathematics, 35*(3), 29-34. Retrieved from http://www.jstor.org/stable/44382686

Lewis, S., Whiteside, A., & Dikkers, A. G. (2014). Autonomy and responsibility: Online learning as a solution for at-risk high school students. *Journal of Distance Education* (Online), 29*(2)*, 1-11.

Lietaert, S., Roorda, D., Laevers, F., Verschueren, K., & de Fraine, B. (2015). The gender gap in student engagement: The role of teachers' autonomy support, structure, and involvement. *British Journal of Educational Psychology, 85(4),* 498-518. doi:10.1111/bjep.12095

Mac Iver, M., Epstein, J., Sheldon, S., & Fonseca, E. (2015). Engaging Families to Support Students' Transition to High School: Evidence from the Field. *The High School Journal, 99*(1), 27-45. Retrieved from http://www.jstor.org/stable/44075331

Mahatmya, D., Lohman, B. J., Matjas, J. L., & Feldman Farb, A. (2012). Engagement across developmental periods. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 1, Section 3). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Major, A. (2016). *Sources of self-efficacy, self-efficacy for self-regulated learning, and student engagement in adolescents with ADHD* (Order No. 10192925). Available from ProQuest Dissertations & Theses Global. (1884789717). Retrieved from http://eagle.sbuniv .edu:2048/login?url=https://search.proquest.com/docview/1884789717?accountid=14196

Manwaring, K. C. (2017). *Emotional and cognitive engagement in higher education classrooms* (Order No. 10688303). Available from ProQuest Dissertations & Theses Global. (2016861431). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/2016861431?accountid=14196

Maslow, A. (1970). *Motivation and personality* (2nd ed.). NY: Harper & Row.

Mathewson, T. G. (2019). How to unlock students' internal drive for learning *Education Digest, 85*(1), 39. Retrieved from https://hechingerreport.org/intrinsic-motivation-is-key-to-student-achievement-but-schools-kill-it/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+HechingerReport+%28Hechinger+Report%29

Maynard, B. R. (2010). *The absence of presence: A systematic review and meta-analysis of indicated interventions to increase student attendance* (Doctoral dissertation). Retrieved from ProQuest. (3422165)

Meyer, D. K., & Turner, J. C. (2006) Re-conceptualizing emotion and motivation to learn in classroom contexts. *Educational Psychology Review*. *18*(4), 377-390. http://dx.doi.org/10.1007/s10648-006-9032-1

Meyer, E. J. (2010). Transforming School Cultures. In: *Gender and Sexual Diversity in Schools*. Explorations of Educational Purpose, vol 10. Dordrecht, NL: Springer.

Meyer, R. C. (2007). *A case study of one-to-one computing: The effects on teaching and learning* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI No. 3289413)

Miller, N. G. (2017). *The impact of 1:1 laptop environments on the english language arts achievement of fifth grade students from diverse socio-economic backgrounds* (Order No. 10619269). Available from ProQuest Dissertations & Theses Global. (1973268077). Retrieved from https://search.proquest.com/docview/1973268077?accountid=14196

Missouri Department of Elementary and Secondary Education. (N.D.). *MSIP 5*. Retrieved from https://dese.mo.gov/quality-schools/mo-school-improvement-program/msip-5

Morelock, J. S. (2015). *Effective technology implementation in schools: Differing perceptions of teachers, administrators, and technology staff* (Order No. 3742845). Available from ProQuest Dissertations & Theses Global. (1752113064). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1752113064?accountid=14196

Morris, R. C., & Parker, L. C. (2014). Examining the connection between classroom technology and student engagement. *Journal of Teaching and Learning with Technology, 3*(1), 1-15.

Morsy, S. (2018). *Understanding self-efficacy, science classroom teaching and learning experiences and high school science achievement in egypt and the united states* (Order No. 10930258). Available from ProQuest Dissertations & Theses Global. (2124196665). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2124196665?accountid=14196

Mukhlis, U. M. A. (2018). *A qualitative descriptive study on the implementation of new technologies in education* (Order No. 13425869). Available from ProQuest Dissertations & Theses Global. (2170709519). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2170709519?accountid=14196

National Center for Education Statistics. (1993). *120 years of American education: a statistical portrait.* Washington, DC: National Center for Education Statistics.

National Survey on Mobile Technology for K-12 Education. (2013). *Research report*. NY: Interactive Educational Systems Design.

Naughton, R. (2016). *Self-determination theory and the at-risk learner* (Order No. 10248527). Available from ProQuest Dissertations & Theses Global. (1864679715). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1864679715?accountid=14196

Noel, A., Stark, P., Redford, J., & Zukerberg, A. (ED). (2013). *Parent and family involvement in education, from the National Household Education Surveys Program of 2012. First Look. NCES 2013-028.* National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubs2013/2013028rev.pdf

Olguin, J. E. (2017). *A correlational study on student retention: Student identity, intrinsic, extrinsic, and amotivation* (Doctoral dissertation). Available from ProQuest Dissertations & Theses A&I. (Accession No. 1943998200)

Orsini, C., Evans, P., Binnie, V., Ledezma, P., & Fuentes, F. (2016). Encouraging intrinsic motivation in the clinical setting: Teachers' perspectives from the selfdetermination theory. *European Journal of Dental Education, 20*(2), 102-111. doi:10.1111/eje.12147

Osborne, D. D. (2015). *Applying frances fowler's model to analyze the history of compulsory attendance laws in the united states* (Order No. 3707106). Available from ProQuest Dissertations & Theses Global. (1695831470). Retrieved from https://search.proquest.com/docview/1695831470?accountid=14196

Otundo, J. O., & Garn, A. (2016). Situational interest and physical activity: Personal interest as a mediator. *Research Quarterly for Exercise and Sport, 87,* A53-A54. Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1817494436?accountid=14196.doi.org/10.1007/s11218-015-9323-9

Palmer, L. L. (2016). *Parental engagement: Stakeholders' perceptions of the impact on student academic achievement* (Order No. 10150109). Available from ProQuest Dissertations & Theses Global. (1832953488). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1832953488?accountid=14196

Parker, F., Novak, J., & Bartell, T. (2017). To engage students, give them meaningful choices in the classroom. *The Phi Delta Kappan, 99*(2), 37-41. Retrieved from http://www.jstor .org/stable/26388270

Parsons, S., Nuland, L., & Parsons, A. (2014). The ABCs of student engagement. *The Phi Delta Kappan*, *95*(8), 23-27. Retrieved from http://www.jstor.org/stable/24374604

Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology, 99*(1), 83-98. http://dx.doi.org/10.1037/0022-0663.99.1.83

Pennington, S. E. (2016). *Influence of language arts instructional practices on early adolescents' motivation to read: Measuring student and teacher perceptions* (Order No. 10169994). Available from ProQuest Dissertations & Theses Global. (1848299302). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1848299302 ?accountid=14196

Penuel,W. R. (2006). Implementation and effects of one-to-one computing initiatives: A research synthesis. *Journal of Research on Technology in Education, 38*(3), 329-348.

Perkins-Jacobs, M. (2015). *Principals' perceptions of technology implementation in high schools and their effects on leadership* (Order No. 3717437). Available from ProQuest Dissertations & Theses Global. (1711153930). Retrieved from http://eagle.sbuniv.edu :2048/login?url=https://search.proquest.com/docview/1711153930?accountid=14196

Persinger, R. J. (2016). *The effects of one-to-one technology on students in schools with a high population of students from low-socioeconomic households* (Order No. 10253838). Available from ProQuest Dissertations & Theses Global. (1867558587). Retrieved from https://search.proquest.com/docview/1867558587?accountid=14196

Perzigian, A. B. T. (2015). *An analysis of ratings of school climate within one urban district's traditional and alternative secondary schools* (Order No. 3721941). Available from ProQuest Dissertations & Theses Global. (1721484561). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1721484561?accountid=14196

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 3, Section 17). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Picard, J. (2015). *What impact? 5 ways to put research into practice in the 1-to-1 classroom*. Retrieved from http://www.educate1to1.org/technology-impact-research-into-practice/

Pintrich, P. R. & Schunk, D. H. (2002). *Motivation in Education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Project Tomorrow. (2010). *Unleashing the future: Educators "speak up" about the use of emerging technologies for learning.* Speak Up 2009 National Findings: Teachers, Aspiring Teachers & Administrators. Retrieved from https://files.eric.ed.gov/fulltext/ED536063.pdf

Project Tomorrow. (2011). *The new 3E's of education: Enabled, engaged, empowered.* Irvine, CA. Retrieved from: www.tomorrow.org/speakup/pdfs/SU10_3EofEducation(Students).pdf

Project Tomorrow. (2019). *Making learning mobile 3.0 Report; The double bottom line with mobile learning: Closing the homework gap and enhancing student achievement.* Irvine, CA: Tomorrow.org. Retrieved from: https://tomorrow.org/publications /MakingLearningMobile3.html

Pynos, R. (2016). *Student engagement and its relationship to mobile device ownership and the role of technology in student learning* (Order No. 10151131). Available from ProQuest Dissertations & Theses Global. (1834606984). Retrieved from https://search.proquest .com/docview/1834606984?accountid=14196

Railsback, J. (2004). *By request . . . Increasing student attendance: Strategies from research and practice.* Retrieved from http://www.nwrel.org/request/2004june/

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 2, Section 7). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Reschly, A. L. & Christie, S. L. (2012). Jingle, jangle, and ceptual haziness: Evolution and future directions of the engagement construct. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 1, Section 1). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Revelas-Nichols, A. (2015). *Examining the role of active student engagement in high school arts courses* (Order No. 3670643). Available from ProQuest Dissertations & Theses Global. (1650707790). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1650707790?accountid=14196

Robinson, M. O. (2016). *An investigation of behavioral, emotional, and cognitive engagement as predictors of the intent to drop out of school for eleventh- and twelfth-grade students* (Order No. 10131724). Available from ProQuest Dissertations & Theses Global. (1820080062). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1820080062?accountid=14196

Rogers, A. A., DeLay, D., & Martin, C. L. (2016). *Traditional masculinity during the middle school transition: Associations with depressive symptoms and academic engagement*. Journal of Youth and Adolescence, *46*(4), 709-724.

Ross, B. B. (2018). *School accountability and equal opportunity in missouri* (Order No. 10827101). Available from ProQuest Dissertations & Theses Global. (2102140621). Retrieved from https://search.proquest.com/docview/2102140621?accountid=14196

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal, 38*,(2) 437-460.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

Sauers, N., & McLeod, S. (2012). *What does the research say about one-to-one computing initiatives?* Lexington, KY: UCEA Center for the Advanced Study of Technology Leadership in Education, University of Kentucky

Shirley-Brown, J. (2018). *School leaders' development of teacher instructional practices that cultivate student engagement across disciplines in grades 6-8* (Order No. 10981937). Available from ProQuest Dissertations & Theses Global. (2193376745). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2193376745?accountid=14196

Schlechty, P. C. (2001). *Shaking up the schoolhouse*. San Fransisco, USA: Jossey-Bass Publishers.

Schlechty, P. C. (2002). *Working on the work an action plan for teachers, principals and superintendents* (1st ed.). San Fransisco, USA: Jossey Bass.

Schmitt, C., & Goebel, V. (2015). Experiences of high-ability high school students: A case study. *Journal for the Education of the Gifted, 38*(4), 428–446. doi:10.1177/0162353215607325

Schnell, P. (2014). Beyond the family: peers and teachers. In *Educational mobility of second-generation turks: Cross-national perspectives* (pp. 119-142). Netherlands: Amsterdam University Press. Retrieved from http://www.jstor.org/stable/j.ctt12877kn.9

Schutte, T., Tichelaar, J., Dekker, R. S., Thijs, A., De Vries, T. P. G., Kusurkar, R. A., Richir, M. C., & Van Agtmael, M. (2017). Motivation and competence of participants in a learner-centered student-run clinic: An exploratory pilot study. *BMC Medical Education, 17* (23), 23. doi: 10.1186/s12909-017-0856-9

Siegle, D. (2017). The dark side of using technology. *Gifted Child Today, 40*(4), 232. https://doi.org/10.1177/1076217517723678

Silvernail, D. (2011). *Middle school one-to-one laptop program: The Maine experience*. Gorham, ME: University of Southern Maine.

Silvernail, D. L., & Lane, D. M. M. (2004). *The impact of Maine's one-to-one laptop program on middle school teachers and students.* ME: Maine Education Policy Research Institute. Retrieved from http://www.usm.maine.edu/cepare/pdf/mlti/MLTI%20Phase%20One%20Evaluation%20Report%201.pdf.

Skaalvik, E. M., & Federici, R. A. (2016). Relations between classroom goal structures and students' goal orientations in mathematics classes: When is a mastery goal structure adaptive? *Social Psychology of Education: An International Journal, 19*(1), 135-150. http://dx.doi.org/10.1007/s11218-015-9323-9

Skaalvik, E. M. (2018). Mathematics anxiety and coping strategies among middle school students: Relations with students' achievement goal orientations and level of performance. *Social Psychology of Education: An International Journal, 21*(3), 709-723. http://dx.doi.org/10.1007/s11218-018-9433-2

Skinner, E., Furrer, C., Marchand, G., & Kinderman, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology, 100*(4), 765-781.

Skinner, E. L., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection. *Educational and Psychological Measurement. 69*(3), 493-525. Retrieved from https://www.pdx.edu/psy/sites/www.pdx.edu.psy/files/Skinner,%20Kindermann,%20%26%20Furrer_EPM_2009_1.pdf

Skinner, E. A. and Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience.. In S. L. Christenson, A. L Reschly, and C. Wylie (Ed.) *Handbook of research on student engagement* (Part 1, Section 2). Springer New York. Kindle Edition. DOI 201210.1007/ 978-1-4614-2018-7.

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology, 82*(1), 22-32. http://dx.doi.org/10.1037/0022-0663.82.1.22

Slusher, A. J. (2018). *The implementation of a middle school one-to-one technology initiative: A longitudinal study of teachers' perceptions of technology and self-efficacy* (Order No. 10975687). Available from ProQuest Dissertations & Theses Global. (2130935701). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com /docview/2130935701?accountid=14196

Smink, J. & Reimer, M. S. (2005). *Fifteen effective strategies for improving student attendance andtruancy prevention.* Clemson, SC: National Dropout Prevention Center.

Smith, S. H. (2018). *An analysis of the relationship between teacher perception of community support and involvement at their school and student rates of attendance, graduation, and academic proficiency* (Order No. 10750612). Available from ProQuest Dissertations & Theses Global. (2048262893). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/2048262893?accountid=14196

Sparks, C., Dimmock, J., Lonsdale, C., & Jackson, B. (2016). Modeling indicators and outcomes of students' perceived teacher relatedness support in high school physical education. *Psychology of Sport and Exercise, 26*, 71-82. doi: 10.1016/j.psychsport .2016.06.004

Speidel, G. E., & Tharp, R. G. (1980). What does self-reinforcement reinforce? An empirical analysis of the contingencies in self-determined reinforcement. *Child Behavior Therapy, 2*(4), 1-22.

Steiner, A. (2017). *The impact of a one to one laptop program on the self-efficacy of nine middle school students with specific learning disabilities* (Order No. 10617878). Available from ProQuest Dissertations & Theses Global. (1952045784). Retrieved from https://search.proquest.com/docview/1952045784?accountid=14196

Stempel, H., Cox-Martin, M., Bronsert, M., Dickinson, L. M., & Allison, M. A. (2017). Chronic school absenteeism and the role of adverse childhood experiences, *Academic Pediatrics. 17*(8), 837-843. Doi10.1016/j.acap.2017.09.013.

Stipek, D. J. (1996). Motivation and instruction. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 85–113). NY: Macmillan.

Storz, M. G., & Hoffman, A. R. (2012). Examining response to a one-to-one computer initiative: Student and teacher voices. *Research in Middle Level Education Online,* 36, 1-18. Retrieved from http://files.eric.ed.gov/fulltext/EJ995733.pdf.

Stoudenmire, M. H. (2015). *Parent connection to improvement of low attendance in high schools: An action research study* (Order No. 3719503). Available from ProQuest Dissertations & Theses Global. (1717095928). Retrieved from http://eagle.sbuniv .edu:2048/login?url=https://search.proquest.com/docview/1717095928?accountid=14196

Stover, J. B., Hoffmann, A. F., de la Iglesia, G., & Fernandez Liporace, M. (2014). Predicting academic achievement: The role of motivation and learning strategies. *Problems of Psychology in the 21st Century*, *8*(1), 71-84. Doi10.1080/01443410701309126

Suhr, K. A., Hernandez, D. A., Grimes, D., & Warschauer, M. (2010). Laptops and fourth-grade literacy: Assisting the jump over the fourth grade slump. *Journal of Technology, Learning, and Assessment, 9*(5), 4–45.

Swayne, J. M. (2017). *Staying connected: Measuring the impact of 1:1 technology integration on student engagement and achievement at the middle level* (Order No. 10643029). Available from ProQuest Dissertations & Theses Global. (2032539257). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2032539257?accountid=14196

Tafelski, J. J., Hejnal, T., Maring, C., McDowell, G., & Rencher, C. (2016). *The cost of disengagement: Examining the real story of absenteeism in two michigan counties* (Order No. 10109296). Available from ProQuest Dissertations & Theses Global. (1793940450). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/1793940450?accountid=14196

Tang, X., Wang, M., Guo, J., & Salmela-Aro, K. (2019). Building grit: The longitudinal pathways between mindset, commitment, grit, and academic outcomes. *Journal of Youth and Adolescence, 48*(5), 850-863. doi:http://dx.doi.org/10.1007/s10964-019-00998-0

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology, 39*,(4), 342-358. doi: 10.1016/j.cedpsych.2014.08.002

Taylor, L., & Parsons, J. (2011). Improving student engagement. *Current Issues in Education, 14*(1), 1-32. Retrieved from http://cie.asu.edu/ojs/index.php/cieatasu/article/viewFile/745/162.

Thompson, J. (2017). *Examining student and teacher attitudes of education technology and perceptions of each other* (Order No. 10267127). Available from ProQuest Dissertations & Theses Global. (1914914301). Retrieved from http://eagle.sbuniv.edu:2048/login?url =https://search.proquest.com/docview/1914914301?accountid=14196

Trenshaw, K. F., Revelo, R. A., Earl, K. A., & Herman, G. L. (2016). Using self determination theory principles to promote engineering students' intrinsic motivation to learn. *International Journal of Engineering Education, 32*, 1194-1207.

Troughton, L. C. W. (2018). *Implementation of a cognitive-behavioral-based intervention for students with emotional/behavioral disorders* (Order No. 10831178). Available from ProQuest Dissertations & Theses Global. (2117036371). Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2117036371 ?accountid=14196

Trowler, V & Trowler, P (2010) *Student Engagement Evidence Summary.* York: Higher Education Academy. Retrieved from https://www.heacademy.ac.uk/sites /default/files/StudentEngagementEvidenceSummary_0.pdf

University of Alberta. (2011). *Student engagement: What do we know and what should we do?* Retrieved from https://education.alberta.ca/media/6459431/student _engagement_literature_review_2011.pdf

Urhahne, D. (2015). Teacher behavior as a mediator of the relationship between teacher judgment and students' motivation and emotion. *Teaching and Teacher Education, 45*, 73-82. Retrieved from http://dx.doi.org/10.1016/j.tate.2014.09.006

Van Eck, K., Johnson, S. R., Bettencourt, A., & Johnson, S. L. (2017). How school climate relates to chronic absence: A multi–level latent profile analysis. *Journal of School Psychology, 61*, 89–102.

Vockley, M. (2007). Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System. Retrieved from http://info.watertown.k12.ma.us /academics/documents/P21doc ument-2007.pdf

Wang, M. T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal, 47*(3), 633-662. DOI: 10.3102/0002831209361209

Warschauer, M. & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education, 34*(1), 179-225. DOI: 10.3102/0091732X09349791

Warschauer, M., Zheng, B., Niiya, M., Cotten, S., & Farkas, G. (2014). Balancing the one-to-one equation: Equity and access in three laptop programs. *Equity & Excellence in Education, 47*(1), 46-62. DOI: 10.1080/10665684.2014.866871

Washor, E., & Mojkowski, C. (2014). Student disengagement: It's deeper than you think. *The Phi Delta Kappan, 95*(8), 8-10. Retrieved from http://www.jstor.org/stable/24374601

Weiner, B. (1986) *An attributional theory of motivation and emotion.* NY: Springer-Verlag.

Wentzel, K. R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology, 89*(3), 411-419.

Whitworth, H. L. (2016). *Engaging the ninth grade mind* (Order No. 10254814). Available from ProQuest Dissertations & Theses Global. (1867021966). Retrieved from https://search.proquest.com/docview/1867021966?accountid=14196

Wigfield, A., & Eccles, J. S. (2002). *Development of achievement motivation*. San Diego, CA: Academic Press.

Williams, K. C., & Williams, C. C. (2011). Five key ingredients for improving student motivation. *Research in Higher Education Journal, 12*. Retrieved from http://www.aabri.comwww.aabri.com/manuscripts/11834.pdf

Willms, J. D., Friesen, S., & Milton, P. (2009). *What did you do in school today? Transforming classrooms through social, academic and intellectual engagement*. (First National Report) Canada: Canadian Education Association.

Williams, T. O., Ernst, J. V., & Kaui, T. M. (2015). Special populations At-risk for dropping out of school: A discipline-based analysis of STEM educators. *Journal of STEM Education*, 16(1), 41-45. Retrieved from http://jstem.org/index.php?journal=JSTEM&page=article &op=view&path%5B%5D=192 1&path%5B%5D=1643

Yang, R. (2014). *The role of non-cognitive skills in students' academic performance and life satisfaction: A longitudinal study of resilience* (Order No. 3635575). Available from ProQuest Dissertations & Theses Global. (1614529644). Retrieved from https://search.proquest.com/docview/1614529644?accountid=14196

Yang, C., Sharkey, J. D., Reed, L. A., Chen, C., & Dowdy, E. (2018). Bullying victimization and student engagement in elementary, middle, and high schools: Moderating role of school climate. *School Psychology Quarterly, 33*(1), 54. Retrieved from http://eagle.sbuniv.edu:2048/login?url=https://search.proquest.com/docview/2072770734 ?accountid=14196

Yeldell, A. (2017). *Digital one-to-one implementation: The teachers' concerns in the change process* (Order No. 10603695). Available from ProQuest Dissertations & Theses Global. (1986548848). Retrieved from https://search.proquest.com/docview/1986548848 ?accountid=14196

Zee, M., & de Bree, E. (2017). Students' self-regulation and achievement in basic reading and math skills: The role of student–teacher relationships in middle childhood. *European Journal of Developmental Psychology, 14*(3), 265-280. Retrieved from http://dx.doi.org/10.1080/17405629.2016.1196587

Zheng, B., Warschauer, M., Lin, C.-H., & Chang, C. (2016). Learning in one-to-one laptop environments: A meta-analysis and research synthesis. *Review of Educational Research, 86*(4), 1052–1084. https://doi.org/10.3102/0034654316628645

Zucker, A., & McGhee, R. (2005). *A study of one-to-one computer use in mathematics and science instruction at the secondary level in Henrico County Public Schools*. Retrieved from http://ubiqcomputing.org/FinalReport.pdf

Appendix A: Survey Instrument

Survey for Staff

This survey is anonymous and only the respondents' grade level, years of service in education, and self-rated technological proficiency will be gathered. No identifying criteria are collected. Your completed survey is your implied consent to be surveyed. Your participation is voluntary and you may withdraw at any time. If you have questions, please contact Craig Masters, RRB Chair, at 417-328-1664.

1. What grade levels do you teach (select all that apply)?

□ 6 □ 7 □ 8 □ 9 □ 10 □ 11 □ 12

2. How many years have you been teaching?

□ 3 or less □ 4-6 □ 7-9 □ 10-12 □ 13-19 □ 20+

3. Counting this school year, how many years has your school had a one-to-one device program?

□ 1 □ 2 □ 3 □ 4 □ 5+

4. How would you rate your overall skills with your school's chosen technology platform for the one-to-one program?

□ Novice (still learning to use the device)

□ Beginner (use some apps, access the Internet)

□ Intermediate (create class materials, assign projects, use some apps)

□ Advanced (regularly use technology and can/ have helped other staff)

□ Expert (use technology for assessment, collaboration, use multiple apps)

5. Please indicate the effect you think implementation of a one-to-one technology plan has had on different groups of students in the following areas:

	Traditional students			At-risk or low achieving students			High-achieving students		
	Declined	No Effect	Improved	Declined	No Effect	Improved	Declined	No Effect	Improved
Participation in Class	□	□	□	□	□	□	□	□	□
Preparation for Class	□	□	□	□	□	□	□	□	□
Attendance	□	□	□	□	□	□	□	□	□
Behavior	□	□	□	□	□	□	□	□	□
Motivation	□	□	□	□	□	□	□	□	□
Engagement	□	□	□	□	□	□	□	□	□
Ability to Work Indepently	□	□	□	□	□	□	□	□	□
Abilty to Work in Groups	□	□	□	□	□	□	□	□	□
Ability to Retain Content Material	□	□	□	□	□	□	□	□	□
Quality of Work	□	□	□	□	□	□	□	□	□
Interaction with Teachers	□	□	□	□	□	□	□	□	□
Interaction with Other Students	□	□	□	□	□	□	□	□	□

Appendix B: Letter to Superintendents and Principals

Survey Email and Survey Instrument for Superintendents

Dear Superintendent, Principal, or Designee

I am completing the doctoral program in Educational Leadership at Southwest Baptist University in Bolivar, Missouri. I am writing to request your help with my dissertation. Your participation will take less than two minutes. *To participate, simply forward this message or the survey link below to building leaders or directly to middle and high school teachers that work in a one-to-one environment.*

The focus of my dissertation is on teacher perceptions of middle and high school student engagement resulting from a one to one technology implementation in a public Missouri school district. Results will be used to help educators across the country support teachers in identifying and providing engaging learning opportunities through technology.

Please confirm that your district (or building) meets the criteria of a one to one technology program as set forth by the study:

A school or district initiative that provides each student with a technological device (e.g.- laptop, iPad, Chromebook) for use both in school and at home for school work.

If you have confirmed that your district (or building) meets the criteria above, I am asking if you would forward the survey linked below to your teachers working in your qualifying middle and/or high school(s).

The teacher survey is electronic and will take less than 5 minutes to complete. The teacher survey is anonymous and only the respondents' grade level(s) taught, years of service in education, and self-rated technological proficiency will be gathered. The teacher survey contains four initial questions and a section that asks respondents to rate their perceptions of students in

12 areas related to academic engagement. Survey questions are statements for which the respondent shows their perceived level of impact and is scored using a three-category scale (Declined, No Effect, Improved) to identify the degree to which they believe a one-to-one program has affected engagement for at-risk, traditional, and high-achieving students.

Your participation is voluntary and you may withdraw at any time. This research study survey has been approved by the SBU Research Review Board.

Thank you, in advance, for your help in this study. Please feel free to contact me if you have further questions. I will be happy to provide you with the results of the survey if requested.

Appendix C: Partial Regression Plots

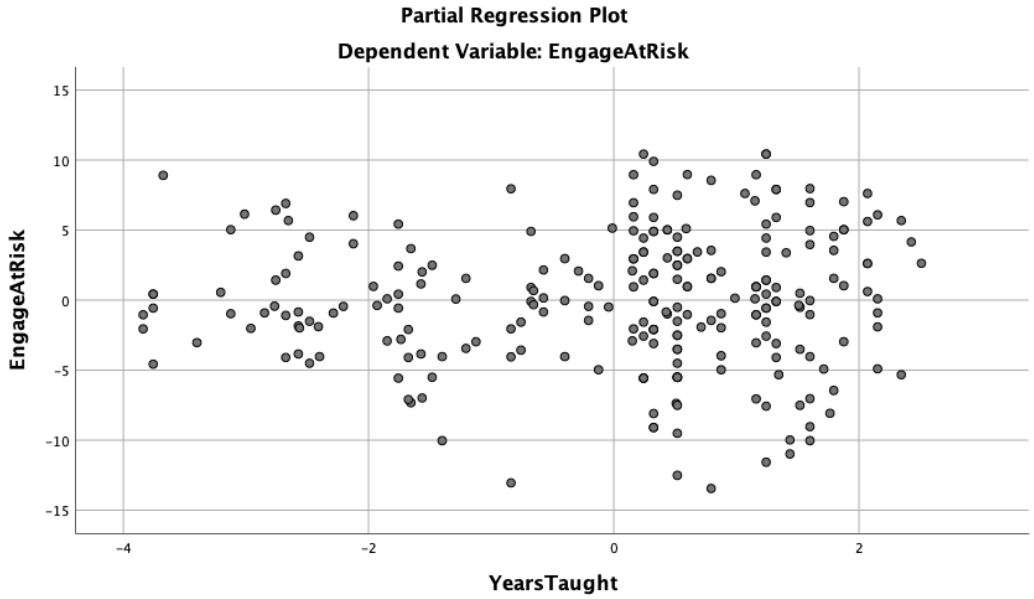

Figure 1. Partial Regression Plot of Years of Teaching Service and Engagment of At-Risk Students.

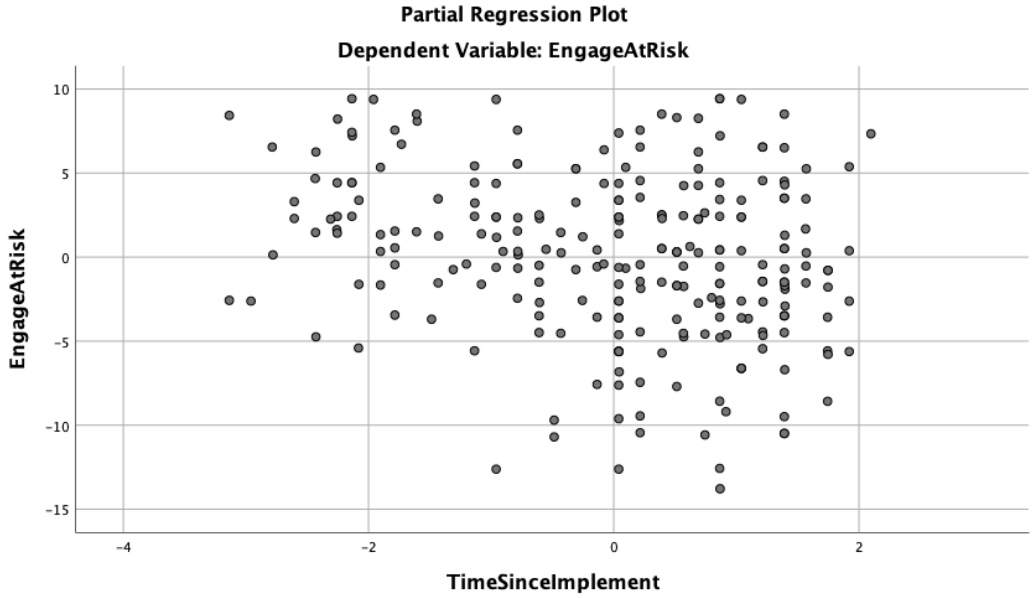

Figure 2. Partial Regression Plot of Time Since Implementation and Engagment of At-Risk Students.

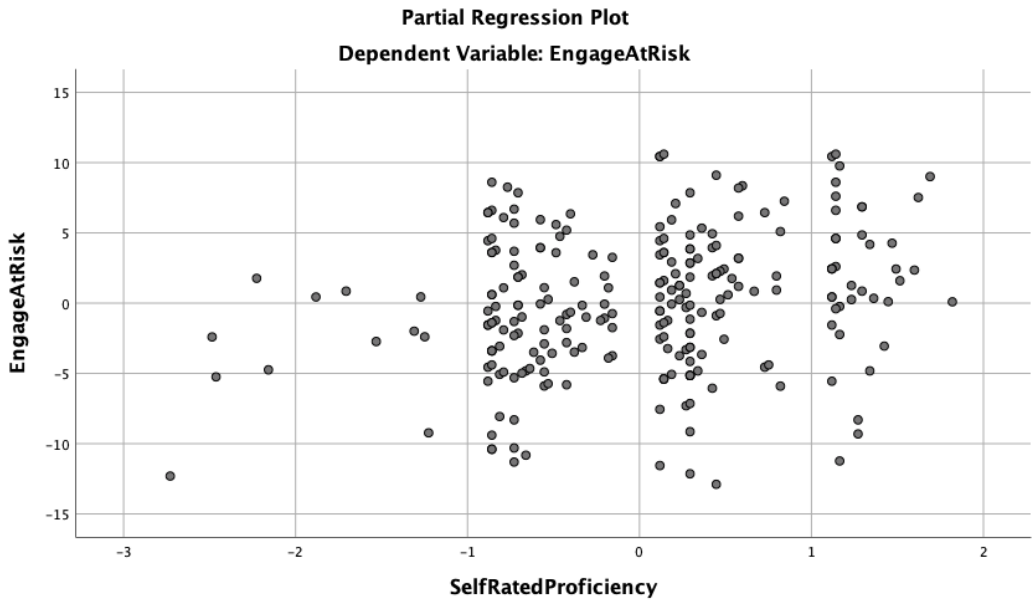

Figure 3. Partial Regression Plot of Self-Rated Technological Proficiency and Engagment of At-Risk Students.

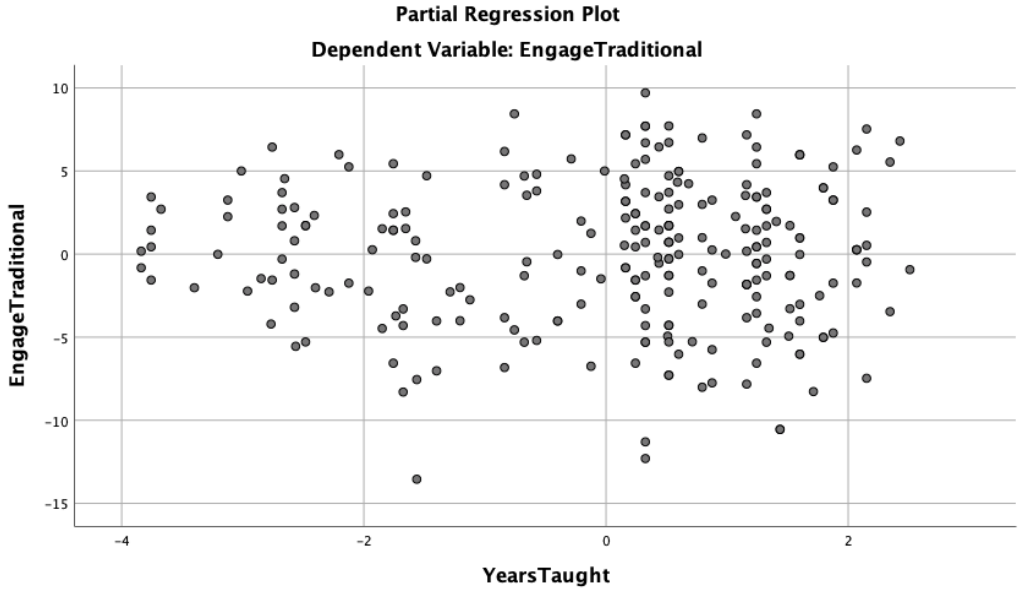

Figure 4. Partial Regression Plot of Years of Teaching Service and Engagment of Traditional Students.

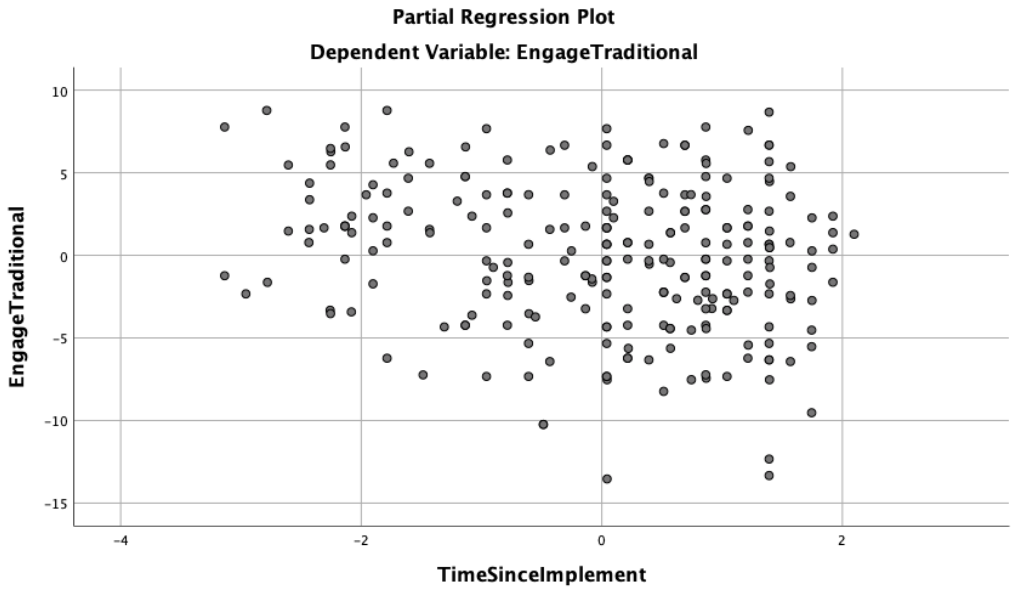

Figure 5. Partial Regression Plot of Time Since Implementation and Engagment of Traditional Students.

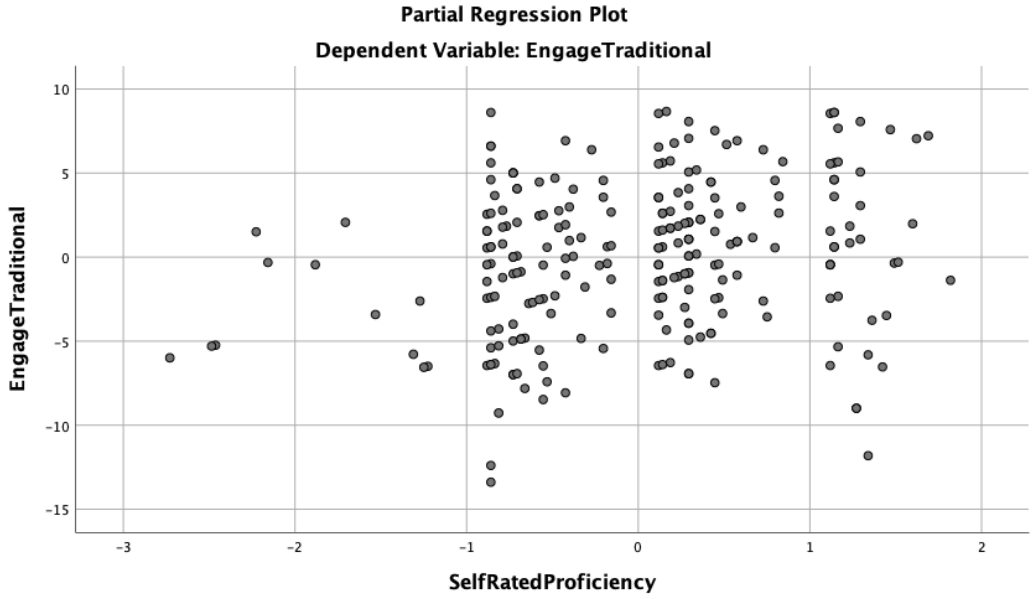

Figure 6. Partial Regression Plot of Self-Rated Technological Proficiency and Engagment of Traditional Students.

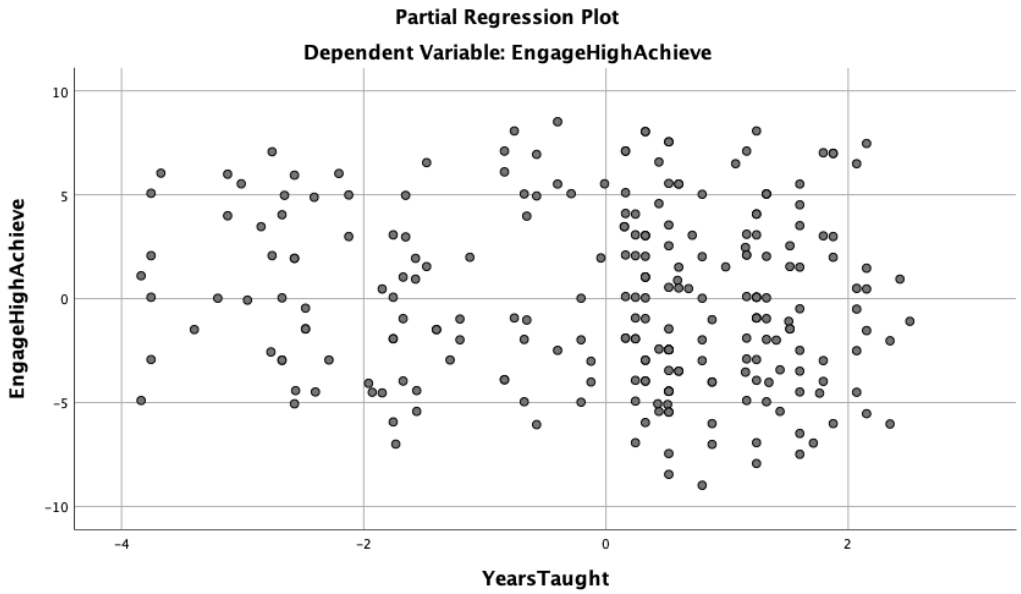

Figure 7. Partial Regression Plot of Years of Teaching Service and Engagment of high-Achieving Students.

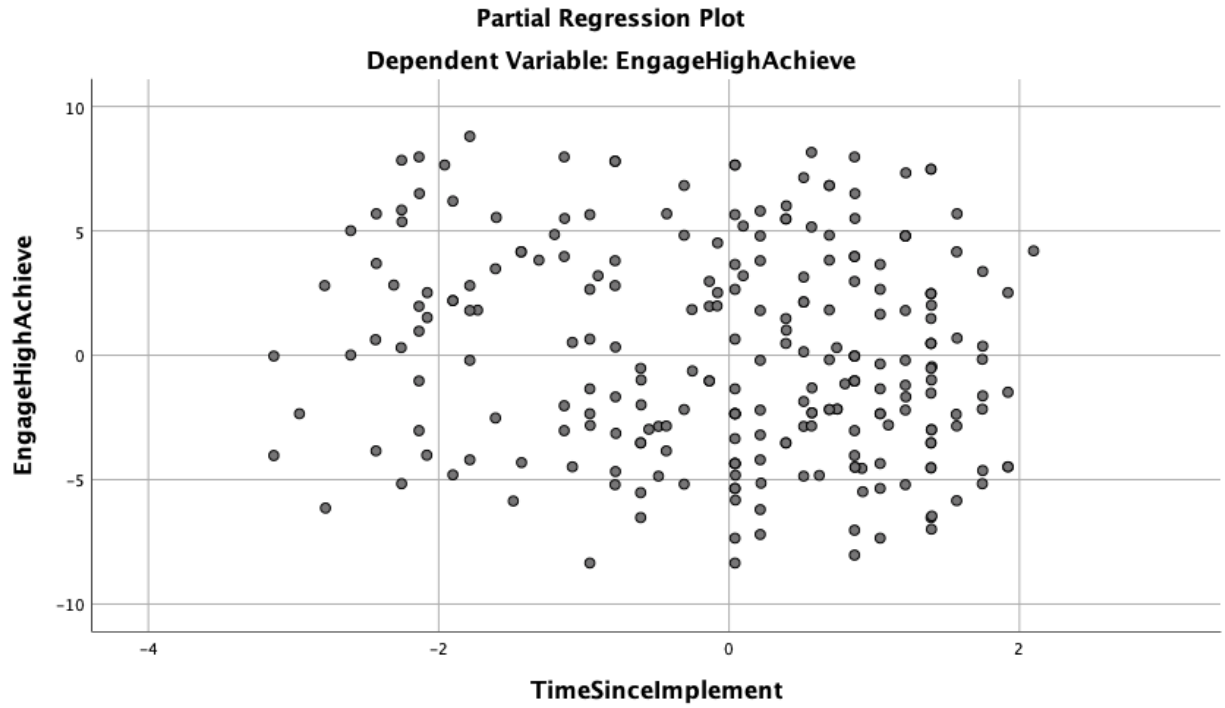

Figure 8. Partial Regression Plot of Time Since Implementation and Engagment of high-Achieving Students.

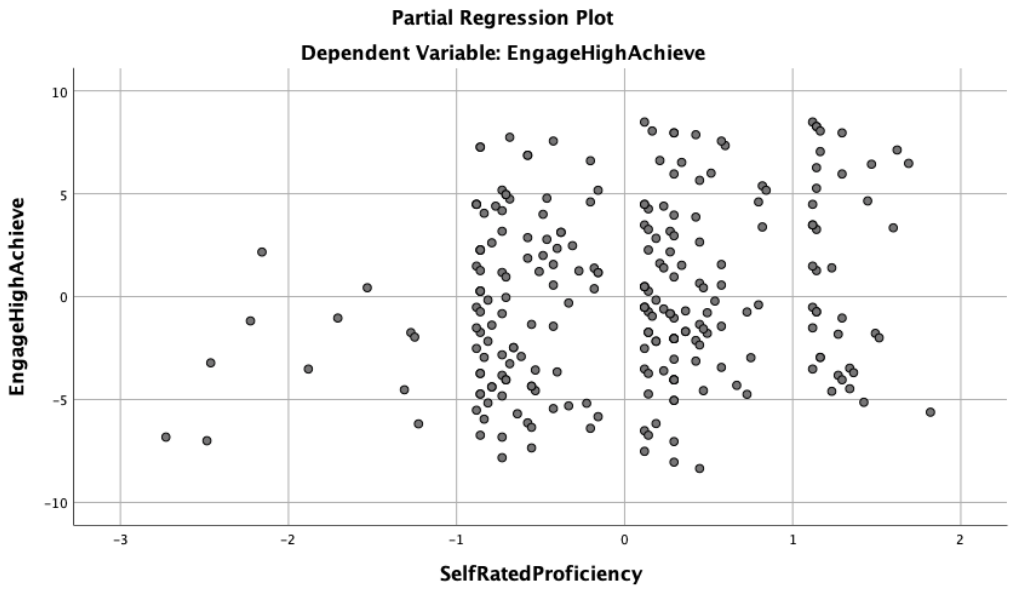

Figure 9. Partial Regression Plot of Self-Rated Technological Proficiency and Engagment of high-Achieving Students.

Appendix D: P-P Plots of Normality

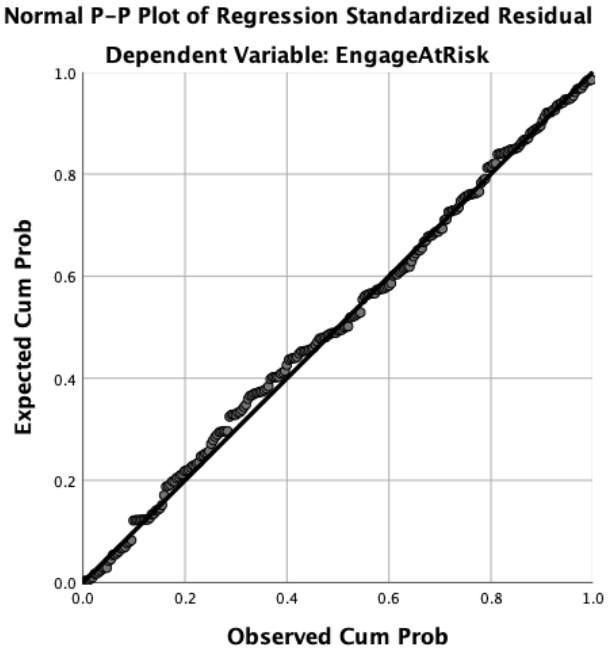

Figure 10. P-P Normality plot for Engagement of At-Risk Students.

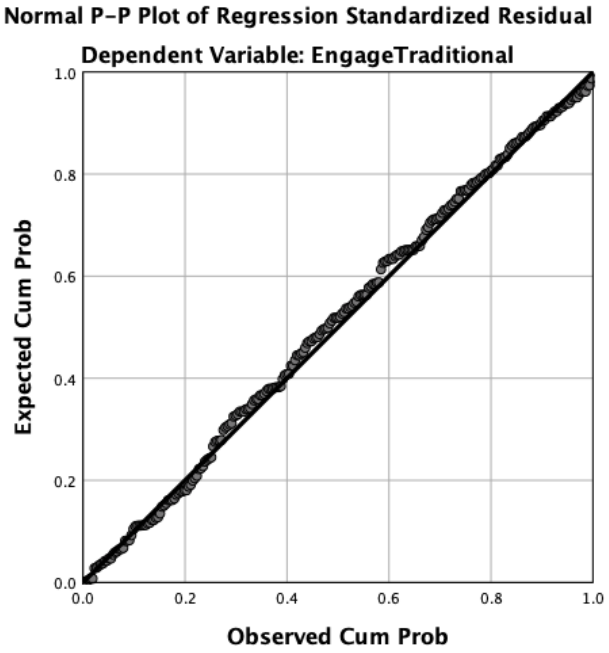

Figure 11. P-P Normality plot for Engagement of Traditional Students.

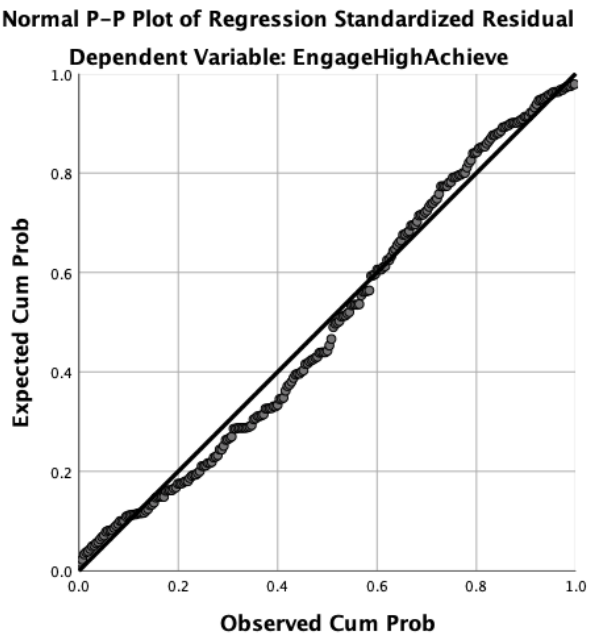

Figure 12. P-P Normality plot for Engagement of High-Achieving Students.