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Blended Learning Integration: Student Motivation and Autonomy in a Blended Learning Environment

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by

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ABSTRACT

Blended Learning Integration: Student Motivation and Autonomy in a Blended Learning Environment

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The purpose of this study was to analyze teacher perceptions on the relationship of technology and student academic behaviors and performance in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments.

The participants of this study were teachers within 2 school districts in East Tennessee. All high school teachers within the participating school districts received an online survey that was distributed from their corresponding principals via email. The online survey used a Likert-type scale that consisted of 40 items focused on teachers' perceptions of student motivation and student autonomy with the blended learning environment. The analysis of the data was based on the responses of 75 teachers from the 2 participating school districts.

Statistical analyses of the data revealed that the amount of teacher technology use, student technology use, learning management system use, and type of professional

development did not have a significant relationship with participants' perspective of student motivation or student autonomy. The research also did not reveal a significant relationship between participants' age and perception of student motivation. However, this research revealed a significant relationship between participant age and participants' perception of student autonomy. The study revealed that, as participant age increased, participants' mean student autonomy scores decreased.

DEDICATION

I would like to dedicate this work to my family and friends, who supported me throughout this journey, both personally and professionally. The continuous support that I received from so many guided me not only into this endeavor, but more importantly helped me overcome the obstacles that I faced along the way.

First, I would like to thank my children, Hunter and Avalynne. They have always been my motivation and my never-ending reason for bettering myself each day. My biggest motivating factor throughout this process has been knowing that I have two amazing children watching and supporting everything that I do. I knew that I could never stop pushing forward, because I was modeling dedication and the value of an education to my children. These two also have always found a way to make me laugh and to help with anything that was needed along the way. I have been so fortunate to watch them grow into young adults, and I can't wait to be by their sides as they continue on their personal journeys.

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I’m so grateful to be in the field of education, where professors and administrators demonstrate the impact that strong, positive leadership makes.

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CHAPTER 1

INTRODUCTION

The achievement gap between underserved students and their peers in reading and mathematics were exposed by the No Child Left Behind Act (NCLB) of 2001 (Burns, Klingbeil, & Ysseldyke, 2010). Underserved students are defined by Zielezinski and Darling-Hammond (2016) as students that that may be under-resourced or under-prepared and are from a low socioeconomic status, a minority, low achieving, or are not on track for graduation. As a response to the achievement gap and creating quality education for all students, measures were developed to increase rigor and expectations on summative assessments. NCLB made a great step forward in providing additional supports, regardless of race, zip code, disability, home language, or income (U.S. Department of Education, N.D.). In 2010 the Obama administration in collaboration with families and teachers focused their efforts on revising the law to prepare students for college and career success. This work provided the foundation for the *Every Student Succeeds Act* (ESSA) signed in 2015. For the first time in America, the law required all students to be taught to a high academic standard to prepare them for post-secondary success (U.S. Department of Education, N.D). ESSA integrated several provisions to ensure that the goal for college and career success for all students and schools would be met. One provision specifically focused on providing federal funding to grow local, evidence-based innovative programs. Through federal funding issued to Tennessee, three ambitious goals were set to be achieved within a 5-year period (Tennessee

Department of Education, 2014). According to the Tennessee Department of Education these goals include:

- Tennessee will rank in the top half of states on the National Assessment of Educational Progress (NAEP), or the nation's Report Card, by 2019.
- The average ACT composite score in Tennessee will be a 21 by 2020.
- The majority of high school graduates from the class of 2020 will earn a postsecondary certificate, diploma, or degree.

In order to meet these goals, The Tennessee Department of Education (TDOE) adopted more rigorous standards, a more thorough student assessment system called TNReady, and implemented changes to Response to Intervention, now known as Response to Intervention Squared (Tennessee Department of Education, 2014). To meet mandated goals, many schools are implementing technology-enhanced formative evaluation (TEFE) systems (Burns, Klingbeil, & Ysseldyke, 2010). The TEFE system was chosen as a resource by schools because of the accessibility of formative assessments to teachers. A TEFE system is a framework that uses data-driven decision-making to monitor student progress. Student performance data is collected through online, computer-adaptive assessments. Computer-adaptive tests are used to assist teachers in monitoring student progress while also establishing instructional learning targets. Educational technology is defined as the process that integrates people, devices, ideas, and organization to analyze problems and manage solutions (Ely, 1983). Included in educational technology are tangible tools consisting of high-tech hardware (computers, instructional medial, transparencies, and videotapes) and other

technological methods that aid in planning, implementing, and determining the effectiveness of learning experiences.

The progressive movement to incorporate technology into daily instruction and assessment within east Tennessee is due to the new state requirements and research regarding technology integrated instruction. Technology integrated instruction is one of the most effective instructional strategies to increase active learning (Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt, & Wenderoth, 2014). Active learning is defined as the engagement of the learner throughout the learning process. As active learners, students become active participants in their learning as teachers facilitate activities and discussions that frequently require students to collaborate and use higher-order thinking skills. Active learning is a student-centered approach which has been found to be more effective than the traditional, teacher-centered approaches to teaching and learning (Rodríquez, Díaz, Gonzalez, & González-Miquel, 2018). Traditional approaches to learning originated over 900 years ago when universities were first founded. Course information was passively received by students as instructors lectured (Freeman et al., 2014). Traditional lecturing is defined as a teacher providing continuous explanations and descriptions to students which limits student activity and participation. To enhance student understanding, traditional methods of teaching should shift to new, innovative pedagogical practices in which students are more active and motivated learners (Rodriguez et al., 2018).

Statement of the Problem

With the increased expectations set forth by ESSA more students than ever before are attending college (U.S. Department of Education, N.D.). However, students of the digital age are preparing for careers that do not yet exist (Sheninger, 2016). The 21st century workforce in constantly changing, requiring employees to have not only mastered the three Rs, but also the four Cs (NEA, N.D.). The three Rs, reading, writing, and arithmetic are no longer desirable factors independently. Today they must be accompanied by critical thinking and problem solving, communication, collaboration, and creativity innovation, known as the 4 Cs. Students, as future employees are better prepared for the workforce when reading, writing, and arithmetic are embedded with critical thinking, effective communication, collaborative work, and creativity. Global competitiveness during the 21st century requires students to go beyond basic informational and technological literacy. Therefore, it is important to analyze how the technological innovations over the past ten years have filled learning gaps between online, blended, and face-to-face learning environments (Güzer & Caner, 2013). Ceylan and Kesici (2017) define blended learning as an instructional strategy that embeds technology while emphasizing the student and teacher relationship, enhancing student achievement, engagement, and independence. Current studies raise suspicion that student performance differs from blended learning models than traditional formats of learning (Asarta & Schmidt, 2017). Additional research should be completed to determine the relationship between blended learning models and student academic behaviors. Technology implementation could affect students of diverse learning abilities in different ways. Asarta and Schmidt found that students that have historically been in

the lowest performing subgroup as measured by standardized assessments and GPAs had lower scores in the blended learning environment than students in the traditional classroom setting. Therefore a “one size fits all” approach or a quick solution does not exist (Moskal, Dziuban, & Harman, 2013). It is vital to understand how all students are impacted by blended learning as public schools across America are already challenged with meeting the needs of a myriad of diverse learners (Connell, 2009). A well-structured approach to blended learning requires an instructional model that is theory-based and focused on individual learner needs (Alias, Sirah, DeWitt, Attaran, & Nordin, 2013). More research is needed to determine the relationship between technology implementation in blended learning environments and student academic behaviors, including academic performance (Hill, Chidambaram, & Summer, 2016).

The design of blended learning is a strength; however, the design also leads to blended learning’s greatest challenges. Four key challenges associated with blended learning focus on interactions among students, developing an effective culture for learning, supporting individual student processes for learning, and providing flexibility within the blended learning environment (Boelens, Wever, & Voet, 2017). Interactions among students becomes more challenging as online interactions become less spontaneous. As transactional distance between learners increases with the use of technology, social interactions become more challenging to maintain, even though the need to belong to a learning community still exists. The distance may also negatively impact the learning climate. In contrast, a teacher can positively impact and create an effective learning climate by demonstrating empathy, encouragement, and a sense of humor while focusing on task-relevant information and individual student needs.

Developing a culture that is responsive to individual student learning needs is essential as each student's brain is uniquely designed, and each student has a preferred style of learning (Connell, 2009). Students crave a learning experience that is connected to their individual interests and incorporates creative, personal expression (Sheninger, 2016). Through blended learning, students engage in more personalized learning experiences as the online components of blended learning provide more flexibility (Boelens, Wever, & Voet, 2017). Increased flexibility means that learners have some control over pace, path, time, and place in which their learning occurs. Additional research is needed to determine how to provide students with a balanced approach of flexibility and structure to support students in achieving academic success.

Academic success goes beyond teaching a set of standards to developing students as learners (Given, 2002). Education is described as "developing a desire to learn, knowing how to learn, and implementing teaching practices based on how the brain actually functions" (p. viii). Students of the 21st century are Digital Natives and no longer learn through traditional educational systems since today's students think and process information differently (Prensky, 2001). Digital Natives have spent their whole lives immersed in technology. Instructors on the other hand are often Digital Immigrants. Digital Immigrants learn how to use technology to an extent but have an "accent" or outdated version of the language and skills possessed by a Digital Native. An example of a Digital Immigrant's accent is printing out a document to proofread rather than proofreading directly on the screen. Therefore, educational systems and pedagogy must embrace technology to reach the Digital Native learner. Research is needed to support administrators and teachers in successfully blending technology with face-to-face

instruction (Güzer & Caner, 2013). Specifically, future research on blended learning should focus on pedagogical practices that are replicable in both the face-to-face and online setting. Instead of comparing the two approaches, research should form a relationship between technology and instruction (Hill, Chidambaram, & Summer, 2016). The pedagogical practices explored should focus on how the techniques enrich the students' learning experience as they enhance interest, control, and value while limiting distractors that also become more prevalent with the increase in access to technology (Manwaring et al., 2017). As technology in the real world continues to evolve, our students, teachers, and leaders must continue to change (Sheninger, 2016).

Therefore, the purpose of this study is to analyze teacher perceptions on the impact of technology upon student academic behaviors and performance in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments.

Research Questions

The research questions that guided this study were developed using two dimensions: student motivation and student autonomy. The purpose statement was used to develop the following research questions.

Dimension 1: Student Motivation

Research Question 1: Is there a significant difference in participants' mean student motivation scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

Research Question 2: Is there a significant difference in participants' mean student motivation scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 3: Is there a significant difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 4: Is there a significant difference in participants' mean student motivation scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 5: Is there a significant relationship between participants' student motivation scores and participants' age?

Research Question 6: Is there a significant difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

Dimension 2: Student Autonomy

Research Question 7: Is there a significant difference in participants' mean student autonomy scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

Research Question 8: Is there a significant difference in participants' mean student autonomy scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 9: Is there a significant difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 10: Is there a significant difference in participants' mean student autonomy scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

Research Question 11: Is there a significant relationship between participants' student autonomy scores and participants' age?

Research Question 12: Is there a significant difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

Significance of the Study

Additional research is needed to determine if certain factors relate to effective implementation of blended learning models within the classroom. The purpose of this

study is to analyze teacher perceptions on the impact of technology upon student academic behaviors and performance in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments.

This study could provide insight for teachers and school leaders on how blended learning environments can meet the diverse needs of learners, specifically to enhance student motivation and student autonomy. The findings from this study could help educators identify areas of weakness in technology integration in blended learning environments as well as practices that lack successful implementation, limiting student motivation, student autonomy, and therefore student academic performance. There is minimal research that combines the blended learning environment and the impact blended learning has on student academic behaviors, specifically student motivation and student autonomy. This study could provide teachers and school leaders with strategies for successful technology integration that can be implemented within the classroom setting to enhance students' desire and ability to master educational skills and content.

Definitions of Terms

To assist the definition and understanding of terms used within this study, the following definitions are provided.

1. *Academic Achievement:* The depth and span of one's knowledge that is valued by the individual's culture and is normally measured by tests that are administered to assess formal knowledge taught in school (Soares, Lemos, Primi, & Almeida, 2015).
2. *Blended Learning:* An instructional strategy that embeds technology and emphasizes the student-teacher relationship to enhance student engagement, independence and achievement (Ceylan & Kesici, 2017).
3. *Brain-Based Learning:* Engagement of strategies that have been derived from principles based on understanding of the brain (Jensen, 2008).
4. *Feedback:* The information regarding aspects of one's performance provided by an agent, such as a peer, parent, teacher, self, or experience (Chen, Breslow, & DeBoer, 2018).
5. *Integrated System of Assessment:* The practice of using summative and formative assessments and using the results to make evidence based decisions that guide students' work and instructional practices (Abrams, Varier, & Jackson, 2016).
6. *Motivation:* The desire a trainee has to learn content taught within a program (Klein et al., 2006).
7. *Need for Autonomy:* An individual's desire to feel in control of and to have some choice over one's behaviors and beliefs, and the individual's desire to feel that one's values and activities align (Marshik, Ashton, & Algina, 2017).

Limitations and Delimitations

Specific delimitations existed during this study due to the nature of the chosen population. The population was limited to 9th through 12th grade teachers in east Tennessee during the 2019-2020 school year. Therefore, the results of this study may not necessarily be generalized to other educational systems that do not reflect a similar demographic. Additionally, the responses of those who chose to participate may have also differed from those who chose not to participate.

Overview of the Study

This study has been organized into five chapters. Chapter 1 contains the introduction to the study, history and context of the issue, statement of the problem, significance of the study, definition of terms, and limitations and delimitations. Chapter 2 consists of the review of literature that is organized by topic. Chapter 3 includes the research methodology, research questions, research design, and sample of this study. Chapter 4 reports the results of the study, while Chapter 5 summarizes the findings and provides the conclusion and recommendations for future practice and research.

CHAPTER 2

REVIEW OF LITERATURE

A review of literature was completed in order to understand the context of this study. The literature review is organized by theme, beginning with the brain's hemispheres and the five learning systems.

The Brain's Hemispheres and the Five Learning Systems

The part of the brain being engaged for successful task completion has less of an impact on development than the specialized brain systems (Given, 2002). The brain receives information through a variety of pathways, each of which is processed differently (Jensen, 2008). The sides of the brain, known as the right and left hemisphere, both process information and contribute to logic and creativity (Moellering, 2018). The hemispheres are asymmetrical in processing information, including emotion, and the organization of the right hemisphere and left hemisphere are individualized in contrast with the misconception that people are either "right brained" or "left brained" (Jenson, 2008). Instead of viewing individuals and learning as being either "right brained" or "left brained," the viewpoint needs to shift to identify all individuals as being whole brained (Jenson, 2008; Moellering, 2018). Both hemispheres, regardless of location, interact as the two hemispheres are connected by millions of nerves (Moellering, 2018). The development and growth of the brain is more heavily attributed to the specific brain system function rather than the major hemisphere of the brain being used (Given, 2002).

The brain is comprised of learning systems, linked circuits and pathways developed by the brain, that process similar input and can be altered based on environmental stimulation (Given, 2002). Each learning system processes information in a complex, specialized way. The five major learning systems work simultaneously as one, so no one learning system can ever be turned off. The learning systems are cognitive, emotional, social, physical, and reflective. The cognitive learning system directly relates to the development of academic skills with most educational systems assessing the output of student learning. Teaching with the cognitive learning system in mind places the educator as the facilitator of learning as students experience authentic tasks where they become decision makers and problem solvers. Learning experiences move away from traditional memorization of concepts. Cognitive learning systems encourage the teaching of thematic units that connect concepts through patterns while building on prior knowledge. The cognitive learning system, comprised of calculation, writing, reading, and additional academic development areas, has historically received the most weight in enhancing learning. However, the emotional system is the primary learning system responsible for reaching one's highest potential. The emotional learning system defines an individual and how a person will act, behave, learn, and interact with others. Negative emotions will limit academic achievement while positive emotions will act as a knowledge booster. A student's ability to learn is enhanced as emotional learning is combined with research-based instructional strategies (Connell, 2009). A desire to belong to a group or community and the desire to receive respect and attention from others defines the social learning system (Given, 2002). The social learning system's foundation is culture, and it is impacted by the culture of the

community, school, and home. Interactions with others in these environments impacts a student's motivation to learn. The physical learning system is the desire for an individual to be actively engaged in a learning task, and it is impacted by environmental factors. Students generally prefer learning through hands-on or experiential activities. The physical learning system is the oldest and most studied learning system while the most recent and most complicated is the reflective learning system. The reflective learning system is essential for the other four learning systems to produce results. This system reflects on personal learning, achievement, and failures to determine how individual performance and learning styles need to adjust to improve. Consequently, these five learning systems are guided by genetic code. Genes serve two main functions: to replicate themselves through RNA and to respond to environmental input. (Jensen, 2007). Environmental input shapes behaviors and response patterns. Therefore, educators must understand how environmental input is associated with the learning systems.

Environmental Input and States of Alertness

Environmental input impacts learning ability (Jenson, 2007; Wang et al., 2018). The brain automatically makes judgements and filters through a new environment to determine if the environment feels safe, is friendly, or if it feels familiar (Jensen, 2005). Learning environments that are well thought out increase student learning while decreasing discipline issues (Jensen, 2008). The brain's neural connections are strengthened in brain-friendly learning environments. Stronger neural connections support motivation, long-term memory, and planning (Jensen, 2008). Jenson (2007)

stated that the learning environment may have as high as 40-50% of a positive impact on student success.

The learning environment positively supports cognition when brain compatible variables are present (Jensen, 2005; Tejeda-Delgado & Lucido, 2019). The five variables that have the greatest impact on physical environment include seating, lighting, temperature, acoustics, and building design. Jensen (2005) recommended that seating arrangements be adjustable to align with learning activities and take student personal preferences for spatial placement into consideration. Consistent and sufficient lighting that maximize daylight exposure also positively impact the learning environment. The recommended temperature of the classroom to remain within the comfort zone is between 68 and 72 degrees. Acoustic considerations determine if the classroom is too noisy or if instruction is not loud enough. Sound system installation supports students in hearing instruction while carpets or drapes limit reverberation (Jensen, 2008). School design should consider brain-compatible components to enhance cognition (Jensen, 2005). The physical environment within the school setting can easily be enhanced. Physical environmental changes that are brain-friendly come at a financial cost, but the benefit to student learning lasts a lifetime (Jensen, 2008). Schools that do not meet the brain-compatible components are not conducive to learning and increase stress. The cognitive learning system is negatively impacted by learning environments that are insufficient or overcrowded.

The cognitive learning system and emotional learning system have a special relationship (Given, 2002). The emotional learning system must feel comfortable in a given situation prior to engaging the cognitive learning system. Therefore, it is vital to

understand how the brain responds to states of alertness to most effectively enhance student learning (Jensen, 2007). As the brain processes challenge and is in a state of relaxed alertness, learning is enhanced (Connell, 2009; Laxman & Chin, 2010). Relaxed alertness is defined as the balance of challenge and lack of threat in a classroom environment. Relaxed alertness creates the ideal classroom culture as learning meets students' social and emotional needs (Gözüyesil & Dikici, 2014). The lower stress levels that occur during relaxed alertness aid the developmental process (Laxman & Chin, 2010). Learners who are nonstressed will benefit from increased thought process, attentiveness, focus, and recollection of content (Jensen, 2008). On the other hand, the distressed brain no longer interprets environmental cues. The distressed brain reverts to familiar behaviors, loses the ability to store and access information, loses the ability to store information into long-term memory, overreacts and cannot implement higher-order thinking, and limits responses. Students who feel threatened are more likely to either sit in acrimony or verbally retaliate if they feel consequences are nonexistent while emotional processes escalate. Moderate to significant threats such as harassment, bullying, and put-downs cause learning to cease as cognitive processing is impaired by strong emotions (Jensen, 2007). When encountering overwhelming threat, the brain will decide whether to fight, flight, or freeze. Therefore, to optimize learning, threats must be diminished so students' brains are at a state of relaxed alertness (Gözüyesil & Dekici, 2014). When students feel safe with low to moderate levels of stress, they can fully invest in a learning experience that provides optimal challenge and relevance (Jensen, 2007). Teaching and learning with the brain in mind create a climate within the learning environment that depicts safety and challenge simultaneously (Connell, 2009; Gözüyesil

& Dikici, 2014). As more understanding and interest in the learning systems has grown, Brain-Based Learning (BBL) has developed (Connell, 2009).

Brain-Based Learning

The apprenticeship method was the first form of learning (Jensen, 2007). Through the apprenticeship method, the apprentice would learn from an expert who was more skillful. For centuries, people learned through the apprenticeship model. Then, in the 1800s, the Industrial Revolution shifted learning to one physical location and standardized learning through a conveyer-belt system that created the “factory model.” The “factory model” focused on unity, completing tasks in a specific order, and respecting authority and lasted until 1950. Since 1950 many models of how schools should function have come to fruition, including the “demand” model, “stand-and-deliver” model, and the “sage-on-the-stage” model. Through these models, teachers were in control of the information, how it was provided to students, and teachers, as the “expert,” stood in the front of the classroom to deliver knowledge to students. During this time, educational neuroscience originated as a new, interdisciplinary approach that focused on understanding the brain and brain-compatible teaching. Brain-compatible teaching is defined as the application of specific strategies and principles that are compatible to what is known about the brain (Gözüyesil & Dikici, 2014).

Educators created the term brain-compatible teaching to reference brain-based learning within the educational system (Craig, 2003). Brain-compatible teaching and learning is not a new method, however new approaches to brain-compatible teaching and learning continue to develop (Yagcioglu, 2017). Brain-compatible teaching has led

to higher levels of professionalism as teachers make and support classroom pedagogical practices and decisions with science (Jensen, 2007). Brain-based learning specifically describes at the cellular level how the brain learns. Brain-based learning has profound educational implications and is frequently used interchangeably with brain-compatible teaching within the educational setting. Brain-based learning focuses on understanding the learning systems to create meaningful learning (Gözüyesil & Dikici, 2014). Brain-based teaching has changed the way in which school systems operate, including teaching strategies, assessment methods, discipline practices, and budgeting (Jensen, 2007).

Cognitive scientists and neurology researchers developed a set of strategies known as brain-based learning that provide the fundamental building blocks to improve teacher instruction and students' learning ability (Connell, 2009; Giddens, Caputi, & Rodgers, 2020). Cognitive functions are the processes that enable information to be processed and knowledge to be developed (OECD, 2007; Dündar & Ayvaz, 2016). The brain's information processing system, which directly aligns to learning in the academic setting, is the cognitive learning system (Given, 2002). The cognitive learning system relies on brain chemistry to process input and emotional sensations to make decisions and solve problems. Understanding how the brain processes information and the brain's natural design, including processing and storing information, has developed the three key words, engagement, strategies, and principles, of brain-based education (Jensen, 2008). Jensen (2008) defines brain-based education as the engagement of strategies that are founded and driven by principles of brain-based research. Brain-based learning has a greater impact on student learning and academic achievement than traditional

methods of teaching (Gözüyesil & Dikick, 2014). Traditional teaching methods including formal, lecture-based instruction do not align with brain-based instructional strategies and are antagonistic (Jensen, 2008). Brain-antagonistic learning minimizes learning as brain-based instructional strategies are not implemented (Phelps, 2011). Brain-based learning implements a brain-compatible model to focus instruction on engagement, strategies, and principles (Jensen, 2008).

Understanding the brain and engaging strategies founded in principles is the foundation of brain-based education (Jensen, 2008). Research on brain development identified 12 principles that further developed understanding on how learning occurs (Connell, 2009; Laxman & Chin, 2010, Tejeda-Delgado & Lucido, 2019). The following 12 brain-based learning principles were selected from brain-based research by Cain and Cain (1994):

- Brains structure is unique to every individual;
- The brain functions as a parallel processor;
- Learning engages the body and brain;
- Patterning is how the brain searches for meaning;
- The brain innately searches for meaning;
- Emotions help the brain in patterning;
- Wholes and parts are processed simultaneously;
- Peripheral perception and focused attention occur when learning;
- Conscious and unconscious processing occur during learning;
- Challenges enhance learning while threat limits learning;
- Rote learning and spatial memory are the two types of memory;

- The learning process is developmental.

The brain, as a complex adaptive system, is social, and every brain is uniquely organized (Laxman & Chin, 2010; Tejeda-Delgado & Lucido, 2019). The brain functions as a parallel processor with the entire physiology engaging simultaneously as the brain innately searches for meaning through patterning. A critical action for patterning to occur is emotion (Connell, 2009; Tejeda-Delgado & Lucido, 2019). The brain processes information through parts and wholes simultaneously as it engages in peripheral perception and focused attention (Laxman & Chin, 2010; Tejeda-Delgado & Lucido, 2019). Different methods of learning include conscious and unconscious processing as the brain is not aware of all the stimuli being perceived. Therefore, encountering challenges enhances brain function while experiencing threat limits the brain's ability to process and learn information (Connell, 2009; Tejeda-Delgado & Lucido, 2019). After information is learned, the brain stores the information in either spatial memory or rote learning. Spatial or autobiographical memory is built as connections between experiences, events, and facts are created. Rote learning, also known as taxon memory, consists of skills and informational facts that are stored in the brain through practice and rehearsal. The learning process is developmental and impacted by the environment in which learning occurs. The Principles of Brain-Based Learning provide a framework for how the brain learns and stores information (Lexman & Chin, 2010). Educators should use the brain-based principles to design instructional practices that support all learning while also creating a safe and rigorous classroom climate.

The principles of how the brain works within the school context provides the structures for engagement strategies that align to brain-compatible teaching (Jensen,

2007). Lessons should be designed to relate to students' existing knowledge, or schema, while being personally relevant, challenging, interesting, and attainable as determined by Vygotsky's (1978) "Zone of Proximal Development." The Zone of Proximal Development (ZPD) is defined as the distance between the level of potential and the level of development as measured through problem solving that occurs through collaborative experiences or through adult support (Dastpak, Behjat, & Taghinezhad, 2017). The interactions among a student and the adult grows a student's ability to perform and make decisions regarding complex tasks. Thinking, which is purposeful, leads to cognitive development and the social interactions among students and a skillful peer or an adult supports cognitive development. According to ZPD, good instruction leads development. A teacher's lesson design is purposeful, connected to brain-based research, and the teacher provides professional justification as to why a strategy is being implemented (Jensen, 2007).

Brain-based research should transition a teacher's instructional focus to whole-brained learning experiences (Jensen, 2008). Transitioning to brain-based learning strategies has a dual focus that positively impacts learning for all students. The dual focus consists of reaching all learners by modifying teaching methods and creating an emotional climate in the classroom that is safe, yet challenging. Students have many developmental similarities when they come into a classroom (Tomlinson & McTighe, 2006). Students search for a sense of autonomy, affirmation, and accomplishment; however, they also have many differences that shape their perception of themselves in the context of school. Variance shapes how a student experiences school. Individual variance is based on biology, degree of privilege, positioning for learning, and

preferences. The contributing factors to biological variance are gender, development, abilities, and disabilities. Biological variance impacts learning as students learn in different modes and in different timetables. Students' degree of privilege is based on contributing factors that include socioeconomic status, culture, race, home supports, and life experience. Students' degree of privilege impacts the challenges a student may encounter in school, the quality of supports, and experiences that influence learning. Positioning for learning is impacted by motivation, trust, self-concept, interpersonal skills, and adult role models. The contributing factors of preferences include learning preferences, individual preferences, and interests. Using techniques in the classroom that align to brain-based learning empowers teachers to accommodate individual student learning needs through modification of methodologies used in instruction (Jensen, 2008). Implementing a differentiated approach provides students with equal opportunities to master curriculum aligned concepts. A differentiated approach needs to be taken by educators to provide authentic learning experiences that meet the individual needs of all learners (Laxman & Chin, 2010).

The traditional school model is not meeting the ever-changing needs and demands of 21st century students (Sheninger, 2016). According to Jensen (2007), students of today have different brains than students did before the 21st century. Experiences change the way the brain develops, and childhood experiences today differ from experiences of children in prior generations. Students of today are Digital Natives and are considered to be the N-gen or D-gen, shortened from Net or digital generation (Prensky, 2001). Digital Natives have been immersed in technology, specifically computers, video games, cell phones, instant messaging, and digital music, since birth.

On the other hand, educators and building leaders that were born prior to the digital world are Digital Immigrants. Digital Immigrants have adapted to technology but will always have their digital "accent." Digital Natives process information and have brain structures that are fundamentally different from the Digital Immigrants that are teaching students and leading our schools. The rapid increase of technology and the application of technology outside of the school setting is requiring stakeholders, including instructional leaders, educators, and students, to shift away from formal, traditional instructional models (Sheninger, 2016). To enhance student learning, educational systems and professionals should implement research-based learning strategies (Connell, 2009). Given (2002) found that using pedagogical strategies that meet the needs of today's learners grow a student's desire to learn and develop learning strategies.

Social Emotional Learning

A learning environment supported by brain-based learning is holistic as it meets the social and emotional needs of students (Jensen, 2008). As the school and classroom are identified as having noteworthy social interactions, the student brain will be positively altered through the social learning experiences that occur during the school day (Jensen, 2007). Interpersonal experiences or interactions with other students regarding learning is a key focal point of social systems (Given, 2002). Social learning systems are positively impacted by social experiences, and social learning systems have been found to improve cognition, improve blood pressure, enhance activity in the immune system, alter memory and attention, and positively influence brain

chemistry (Jensen, 2007). According to Jensen (2008) creating a brain-based environment provides support for students to express their emotions in many ways. A brain-based learning environment provides the opportunity for students to make choices about their learning through relevant projects. Classroom routines and structures through brain-based learning meets the needs of students by creating a balance in the state of mind and body. Additionally, students are able to have easy and consistent access to resources while receiving performance feedback through peer review and self-assessment tools. Brain-based learning environments limit threats while creating collaborative learning experiences and requiring students to use problem solving techniques that benefit all members of the learning community.

As students' emotions, beliefs, feelings, attitudes, and skills are being actively engaged in lessons, a holistic learning approach is developed (Jensen, 2008). A holistic learning approach within the classroom creates an environment in which students and their personal needs are involved in classroom activities, and personal needs become the individual focus of the learning process. The social learning system's natural tendency meets the student's innate desires of belonging to a social group, to find delight in receiving attention from others, and to be respected by others (Given, 2002). A portion of the student's day must provide constructed social conditions in which the student can use his or her personal strengths and have options to work in the mode in which the student is the most successful. As a student's ability to have control and choice over the learning environment decreases, there is an increase in aggressive and social behaviors (Jensen, 2007). The social system of the brain learns to either advance

authentic processes for decision making across a vast array of academic skills, cultures, and ages, or differences will be viewed as liabilities (Given, 2002).

Positive social interactions enhance academic achievement (Jensen, 2007). Social and Emotional Learning (SEL) has demonstrated that academic achievement is significantly improved when skills, values, and knowledge of social and emotional learning are emphasized (Goleman, Barlow, & Bennett, 2010). Human emotions are the neural operating system's integral component as emotional state and mood have a significant impact on the brain's ability to think (Jensen, 2008). Emotional distractors should be limited as they cause the brain to underperform instead of processing information at the brain's full ability (Jensen, 2007).

Social and emotional learning aids a student in being able to better understand situations from another student's perspectives and are able to better empathize with and demonstrate genuine concern for other students (Goleman, Barlow, & Bennett, 2010). Students who are able to extend their capacity to relate with other students and apply emotional intelligence are able to blend an understanding of cognitive skills with natural systems to empathize with all living things. To reinforce more positive responses to emotions over time, emotional intelligence skills should be taught in a manner that educates students to what is happening within their own body (Jensen, 2008). A student's ability to learn is influenced by emotions. Therefore, interventions that are research-based must also be combined with emotional learning (Connell, 2009). Laxman and Chin (2010) have found that the encouragement for learners to become risk-takers develops when effective teaching practices takes place in a safe learning environment that embraces brain-based and social and emotional learning.

Blended Learning

Blended learning is defined as an instructional strategy that embeds technology and emphasizes the student-teacher relationship to enhance student engagement, independence, and achievement (Ceylan & Kesici, 2017). Technology has been integrated globally into courses via a variety of intensities, ranging from low levels of intensities that are web enhanced to high levels of intensities that are completely virtual (Asarta & Schmidt, 2017). Blended learning shifts the focus from two extreme approaches and instead, forms a companionship between technological, environmental, and instructional components to increase learning and achievement outcomes (Hill, Chidambaram, & Summer, 2016). Also known as hybrid learning, blended learning combines traditional learning with virtual learning components (Moore, Robinson, Sheffield, & Phillips, 2017). Blended learning environments are created when different modes of effective instruction are delivered as students engage in meaningful, interactive learning experiences (Kaur, 2013). The goal of blended learning is to mix the positive attributes of both web enhanced and face-to-face learning (Chaeruman, Wibawa, & Syahrial, 2018; Güzer & Caner, 2013).

Web enhanced and face-to-face instructional components are combined in the blended learning environment to maximize the strengths of both delivery models (Chaeruman, Wibawa, & Syahrial, 2018; Güzer & Caner, 2013). The impact of blended learning is described as the most effective and valuable components of face-to-face instruction combined with the most effective components of instructional technology (Chaeruman et al., 2018; Kaur, 2013). The strengths of face-to-face instruction are

ignited within the blended learning environment as relationships are fostered through interactions among students and the teacher (Balentyne & Varga, 2017). Additionally, opportunities for students to collaborate are increased through face-to-face instruction. Online components that are integrated into blended learning environments provide opportunities for each individual learner to experience success. Collaborative experiences and the distribution of knowledge are enhanced through blended learning as the barriers of time and space are removed through technology (Chaeruman et al., 2018). Blended learning overcomes the barriers of time and space by providing synchronous and asynchronous learning environments. Through blended learning the different strengths of face-to-face instruction and online attributes are embraced to motivate learners in different ways (Boelens, Wever, & Voet, 2017).

Synchronous learning is defined as simultaneous learning in which the learner and instructor are engaged in the learning process at the same time (Chaeruman et al., 2018). The two types of synchronous learning are synchronous physical format and virtual synchronous. Synchronous physical format occurs when students and instructors are engaged in the learning process at the same time and at the same place. Virtual synchronous learning occurs when the learners and educators are engaged in the learning process at the same time but in different locations. An example of virtual synchronous learning is students and educators participating in face-to-face instruction through digital methods such as virtual worlds, video conferencing, or web conferencing (Bower et al., 2015). Synchronous instruction facilitates hands-on learning experiences, learning through collaborative processes with peers, and authentic feedback that occurs spontaneously throughout the lesson. Synchronous learning components increase

equity and opportunity for students to be active participants of classes that they may otherwise not have the opportunity to participate in due to barriers such as geographic location or lack of transportation (Bower et al., 2015). Blended learning reaches a wider geographic audience and meets the needs of more diverse learning styles than other delivery models (Hill, Chidambaram, & Summer, 2016).

Asynchronous learning is defined as the learning process that occurs among learner and educator at any time and from any location (Chaeruman et al., 2018). The two types of asynchronous learning are collaborative asynchronous learning and self-paced directed asynchronous learning. Collaborative asynchronous learning occurs when learners and educators are able to engage in collaborative experiences and learn from one another at any time and from any location. Collaborative asynchronous instruction facilitates collaborative experience such as group discussion boards or group assignments (Nortvig et al., 2018). Self-paced directed asynchronous learning is when learners and educators are able to engage in the learning process at any time and from any location by viewing online resources such as PowerPoints, articles, and videos (Chaeruman et al., 2018). Asynchronous learning activities significantly impact a student's identify (Nortvig et al., 2018). Student learning characteristics are affected as students learn to master challenging tasks independently, often with less support from teachers and peers. The asynchronous interactions that occur virtually may cause a learner to feel more isolated as these interactions are frequently considered to be more monotonous than face-to-face instruction (Boelens, Wever, & Voet, 2017). However, asynchronous communication available through the online components of blended learning provide flexibility with the time in which interactions occur. Communication

through asynchronous learning can expand beyond the school day providing a more feasible option than traditional brick and mortar learning environments (Boelens, Wever, & Voet, 2017). The flexibility provided through online components of blended learning directly impact both teachers and students by increasing accessibility while maintaining the strengths of face-to-face instruction (Kaur, 2013). Both synchronous and asynchronous learning work together to create a holistic model of blended learning (Nortvig et al., 2018).

Courses taught through a blended learning model combine classroom activities and online resources to optimize student learning (Kaur, 2013). At the classroom level, four different blended learning models provide a framework for integrating technology into classroom instruction (Acree, Gibson, Mangum, Wolf, Kellogg, & Branon, 2017). The four models are flex, a la carte, enriched virtual, and rotation. Learning through the flex model occurs predominately through online platforms while in the school setting. Students are able to self-structure how they progress through content to meet their individualized learning goals with teachers available to support their individual learning needs. A la carte combines an online course with a corresponding brick and mortar course. In the a la carte model, the online teacher is the teacher of record. The online course may be taken at an alternate location or within the school setting. The enriched virtual model is completed online with minimally one face-to-face session. Online learning is supported by face-to-face learning experiences. The rotation model occurs in a brick and mortar building with the teacher rotating students between face-to-face and online learning experiences in a fixed, strategic way. Face-to-face instruction consists of either individual, group, small-group, or whole class instruction. The rotation model

includes station rotation, individual rotation, lab rotation, and a flipped classroom. Station rotation consists of stations in which the students rotate. Minimally one station includes face-to-face instruction with the teacher and minimally one station in which learning occurs through an online component. The individual rotation is similar to station rotation as stations are established with minimally one face-to-face and one online station. However, instead of rotating through stations, students are provided an individual “playlist” that determines which stations a student is to complete. The lab rotation consists of students rotating between a computer lab and a classroom within the school setting. In a flipped classroom, students engage in learning content off campus outside of school hours. New skills are learned outside of the school day and then practiced through activities and tasks during the school day with teachers and peers. As traditional and online learning components are integrated into blended learning models, the strengths of all learning models are leveraged and a synergy for learning is achieved (Hill, Chidambaram, & Summer, 2016).

The key to a successful blend is using a learning management system (LMS) that meets teacher and student needs (Loomis, 2015). An LMS will support the teacher by increasing efficiency in grading student work and reporting student grades while also saving time during transitions by electronically distributing and collecting student work. A learning management system also organizes and creates engagement opportunities among content, peers, educators, and the learner (Nortvig et al., 2018). However, Hill, Chidambaram, and Summer (2016) found that 62% of students using an LMS are passively interacting with learning tasks and curriculum resources minimally, accessing to meet but not surpass teacher expectations. Additionally, the use of learning

management systems is being limited by teachers to provide a structure for students to turn in assignments and for teachers to score assignments in 76% of 21st century classrooms (Acree et al., 2017). Engaging content and interactions with the use of online platforms is essential for student success in a hybrid environment.

Blended learning integrates technology and innovative strategies into the classroom (Soler et al., 2017). As an emerging pedagogical concept in 2000, blended learning has grown in popularity (Güzer & Caner, 2013). The combination of web based and traditional learning strengths blend to create a pedagogical practice centered around the design of a more effective learning environment (Asarta & Schmidt, 2017). The blended learning environment is more interactive than traditional classrooms and is constructed on reflective thinking (Vo, Zhu & Diep, 2017). Transitions in the blended learning environment occur as learning practices and patterns adapt (López-Pérez et al., 2011). The adaption to learner centered classrooms provides students with more engaging and rigorous learning experiences (Güzer & Caner, 2013). Technology expands the boundaries of physical space and provides greater content and resources to enhance instruction while providing teachers with more specific understandings of a learner's progress towards mastery (Klein et al., 2006). Blended learning creates flexibility and adds time to classroom discussions (Güzer & Caner, 2013). Additionally, students are given more control in terms of time and space, responsibility, and interdependence. Blended learning transforms the educational process while increasing students' capacity to think critically and reflectively (Garrison & Kanaku, 2004). Blended learning provides a more effective structure for pedagogical practices as instructional

designs meet the learning styles and needs of diverse learners (Prohorets & Plekhanova, 2015).

Blended learning increases learning outcomes and interactions within the learning environment as it fosters differentiation (Prohorets & Plekhanova, 2015). Success is experienced by all learners as teachers individualize student work and personalize instruction to meet the needs of diverse learners (Sheninger, 2016). Students are able to actively engage in the learning process that is personalized and differentiated to meet individual student needs (Kaur, 2013). In a system with such diversity among learners, blended learning also provides students with opportunity to reflect on their individual learning. Strictly face-to-face instruction no longer meets the needs of diverse learners (Sheninger, 2016).

Through blended learning, a more flexible and social learning environment is developed that places the student at the center (Nortvig et al., 2018). Blended learning has been able to increase engagement and transition the learning environment to being student-centered as effective technology implementation provides more dynamic and interactive learning opportunities (Prohorets & Plekhanova, 2015). Blended learning does not replace the teacher, but rather shifts instruction from being teacher-centered to student-centered (District Admin, 2015). Teacher-centered instruction refers to the teaching style in which the teacher directly transfers knowledge to students (Dong, Wu, Wang, & Peng, 2019). The teacher as the decision-maker designs the learning environment and determines the processes for learning. On the other hand, a student-centered approach highly engages students through the process of knowledge acquisition while shifting the role of the teacher to facilitator. The student-centered

learning environment increases student understanding, motivation, and critical thinking skills. In the student-centered learning environment, students' self-regulation of learning and the teachers' instruction work collaboratively to enhance the learning process. As the teacher shifts to the facilitator role, the teacher must consistently monitor progress as a student's ability to self-regulate within the blended learning classroom is a vital factor for determining success (Boelens, Wever, & Voet, 2017).

The integration of technology into classroom routines enhances the learning process as demonstrated by student mastery of concepts (Sheninger, 2016). The role of technology changes in the blended learning setting, however the expectations for effective teaching and learning remain (Kaur, 2013). Consideration of design challenges provide a framework for a successful blend. The five instructional blended learning design challenges consist of looking beyond what to teach to how to teach, determining performance objectives and providing a complementary delivery method, maintaining interactive online components, ensuring perseverance with non-live components, and validating that blended components are successfully integrated (Kaur, 2013).

Blended learning integration in the K-12 educational system comes with challenges, specifically in the area of technical, organizational, and instructional (Kaur, 2013). Technical challenges within the blended learning environment consist of successful implementation and use of technology. Lack of funding is a continuous barrier to successful technology integration (Sheninger, 2016). Outdated and aging infrastructure limit technological resources available and the ability of teachers and administrators to effectively implement technological systems. The effectiveness of technology integration impacts the ability of students and teachers to successfully use

technology, especially in rural areas that lack access. Instructional challenges consist of implementing technology strategically within the classroom setting (Kaur, 2013). Kaur found that school systems should transition to blended learning. However, it is a complex system that often fails due to lack of understanding and connection between programs. Resources, autonomy, and professional development must be established by learning organizations to ensure successful technology implementation (Sheninger, 2016). An overlying organizational challenge lies in a mindset shift as stakeholders overcome the thought process that traditional classroom instruction is more effective than blended learning. Additionally, the organization must shift the traditional role of the teacher to a facilitator who overcomes the organizational challenge of consistently managing and monitoring progress (Kaur, 2013).

Organizational changes overcome barriers when transitioning to blended learning (Soler et al., 2017). As the implementation process begins, it is also important to pilot the program for a predetermined length of time and to then analyze the results (Boone, 2015). Successful implementation and sustainment of blended learning requires a school system to commit to providing resources (Boone, 2015). Blended learning provides a more cost-effective way to enhance program effectiveness and the learning experience. Additionally, administrative support consists of providing students with quality access and strategically managing the decision-making process. Technical support is also needed to manage platforms and internet coverage across buildings while also providing resources and support in the design process. Effectiveness of the online components of blended learning weigh heavily on the reliability of the systems being used (Bower et al., 2015). If connectivity issues exist, such as the cutting in and

out of audio files, the learning environment would likely be negatively impacted. Digital connectivity issues lead to even a larger issue if lack of reliability causes teachers to choose fewer effective tools and teaching strategies. The infrastructure supporting technology implementation varies greatly across school systems and must be strategically taken into consideration (Parks, Oliver, & Carson, 2016). Stakeholders within a low socio-economic system might not have the same access to technology as more affluent systems, however the expectations for blended learning are the same. To enhance the blended learning model being implemented throughout a system, continuous evaluation, reflection, and advancements should be made that focus on the culture and goals of the learning organization, policies and approaches to education, and organizational strategies (Soler et al., 2017).

Sheninger (2016) found that there was a larger advantage when using blended environments instead of face-to-face or online delivery models. As compared to completely web-based or face-to-face instruction, blended learning increases the rate at which students meet course expectations (Kaur, 2013). In the blended learning environment, dropout rates have decreased while test scores and student motivation have increased. Additionally, effective blended learning enables a student's ability to think critically, take responsibility for learning, and to work collaboratively with peers (Soler et al., 2017). Creating a blended learning environment can increase collaboration, engagement, and attitudes solely due to the integration of technology (Ellis et al., 2016). As blended learning bridges the old way of instruction with the new, flexibility is provided in the form of both space and time (Moskal, Dziuban, & Hartman, 2013).

Self-Determination Theory and Blended Learning

Self-Determination Theory (SDT) bestows a continuum that can be used to understand how an individual's motivation develops and dissipates (Fryer & Bovee, 2016). The SDT continuum creates a regulation of motivation that includes amotivation, extrinsic motivation, and intrinsic motivation. Amotivation is the lack of motivation in which there is a lack of drive in achieving the targeted behavior or goal (Gillet, Morin, & Reeve, 2017). Extrinsic motivation is when external factors such as incentives and rewards drive participation or completion of a task (Serin, 2018). Intrinsic motivation is when enjoyment and satisfaction come from within to achieve a goal (Gillet, Morin, & Reeve, 2017). Motivation for individuals, including students, can stem from a variety of reasons. The learning objective within the classroom setting can determine the source of and type of motivation within a student (Nayir, 2017). Academic motivations can co-exist and combine to create a student's motivation profile (Gillet, Morin, & Reeve, 2017).

Barriers that exist for individual students influence goals and a student's ability to take actionable steps towards goals have a negative impact on student motivation. In a blended learning environment, students must actively overcome barriers created by technology, especially in terms of online homework (Fryer & Bovee, 2016). Time constraints, limited relationships among student and teacher, and technology complications can perceptually be classified as a barrier of online components while time, equipment, authority, and delivery context can be perceived as barriers of face-to face-components (Klein et al., 2006). Teachers of blended learning courses must be aware of barriers that impact student motivation and integrate specific strategies to

support students when integrating new educational models and approaches (Fryer & Bovee, 2016).

Blending a classroom has the potential to transform the learning process as students become the driving force of instruction (Asarta & Schmidt, 2015). By having students drive instruction independence within the classroom is fostered. Students take control of how and when they learn, take responsibility for their learning, and engage in higher levels of critical thinking. As teachers implement blended learning in the classroom, technology can be used to provide more control over learning conditions, such as where and when they learn, and increase resources to facilitate student learning (Klein et al., 2006). Technology can increase motivation as it increases student accountability for their work while directly making connections between learning assignments across subject areas (Fryer & Bovee, 2016). Additionally, perceptions of barriers can be transitioned to enablers when students engage with technology to increase motivation (Klein et al., 2006).

López-Pérez et al. (2011) reported that the more engaging the technological components of blended learning, the greater the student motivation to meet classroom expectations and learning goals. As learning motivation increases, so does a student's grades, metacognition, and overall satisfaction with the course (Klein et al., 2006; López-Pérez et al., 2011). Metacognition includes self-monitoring understanding and absorption of new learning as a continuous component of the learning process (Kowalski, 2017). As blended learning requires students to become more active learners than face-to-face or web-based models, metacognition increases (Klein et al., 2006). Metacognition skills consisting of goal setting, self-monitoring progress towards

goals, and time management are essential factors within a blended classroom (Chen, Breslow, & DeBoer, 2018). Integrating a metacognitive approach that is focused on student learning with professional educational practices requires reflection and self-assessment of successes and failures (Kowalski, 2017).

As students engage in self-regulated learning (SRL) they successfully connect the complex learning system with goals and motivation (Chen, Breslow & DeBoer, 2018). Goal achievement becomes an intrinsic motivation as students set and monitor goal achievement that fosters individual learning as compared to extrinsic motivation that results from outside rewards. As a result of SRL, students develop the understanding that they are in control of their learning and willingly accept responsibility for closing their own learning gaps. As a decision-maker in the education process, technology and online resources provide supports for students to optimize their learning and achieve learning goals (Hill, Chidambaram, & Summer, 2016). Students increase intrinsic motivation and goal achievement as they become decision-makers, navigating through instruction and resources in the blended learning environment (Manwaring et al., 2017).

Advantages of a hybrid learning environment for students include flexibility of time and pace, managing resources digitally, using computer platforms to improve collaboration and writing skills, and developing both social and personal skills (Soler et al., 2017). Flexibility in pace, place, time and path provides students with the opportunity to personalize and have control of their learning (Boelens, Wever, & Voet, 2017). Students are able to take ownership of when they learn and the pace at which they learn, increasing students' ability to transfer learning and performance. Blended learning

has had a positive impact on students' transfer skills defined as the ability of students to apply their learning to new situations (Yusoff et al., 2017). Students learning through blended environments are more successful at transferring their learning than students in traditional learning environments. Through blended learning, students experience more satisfaction with the learning process and experience more success as retention is increased. Self-motivation becomes more vital in a blended learning environment as students must increase self-regulation to succeed in the online learning components of courses (Tseng and Walsh, 2016). The use of online platforms allows students to monitor their grades upon accessing the platform (Mirriah et al., 2015). Additionally, completion bars also provide a visual representation of progress through the curriculum. Transparency and ease of access help students monitor their progress, enhancing their self-regulation skills over time. Blended learning has had a more positive impact on student achievement on assessments, but also on student completion rates and student course satisfaction (Kintu et al., 2017). Blended learning increases motivation and autonomy as it shifts control of learning from teachers to students (Banditvilai, 2016).

Hill, Chidambaram, and Summer (2016) found that blended learning offers a way to improve student return on invested time in learning. Student motivation is increased as error correction opportunities increase through feedback, a prime factor in student achievement (Jensen, 2007). Online learning components of blended learning provide easily accessible, low-cost, high functions means for students to receive performance feedback and to monitor their progress (Hill, Chidambaram, & Summer, 2016). Lynch and Dembo (2004) found autonomy increased in blended learning environments as student teacher interaction and course structure increased. As young learners positively

respond to technology, technological components should be embraced to improve student learning and motivation (Nazarenko, 2015).

Student Motivation and Blended Learning

During the mid 1800s, psychology shifted to an applied discipline from a philosophical approach (Cudney & Ezzell, 2017). Since this shift, motivation has been able to provide understanding and insight to people's actions. Through the study of motivation, a person's wants become transparent (Alkaabi, Alkaabi, & Swinburne, 2017). By definition, motivation is as an internal drive to achieve needs and desires (Serin, 2018). Motivation is the psychological process of involuntary actions that are goal focused and involve persistence, direction, and intensity, also known as effort (Dybowski, Sehner, & Harendza, 2017). Persistence, direction, and intensity are the three components of motivation (Serin, 2018). Persistence is how long an individual is willing to continue working towards a goal, direction refers to what an individual is trying to achieve, and intensity refers to how hard an individual is willing to work to achieve the desired result. Motives impact an individual's attention and actions (Alkaabi, Alkaabi, & Swinburne, 2017). Over time, motives change, directly impacting an individual's actions. Motive status, including emotions, cognitions, and needs, focuses one's direction and energy towards either avoiding or approaching a desire. Avoiding or approaching a desire leads to the four expressions of motivation. The expressions of motivation include behavior, engagement, physiology, and self-report. Behavior is formed and directed through motivation, leading actions to continuously align to goals. The most significant component in goal attainment is motivation (Serin, 2018). Motivation is a

private, mysterious phenomenon that innately drives goal-directed actions (Alkaabi, Alkaabi, & Swinburne, 2017).

Goals, emotions, and beliefs construct motivation, typically generating higher engagement and perseverance for students within the classroom setting (López-Pérez et al., 2011). A student's ability to engage in the learning process is directly related to student motivation (Nayir, 2017). The three levels that are used to examine student motivation are intrinsic motivation, extrinsic motivation, and amotivation. Students who are highly motivated and confident learners spend more time engaging in the learning process, resulting in higher academic achievement (Nayir, 2017; Yusoff et al., 2017). Hill, Chidambaram, and Summer (2016) found that motivated learners complete evaluations of their learning and make adjustments to their academic behaviors based on their appraisals to grow or continue behavioral patterns. Motivated learners will explore and search for content that will help them meet targeted learning goals when their performance and learning goals are not aligned. Successful students are highly motivated to learn, therefore the materials used in blended learning can be a motivating factor for students that are performing well (Yusoff et al., 2017). Students with high levels of intrinsic motivation are more engaged and have higher levels of academic success than students with extrinsic motivation (Nayir, 2017). Students who lack motivation often act without meaning. Actions in the learning environment do not have meaning when students lack motivation. Non-motivated or students who are not as motivated as others perform lower on tests (Yusoff et al., 2017). To increase student achievement across all motivation levels, teachers should identify and develop activities to develop students' motivation levels to promote intrinsic motivation (Nayir, 2017).

Student motivation is defined as the student's desire to learn content (Klein et al., 2006). The classroom teacher directly impacts students' motivation (Astuti, 2016). Classroom teachers enhance a student's motivation and the student's ability to deeply process course content or metacognitive ability (Bolkan, Goodboy, & Kelsey, 2016). As student effort and metacognitive ability increase, student self-motivation increases (Hill, Chidambaram, & Summer, 2016). Motivational Teaching Practice (MTP) studies report that student motivation and teacher motivational teaching strategies are correlated (Astuti, 2016). MTP is a circular system that includes four distinct phases. The four phases include creating motivational conditions, generating student motivation, maintaining and protecting motivation, and encouraging positive retrospective self-evaluation. The instructor's ability to increase communication through verbal and nonverbal means with learners increased student motivation through more effective and relevant learning experiences (Hill, Chidambaram, & Summer, 2016). Without motivational conditions, students may not initiate the learning process or persevere through learning challenges (Vibulphol, 2016). Motivation remains an important factor in student success (Tseng & Walsh, 2016).

Teachers' characteristics and behaviors are vital in enhancing student motivation as the different motivational strategies implemented by teachers impact student learning differently (Vibulphol, 2016). A teacher's perception of student behavior impacts situational motivation (Dybowski, Sehner, & Harendza, 2017). Motivation is one of the most important factors impacting student achievement, however teachers feel that they have little impact on student motivation and are not adequately prepared to address student motivation (Daniels, Poth, & Gorgan, 2018). Findings from Daniels, Poth, and

Gorgan (2018) reveal that teachers feel they do not have personal responsibility for student motivation. When teachers feel that they are directly held accountable for student learning through policies and assessment data, negative teaching strategies such as less student choice, more teacher control, and more criticism are increased (Daniels et al., 2018; Vibulphol, 2016). Negative teaching strategies that increase teacher control overpower student motivation (Vibulphol, 2016). A controlling teacher style may limit students to meeting minimum task expectations as external factors cause the teacher to depend on external controls. On the other hand, when teachers take personal responsibility and report intrinsic motivation, they express greater concern for others and invest more effort into the learning process (Daniels et al., 2018). Vibulphol (2016) found that students become more intrinsically motivated when teachers provide the students with more space than when teachers used more controlling styles of instruction. Teachers' perceptions and personal motivation can either enhance or limit individual student motivation (Vibulphol, 2016).

Sung et al. (2017) reported that since the 1960s learning enhanced by the strengths and effectiveness of technology has been linked to an increase in student motivation and interest across various subjects and learner ages. However, the introduction of technology in the classroom setting does not answer the ongoing question of how to improve student motivation (Fryer & Bovee, 2016). A teacher in the blended learning environment will encounter the challenge of motivating students (Yusoff et al., 2017). The quality of the blended learning environment does not solely determine student success (Hubackova & Semradova, 2016). The success of the student is also determined by how prepared the student is to work, the student's ability

to organize work, and the student's ability to use available tools to enhance work. The impact of technology on student motivation lies heavily on how the student engages and interacts through the use of technology (Fryer & Bovee, 2016). The student's identity as an online learner impacts the student's motivation and ability to retain information (Nortvig et al., 2018). Confidence, prior academic performance, and prior experience with online forums such as Facebook and Twitter impact how a student participates and contributes in online platforms. Blended learning extends the learning process through social media platforms such as blogs, wikis, Twitter, and Facebook (Boone, 2015). Students who have confidence in these areas are more likely to have an authoritative approach to learning through technology while students that lack confidence towards their knowledge and skillsets are more likely to passively participate. Motivation, despite innovative teaching methods is an important factor in student performance in a blended learning environment (Yusoff et al., 2017).

Keller's ARCS Model of Motivation is a comprehensive instructional model for supporting student motivation (Tseng & Walsh, 2016). ARCS is an acronym for Attention, Relevance, Confidence, and Satisfaction. Instructional content should gain and sustain students' attention throughout the lesson. Content and learning tasks should also be relevant to the students learning and future learning. A student's confidence is built as the student experiences success and develops a sense of accomplishment. Additionally, motivation is supported when students experience intrinsic and extrinsic satisfaction upon task completion. Tseng and Walsh (2016) found that when the ARCS Model of Motivation was used, students in the blended learning environment had higher level of motivation than students in the traditional classroom

setting. Additional platforms for engagement and communication places students at the center of their learning and increases student motivation. In situations where instruction was personalized, and students had meaningful learning experiences enhanced through technology, students were more motivated to learn the subject (López-Pérez et al., 2011).

Student Autonomy and Blended Learning

Student autonomy refers to a student's ability to take responsibility and ownership of the learning process (Sheninger, 2016). As students personally impact the how, why, what, and where of learning, they become more vested in the learning process. A student's desire for independence, or autonomy, in conjunction with a student developing self-restraint results in a personal determination to become an independent individual (Given, 2002). Autonomy is defined as one's ability to take individual responsibility for the learning process and choose one's own behaviors (Gamble, Wilkins, Aliponga, Koshiyama, Yoshida, & Anado, 2019). An individual is acting autonomously when acts are volitional (Yuan & Kim, 2017). When an individual actively engages in an activity solely for volition, pleasure, and/or choice, the individual is acting autonomously (Tucker, Wycoff, & Green, 2017). Students act autonomously as they engage in their own learning by choosing learning experiences and setting instructional goals while teachers facilitate the process. As school administrators and teachers give up control to students while developing a growth-mindset, students are able to navigate through interests, passions, and learning experiences (Sheninger, 2016). Students learn to become independent thinkers when they are asked higher level

questions, engage in conversations, and when they are provided with acceptable, clear choices (Given, 2002).

Blended learning environments provide students with choices (Mirriahi et al., 2015). Students can choose to demonstrate their learning through their interests by designing posters, presentations, videos and more that showcase their learning while meeting learning criteria. Blended learning provides students with the opportunity to make choices, however, if students are presented with too many choices, they may become overwhelmed (Eaton, 2017). Additionally, blended learning gives students control of not on only how they demonstrate their learning, but also over when they learn content through the use of online platforms (Tseng & Walsh, 2016). Student learning is enhanced through digital learning opportunities which increase student engagement in complex, authentic tasks (Mirriahi et al., 2015).

Online platforms provide teachers the time during face-to-face instruction to scaffold instruction, creating authentic learning tasks with increased student engagement that results in students taking more ownership of their learning (Tseng & Walsh, 2016). Technology provided in blended learning environments serves as an avenue for students to increase autonomy and therefore own their learning (Sheninger, 2016). Blended learning requires students to take more control of their learning which increases student responsibility and their ability to direct their learning (Klein et al., 2006). A student's ability to self-asses one's abilities increases student autonomy and goal completion both within and outside of the learning environment (Gamble et al., 2018). The online components of blended learning allow all students, especially more reserved students, another platform to interact with peers, teachers, and content. The

alternate communication methods increase engagements and interactions, therefore increasing student autonomy.

The ability of a learner to take ownership of and drive one's learning process defines student's autonomy (Banditvilai, 2016). As learning autonomy increases within students, students become more engaged, are emotionally more positive, prefer greater challenges in learning, and increase conceptualization while also increasing academic achievement and retention rates school wide. Students in blended learning environments demonstrate more focus and autonomy than their peers learning in traditional classroom settings. As teachers release control of the learning environment and provide students with choices, student autonomy is supported and intrinsic motivation to actively engage in the learning process is enhanced (Yuan & Kim, 2017).

Student Prior Academic Achievement and Blended Learning

In blended learning environments, the most predictive factor in a student's engagement and completion of web-based tasks is a student's academic ability (Fryer & Bovee, 2016). Prior academic performance will impact student learning performance and progression towards mastering learning goals as online learning platforms supplement traditional, face-to-face instruction (Hill, Chidambaram, & Summer, 2016). Academic ability levels impact the effectiveness of technology in blended learning environments as measured by grade point averages more than in traditional academic settings (Asarta & Schmidt, 2017).

Asarta and Schmidt (2017) found that students with lower grade point averages had significantly higher performance in face-to-face instructional settings over the same

course that combined face-to-face instruction with online platforms. Students who began a course with more significant gaps in critical learning levels were less likely to improve academic performance in the blended learning environment (Fryer & Bovee, 2016). Additionally, students with lower attainment tend to lack the self-regulation skills required to be successful in the blended learning environment (Boelens, Wever, and Voet (2017). Strategies for cognition and metacognition are less impactful for lower performing students (Yusoff et al., 2017). Historically lower performing students are more likely to focus their learning on factual information rather than making connections to the larger content of the course. Self-monitoring strategies to gauge understanding and use of learning strategies are also limited for struggling learners. To strategically support learning for students that are historically less proficient, educators should use repetition by stating the same thing over and over again and engage students in the new learning experiences and activities. Educators must have innovative strategies to grow lower performing student's self-confidence.

On the other hand, high performing students have more strategies and use those strategies more effectively than lower performing students on tasks (Yusoff et al., 2017). Boelens, Wever, and Voet (2017) revealed that high performing students and students that are effective self-regulators respond positively to the flexibility and control provided through the online components of the blended learning classroom. Additionally, the research conducted by Asarta and Schmidt (2017) found that the opposite was true for students with high grade point averages. Students with higher grade point averages as measured by previous academic achievement performed significantly higher in blended learning environments than in traditional classroom settings (Asarta & Schmidt, 2017;

Vo, Zhu, & Diep, 2017). Students with historically higher academic ability also significantly improved their attitudes towards academic coursework in the mathematics classroom where they had the opportunity to make choices regarding pacing in blended courses (Balentye & Varga, 2017). Peer assessments and peer support have less impact on students that are high achieving with more significant gains for students that are in the lower or average achieving subgroup (Nortvig et al., 2018). Peer to peer assessment and support can be a valuable pedagogical strategy, however its impact varies by students' prior academic performance.

Students with prior academic achievement and grade point averages that fell in the middle zone did not show significant difference over one learning delivery system than the other (Asarta & Schmidt, 2017). However, a study completed by Balentyne and Varga (2017) indicated that middle school learners with disabilities had significantly improved academic performance in blended learning environments.

Prior academic performance plays a greater role in student success in blended learning environments than traditional, face-to-face learning environments (Asarta & Schmidt, 2017). Due to this fact, publishers of school textbooks have begun offering online supports that determine individual student's level of performance, time on task, and the frequency at which a student accesses a specific platform to be proactive in evaluating student engagement with the curriculum and when interventions are needed to support student learning. Personalizing learning modules and pathways based on student individualized performance on a pretest has been proven to increase student performance for students across all prior academic achievement levels, even more significantly for students who are typically low achieving (Asarta & Schmidt, 2017).

Complimenting face-to-face instruction with technology and online learning platforms has resulted in significant improvements on academic performance, especially for historically lower performing subgroups (Hill, Chidambaram, & Summer 2016). Historically lower-performing students have also been supported in the blended learning environment through peer learning (Asarta & Schmidt 2017; Broadbent & Poon, 2015). Across all levels of prior academic performance, blended learning was found to be weakly significant to the students' ability to manage time effectively, self-monitor progress, think critically, or to improve metacognition (Broadbent & Poon, 2015).

Blended schools have the same performance expectations as funding remains consistent across all types of public schools (Gulsino & Miron, 2017). However, it is not known if blended learning environments are supporting and meeting the needs of all learners. It is essential to know how and if blended schools that receive consistent funding are performing equivalently, above, or below traditional learning systems. This is important as at-risk students are more likely to enroll in blended learning schools, especially at the secondary school level, that offer multiple learning systems and approaches for student success (Gusino & Miron, 2017). Although at-risk students are more likely to enroll in blended learning schools, nationally, the ethnic diversity in blended learning environments is proportional to the ethnic diversity within brick and mortar schools. However, the percent of students of minorities, specifically African American and Hispanic, increases in strictly online learning environments as compared to blended learning or traditional learning environments. Resources available through blended learning platforms provide students with equitable access consistently (Mirriahi et al., 2015). Increased engagement and learning occur as students not only have

access to resources but are able to create their own learning resources that incorporate their interest and their own individualized level of skills and knowledge. Blended learning schools' multiple approaches to learning make blended schools a competitive, cost-effective alternative to traditional school systems.

Teacher Pedagogical Practices and Blended Learning

Blended learning has become a pedagogical strategy in which the teaching and learning experience have been redefined (Yusoff et al., 2017). The goal of the blended learning framework is to achieve learning goals by creating learning experiences that are flexible to student learning needs and effectively integrate the use of technology with pedagogical practice (Mirriahi et al., 2015). Technology within the classroom has become common practice with 40% of teachers reporting that students use computers often and 29% reporting students use computers some of the time (Delgado et al., 2015). Strategic technology integration with effective practices can increase student success and mastery of goals (Walsh, 2016). However, the most common use of technology in the classroom is for administrative purposes which include managing student records, using the Internet, and using word processors (Delgado et al., 2015). The most common use of technology for students includes research and practicing basic skills. Technology is a tool that can positively support effective teaching; however, technology integration does not replace teaching (Walsh, 2016).

With technology at the forefront of 21st century classrooms, teachers can design lessons that foster creative learning that is personalized to meet individual learners needs (Tseng & Walsh, 2016). Technology is a resource available to educators to

support and enhance effective practices, not to replace the art of teaching (Walsh, 2016). The integration of technology should enhance student learning and will not lead to increased achievement without strategic implementation. Technology has led to an innovative approach to incorporate communication and information as students engage in both independent and collaborative work that is also interactive (Yusoff et al., 2017). One characteristic of effective classrooms is active learning in which emphasis is put on the how students spend their time in a class and the class structure in contrast to how much time students are physically present within the brick and mortar structure of the classroom (Baepler, Walker, & Driessen, 2014).

A variety of delivery models may be implemented within the blended learning environment to foster both effective and efficient experiences that engage the learner in the educational process (BakerNordin & Alias, 2013). The educational role of the teachers shifts as student learning needs and classroom constraints shift (Fryer & Bovee, 2016). A goal of integrating technology into the traditional class settings is to enhance learning outcomes while minimizing cost in innovative ways. Technology should never be viewed as a substitute for the teacher but instead as a tool for enhancing teacher practice (BakerNordin & Alias, 2013). Student learning is still dependent on effective pedogeological practices strategically used with technology by the instructor to improve student mastery of concepts via technology by the instructor. A vital role of the educator is to know how learners individually develop and how to strategically implement brain research, while honoring each students' individual learning system, to help students achieve high levels of success (Given, 2002).

The shift from traditional learning formats to a blended model requires a system of support centered around a precise vision (Moskal, Dziuban, & Harman, 2013). As school staff are typically timid and analyze top down initiatives with hesitation, due to the graveyard of failed initiatives, open lines of system communication are imperative for successful implementation of blended learning. Moskal, Dziuban, and Hartman acknowledged that developing school faculty and constructing a partnership creates a more consistent learning environment in which students master and reach successful levels of learning, specifically in online components. Developing staff and courses reduces the workload for educators while enriching learning experiences that increase student engagement and outcomes with more relevant, authentic learning opportunities. The teacher advantages of blended learning include increased communication and up to date information provided to students and families (Soler et al., 2017). The teacher advantages require the educator to be committed to one's role as a blended learning teacher. Due to its efficiency, effectiveness, and ability to access knowledge, educators prefer enhancing their instruction by creating a blended learning environment (Ceylan & Kesici, 2017).

Technology enhances the educator's practice when it is strategically implemented (Ceylan & Kesici, 2017). Blended learning that uses a surface approach of downloading and uploading files will be more restrictive than a deepened approach (Ellis et al., 2016). A deepened approach expands student understand and performance of learning outcomes. An effective blend keeps pedagogy, not technology, at the center of the work (Crawford & Jenkins, 2018; Kolb, 2019a). As the teacher focuses on pedagogical practices, implementing and adjusting new approaches ignites the success

of the blend. A teacher first must determine the concept or skill to be taught, decide which components would best support student learning if offered traditionally versus digitally, and then determine which digital technologies best connect the content to the learner. Educational learning delivered through digital platforms can actively engage students by integrating interactive curricular resources and materials (Tseng & Walsh, 2016). Supports for student digital literacy must also be in place as students are trained on how to experience success in a blended learning environment (Mirriahi et al., 2015). Even though students of the 21st century are digital masters, students need to be taught how to use technology for learning purposes.

The Triple E Framework was created to assist educators in the K-12 setting in effectively blend technology with instructional practices (Kolb, 2019a). The focus of the Triple E Framework is to provide teachers with an easy system for evaluating and purposefully selecting technological tools that will positively impact student performance. Technological tools that support student learning should be in the higher-order of Blooms Taxonomy, however many of the educational technology resources are in the lower-order of Blooms Taxonomy. Therefore, Kolb provides specific strategies and tools for evaluating how educational technology engages, enhances, and extends the learning. The very presence of technology will capture students' interest, however effective technology integration engages students in the learning experience (Kolb, 2019b). Student engagement can be determined by time on task, and engaging activities include learning experiences that are social and motivate students to initiate the learning process. The Triple E framework also focuses on enhancing student learning by creating more sophisticated learning experiences that are student-centered

and create opportunities for students to demonstrate understanding (Kolb, 2019c). Effective technology integration also extends student learning to authentic, real-world experiences (Kolb, 2019d). The Triple E Framework is a tool designed to help educators design lessons that are grounded in effective pedagogical practices that leverage technology to increase student learning (Kolb, 2019e). Kolb's Triple E Framework is located in Figure 1.

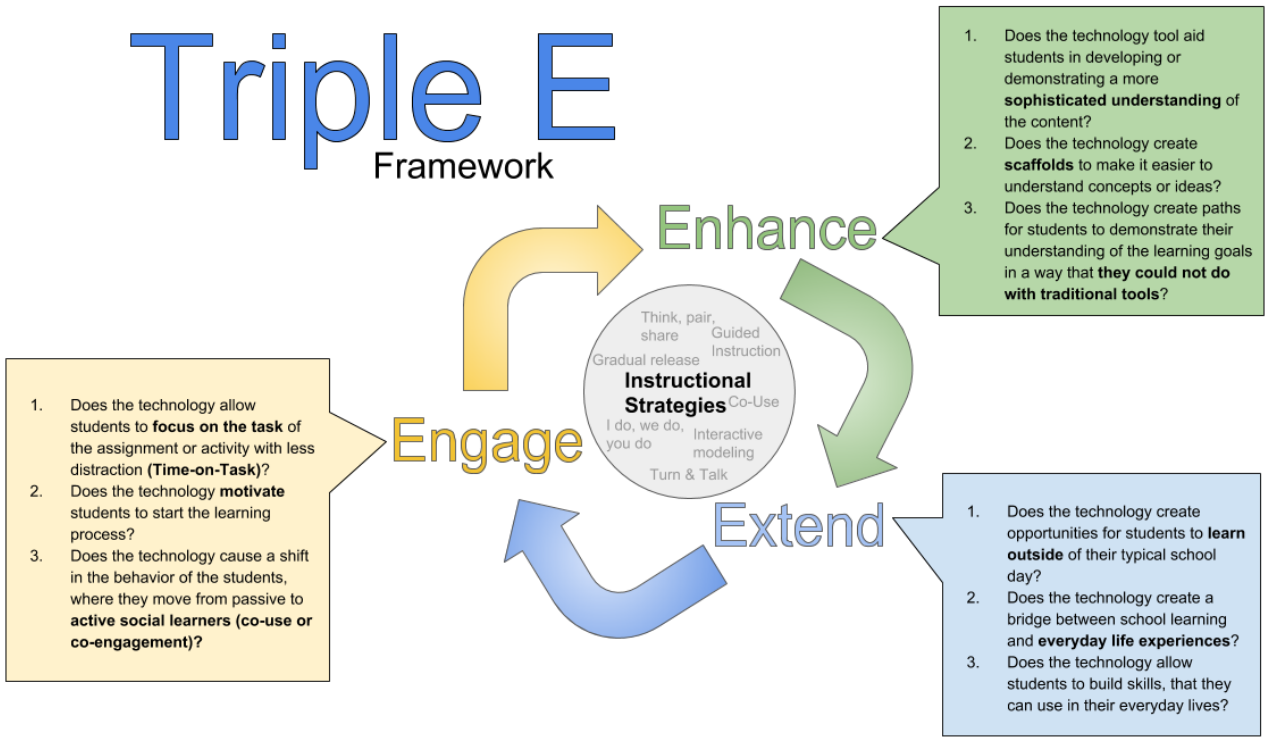

Figure 1. Triple e framework (Kolb, 2019a).

The informational age requires education to implement innovative approaches towards learning and growing students' skillsets (Boone, 2015). Therefore, the traditional roles of both students and educators should be re-evaluated (Crawford & Jenkins, 2018). The roles and responsibilities of the facilitator in a blended learning

environment should shift to most effectively support student learning (Nortvig et al., 2018). As the roles of teachers and students reverse to create student-centered classrooms, the curriculum should adjust to grow creative and critical thinking skills (Crawford & Jenkins, 2018). Students demonstrate and grow higher order thinking skills as they engage in new learning experiences and apply new learning.

The facilitator approaches face-to-face and online learning activities differently (Nortvig et al., 2018). Online components of blended learning require a strong teacher presence to positively impact student learning. Consistent student-teacher communication through critical discussions and meaningful feedback helps students feel connected to the learning environment through online components. Additionally, the teacher can connect the students to the learning environment by strategically embedding authentic activities with high-impact online tools, including audio and video files. Videos are more impactful and increase student interest along with teacher presence when the teacher is in the video.

A strong teacher presence enhances student engagement and participation in online learning communities (Nortvig et al., 2018). Establishing an online learning community between students also supports students in connecting to the online learning environment. Trust should be established among members of the learning community so all students can learn together and from one another. Establishing trust occurs through diligent effort and time. Creating an environment of trust enhances student interactions and connectedness to the learning environment. Online learning activities require more timely feedback and a more personalized approach to individual student work while face-to-face components of the blended learning environment emphasize

active engagement and peer-to-peer collaboration. Challenging content that requires more support and explanation from the facilitator should also occur during face-to-face instruction. A constant role and responsibility for the education is to be consistently assessible to student during both online and face-to-face learning activities.

Globally, teachers are finding innovative ways to connect online and face-to-face instruction (Sheninger, 2016). The instruction within K-12 classrooms of the 21st century focus on multiple learning strategies and modalities for providing instruction to students (Parks, Oliver, & Carson, 2016). An educator in a blended learning environment may deliver information through face-to face instruction or via technology. As technology and research-based, effective pedagogical practices continue to advance, so do the instructional methods within the classroom. Strategies for teaching and learning include analysis, case studies, exhibition, discovery and problem solving, concept maps, presentations, discourse and discussion techniques, and summaries (Soler et al., 2017). Classroom tutorials, video power point, and online assessments are three components of blended learning (Yusoff et al., 2017). Yusoff et al. found that classroom tutorials grew students' understanding while video power point and online assessments were the components that had students encountering higher percentages of problems. Technology can also serve students as a less intimidating method to develop and understand the meaning of new vocabulary. The content may also be taught via instructional methods such as direct instruction, discourse, guided practice, simulation, interactive games, and through case studies. Asynchronous and synchronous scheduling also provide variety in classroom meeting structures (Banditvilai, 2016). For learning to be meaningful, teachers must be strategic in their approach by creating

learning opportunities that go beyond the surface of content by engaging students through high level thinking that connect content to the learning outcomes (Ellis, Pardo, & Han, 2016). Blended learning is the most impactful when all learning activities, including both synchronous and asynchronous, are aligned to the learning goal (Mirriahi et al., 2015). Blended learning combines a variety of methods for delivery and instruction (Banditvilai, 2016).

As teachers design lessons, emphasis and awareness should be drawn to Vygotsky's (1978) "Zone of Proximal Development". A lesson designed within the "Zone of Proximal Development" is challenging yet attainable, builds upon prior student knowledge, sparks student interest, and is relatable to students lives (Given, 2002). Differentiation within the blended learning setting should not only occur to meet the diverse needs of student learning styles (Yusoff et a., 2017). Instruction should also be personalized to meet the varying cognitive needs of individual learners. Online systems for delivering instruction provide teachers with the tools to personalize learning to meet individual learning styles and the resources to differentiate course materials to align curriculum with individual student levels (Tseng & Walsh, 2016). Learning activities should be scaffolded and explicit relationships between activities should connect online and face-to-face teaching and learning activities (Nortvig et al., 2018). Discussion boards via an online platform should have explicit directions and expectations set at the beginning of the course with immediate feedback to students that are not engaging in online discourse. The facilitator must highlight the conversations and interactions as scaffolded instruction of online learning as activities unfold. Along with scaffolded communication among learners and facilitators, podcasts, online tutorial systems,

media, and hands-on assessments should also be scaffolded. Scaffolded instruction is vital for blended learning to be effective. As teachers take a facilitator role in the blended learning environment, course curriculum should be mastered as students take ownership of and shape their learning (Crawford & Jenkins, 2018). With support from the learning organization, blended learning can increase the effectiveness of teaching and learning by placing the focus of the work on individual students needs to personalize the student learning experience (Mirriah, Alonzo, & Fox, 2015).

Many factors impact student learning; however, it is very plausible that the factor of greatest impact on student achievement is the quality of the teacher (Sheninger, 2016). A classroom climate in which students experience individual relevance and emotional safety is a vital for overall effectiveness of the teacher (Given, 2002). Teachers that show enthusiasm for instructional content while coaching students by fostering a love of learning and assisting students in goal attainment enrich the emotional system (Given, 2000). As teachers facilitate learning, they meet the social needs of students through the development and fostering of a learning community. The learning community builds relationships among students and teachers as a quasi-family structure develops from the reverence and respect is given towards individual strengths. As the context of the classroom focuses on strengths, students and teachers view differences as positive characteristics as opposed to negative character traits.

Collaboration among students with the teacher playing an equal role maximizes social growth when differences are embraced to enrich the learning and problem-solving process. The educator should specifically choose technology as tools to support collaboration and student academic success (Yusoff et al., 2017). Ineffective attempts to

connect students to peers, facilitators, and content can cause transactional distance in a blended learning environment (Bower et al., 2015). Transactional distance generates a feeling of isolation and disconnection that may lead to a decline or lack of motivation. Facilitation of a hybrid learning environment must intentionally foster student needs for social and emotional connections. Technology should never pull from the relationships formed within a classroom but should instead enhance the role of the learner and the learning process (Yusoff et al., 2017). As technology implementation increases, communication and interactions among students and between students and teachers should remain a constant.

Blended learning allows students to obtain performance and learning goals as they learn with technology as opposed to learning from technology (Mirriah et al., 2015). Educational technology consists of software and hardware that are integrated into instruction to help students meet educational goals (Delgado et al., 2015). The integration of educational technology, including computers, does not shift the learning environment to a blended instructional method (Nortvig et al., 2018). Rather, the integration must also include a transition in pedagogical practices and implementation processes that align to the definition of blended learning. Blended learning environments are most effective when the teacher's role shifts to facilitator (Walsh, 2016). A student-centered classroom provides opportunities for students to collaboratively problem solve through co-constructive pedagogies that lead to greater academic success for students of the 21st century. Students' perception of their learning along with the course design influence students' satisfaction of blended courses (Nortvig et al., 2018). Technology integration along with a strategic implementation

process that focuses on the learner's characteristics and the context of learning and resources improve student attainment.

Feedback and Blended Learning

According to Social Cognitive Theory feedback plays an essential role in influencing student motivation and effort as it depicts discrepancy between learning goals and student performance (Hill, Chidambaram, & Summer, 2016). Feedback as defined by Chen, Breslow, and DeBoer (2018) is the specific information relating to one's understanding or performance that is provided through an agent, such as a teacher, parent, self, peer, experience, or book. Since misunderstandings and misconceptions can negatively impact student attainment of learning goals and content mastery, feedback is essential for closing gaps in learning (Chen, Breslow, & DeBoer, 2018). Additionally, feedback impacts a student's motivation and ability to self-monitor one's learning (Hill, Chidambaram, & Summer, 2016). Self-assessment improves student achievement towards mastering learning goals as students are able to take ownership of the learning process by setting personal learning goals, practicing new skills, and self-evaluating progress towards mastering learning goals (Mirriahi et al., 2015). Learners are able to identify and correct current misunderstandings which enhances motivation and confidence when feedback is specific and timely (Chen, Breslow, & DeBoer, 2018).

Technology provides additional opportunities for students to receive timelier, automatic feedback than instructors are able to provide in traditional settings on formative assessments including quizzes, homework, and practice problems via

checkable answer features (Chen, Breslow, & DeBoer, 2018). Hill, Chidambaram, and Summer (2016) found that learners who received feedback demonstrated higher levels of performance than learners who did not receive feedback when online platforms were used by students to self-monitor and regulate their learning. Effective implementation of formative, online assessments enhances student engagement and the teacher's ability to personalize instruction to develop relevant and meaningful learning experiences for students to collaborate with peers on learning goals and strategies to meet learning goal expectations (Chen, Breslow, & DeBoer, 2018).

Feedback in the blended learning environment can be provided through multiple formats including written, audio, video, in-text comments, and rubrics (Mirriahi et al., 2015). Rubrics provide a means for students to monitor their own performance towards mastering specific goals and standards. Rubrics may also be used by students to monitor and provide feedback to peers. Providing peer feedback develops students' ability to think critically while learning to receive and provide feedback sensitively to assist performance. Students can use digital formats to provide feedback to peers to enable adjustments to their work based on learning outcome achievement prior to receiving a score. Formative assessments such as peer reviews and self-assessments significantly enhance levels of student learning. Continuous feedback increases student achievement and can be supported through digital means effectively and efficiently.

Van der Kleij, Feskens, and Eggen (2015) found that elaborative feedback was more effective as students who were provided elaborative feedback reached higher learning level outcomes than students who received simple, corrective feedback. Timely feedback to students is increased through the use of technology (Mirriahi et al., 2015).

Online feedback can be connected to online resources for remediation and advancement. Feedback via online platforms provides flexibility to meet individual learner needs and access to feedback in a variety of locations and times that meet individual learner preferences efficiently (Chen, Breslow, & DeBoer, 2018).

Student engagement with online platforms that provide immediate feedback positively impacts student success in reaching educational outcomes in blended learning environments (Chen, Breslow, & DeBoer, 2018). Research validates the effectiveness of the feedback loop for student's engagement and motivation in the learning process through online portals (Hill, Chidambaram, & Summer, 2016). Four levels of feedback can be provided to students through the online components of blended learning, including feedback on task execution, learning strategies, metacognition skills, and personal feedback (Chen, Breslow, & DeBoer, 2018). Digital badging, commonly used in adaptive software programs, provides evidence on what skills or standards students have mastered. The badge signifies a learning accomplishment immediately to the learner and can be shared to others to provide recognition of student academic gains (Sheninger, 2016). Chen, Brewlow, and DeBoer (2018) found that similar to digital badging, multiple-choice questions provide immediate feedback on correctness, positively improving academic achievement while decreasing the achievement gap. Immediate feedback provided through technological means enhances learner motivation and confidence while limiting misconceptions.

The time that elapses between when students receive feedback and are able to correct learning based on feedback is negatively related to student performance. As time between study session increases, there is a greater chance that students will have

forgotten previous feedback (Chen, Breslow, & DeBoer, 2018). Feedback and error correction in a timely manner is essential and is the most impactful to student learning when the process of the task itself provides corrective feedback and insights (Jensen, 2007).

Professional Development and Blended Learning

As technology integration and blended learning advancement continue to expand across 21st century classrooms, the need for professional development centered on pedagogical practices becomes more vital for a successful blend (Moore et al., 2017). Professional development of high quality that focuses not only on informing teachers of strategies, but more importantly, shifting teacher practice is needed. High quality professional development should model effective pedagogical practices through hands-on learning experiences that provide educators with a wide range of strategies that can be successfully implemented to foster student learning (Moore et al., 2017). Additional pedagogical practices are required for successful blended learning implementation that focus on asynchronous and synchronous instruction strategies, using technology to individualize learning experiences that are student centered, and using data to assess and personalize learning (Parks, Oliver, & Carson, 2016). The effectiveness of blended learning will continue to be limited until blended learning is implemented in conjunction with effective strategies (Moore et al., 2017). As the shift to blended learning shifts the classroom to becoming student-centered, school systems must provide professional development that is timely, relevant, and effective (Parks, Oliver, & Carson, 2016).

A teacher will most likely implement pedagogical strategies that mirror the strategies by which the teacher was taught (Moore et al., 2017). It is challenging for classroom teachers to successfully implement a blended learning environment without ever experiencing it for themselves (Eaton, 2017). Unfortunately, most blended learning teachers were not taught by being an active participant in a blended learning environment (Moore et al., 2017). Therefore, providing teachers the opportunity to learn through the same tools that they will later use to provide instruction increases motivation, engagement, and the ability to transfer learning into practice (Eaton, 2017). Blended learning has been proven to be effective for student learning and has also been effective in improving teacher practice (Acree et al., 2017). Blended learning professional development provides a cost effective and flexible way for teachers to engage in learning activities when and where it is convenient for the learner. Blended learning creates a flexible learning environment as learning does not only happen in the brick and mortar classroom during the school day (Mirriahi et al., 2015). Instead the options provided by a blended learning environment allow for a flexible setting, including time and space, that is individualized to meet learning preferences. Additionally, trainers are able to create more opportunities for peer-to-peer collaboration that expand beyond sessions while also increasing the number of learner-centered strategies used. In order for participants to be motivated and fully engaged in professional learning opportunities, participants must view the learning environment as supportive and safe (Kowalski, 2017). Blended learning practices become effective when teachers learn through student-centered professional development and practice implementing new strategies (Moore et al., 2017).

Barriers to successful blended learning professional development exist and must be strategically addressed to create a supportive learning environment for teachers. Implementing blended learning professional development in a safe and supportive environment has not become a common practice (Moore et al., 2017). Teachers with limited technology proficiency might feel less safe when expected to use technology as a learning tool, resulting in a decrease in engagement and motivation (Kowalski, 2017). Technical support and providing differentiated learning opportunities in terms of tasks and resources becomes essential in meeting the needs of teachers with different levels of technological knowledge. Professional learning should also provide teachers with the time to learn and become comfortable with platforms that they will be expected to integrate into the blended learning environment. Face-to-face sessions should embed activities that model the use of online tools to increase teacher skill levels and confidence with technology with specific staff available to troubleshoot and support immediately. Specific skills should focus on uploading documents and materials, creating discussion forums, and more.

Kowalski (2017) stated that professional development is most effective when the professional development models blended learning and begins with a face-to-face session. Professional learning should create collaborative partnerships to enhance educational practice instead of occurring within isolated environments. Opportunities for colleagues to share and respond to each other's knowledge, practices, ideas, and perspectives are just as important as working collaboratively to engage in common task completion and activities. Kowalski noted that collaboration is most effective when attention and cognitive demands focus on the task itself rather than having the cognitive

demands centered on how to use digital technologies required to complete the task. Both face-to-face discussion and online discussion forums can foster community amongst learners.

To create high quality discussions, facilitators must be strategic with their own engagement, strategically integrate questioning strategies, and craft thoughtful prompts (Kowalski, 2017). When prompts are created, designers must verify that alignment exists between the prompt itself and the intended instructional goal of the discussion. Video prompts and other instructional artifacts, such as student work samples, lesson plans, and classroom video, may be used to spark discussion. Norm setting and creating common expectations for professional discourse is essential in creating a supportive and safe environment. A well-crafted discussion prompt in a professional development setting empowers teachers to discuss potential misconceptions and thought process students might have. During face-to-face instruction, Kowalski recommended that the instructor must take extra caution to remain the facilitator to verify that participants ideas remain the focus of the discourse. A talented facilitator may enhance the learning process by selecting videos and artifacts strategically. Using videos and artifacts specific to the learner's own practice creates a more personalized learning approach that increases motivation. Analyzing videos of others on the other hand requires participants to think more critically about the events taking place. Integrating videos and artifacts strategically into professional discourse can increase a teacher's content knowledge as student thinking, including misconceptions, is analyzed.

Acree et al. (2017) conducted a study to determine how engagement in a Leadership in Blended Learning course impacted teacher practices. They found that

88% of teachers shifted their professional practice with 57%-83% stating that they had applied their learning to their professional practice. The strategies used to positively impact pedagogical practices for blended learning consisted of modeling effective blended learning strategies, assisting teachers through provision of additional supports, and developing and revising a systematic blended learning implementation plan. The largest impact on shifting teaching and learning were a result of meaningful technology integration and strategies for blended learning. Teachers embraced collaboration by creating time and space for purposeful interactions, implemented feedback loops, and focused their work on individual student needs. Professional development trainers focused not only on the increase of technology, but also shifting teacher and administrator mindset to increase personalization for students. School administration started listening and interacting with purpose and provided actionable, timely feedback to teachers. Teachers followed their administrators and began using the same practices with their students. As a result, staff increased exploration and collaboration regarding to their practice in the blended learning setting. Acree et al. (2017) found that using a blended format for professional development was effective.

Approximately 70% of school districts across the United States are implementing blended learning, even though blended learning is not fully understood by 2.1 million teachers that are using some form of blended learning (Parks, Oliver, & Carson, 2016). This is evident as only 27% of teachers in a study completed by Parks et al. were technically meeting the components required by their study to be considered a blended learning environment. The one-year study intended to reveal the most effective professional development for educators of blended learning. Results found that blended

learning educators preferred professional learning that was research-based, relevant, modeled effective blended learning practices, and were on-going. Parks et al found that professional development was more desirable with increased buy in from teachers when they knew strategies were field tested and research based, effective practices. Additionally, teachers preferred learning when the content was personalized to meet their specific learning needs and authentic to their situations. As facilitators of professional development model effective practices that incorporate real world situations, teachers actively engage with the curriculum and technology through hands on experiences. By modeling strategies that require the educator to learn through multiple new modalities, educators develop a stronger sense of empathy for their students as learners. The study also found that professional learning shouldn't end with a set number of sessions. Instead, it should be continuous so that participants can continue to support and grow with one another. Effective professional learning on research based pedagogical strategies that implement the use of technology are vital for the successful adoption of blended learning.

Effective implementation of blended learning requires teachers to have pertinent training and the time and effort to develop and integrate pedagogical practices (Crawford & Jenkins, 2018). Professional development that occurs over time with culminating engagement with content, collaboration and feedback cycles with peers, and reflection of the new pedagogical strategies and implementation process are the most effective (Kowalski, 2017). Professional learning is especially effective for educators of blended classrooms when it is designed to meet the individual teacher needs while focusing on educator's pedagogical gaps that are essential for an effective

blend (Parks et al., 2016). Within the professional development setting, teachers can receive automatic, individualized feedback to help grow their pedagogical practices through artificial intelligence (Kowalski, 2017). For blended learning to positively impact student learning, educators must successfully combine learning styles, instructional methods, and the teaching model (Mirriahi et al., 2015). The quality of instruction and learning experiences directly impact the level of student learning.

Professional learning opportunities should provide teachers with the skills to adjust to an ever changing educational system (Crawford & Jenkins, 2018). As educational systems continue to change, skilled teachers must act and think creatively and flexibly to successfully adapt. As education continuously shifts, teachers as reflective practitioners should consistently question and search for new ways to grow their practice and curriculum through both innovative and analytical means. Professional development is essential in clarifying how the role of the educator shifts in the blended learning environment (District Admin, 2015). Teaching and modeling to educators how to efficiently and effectively implement technology and resources shifts educators' pedagogical practices and philosophy of education. The initial focus for a successful blend is developing philosophy and pedagogy. Developing understanding of why a system is shifting to blended learning and the supports available help shift the mindset prior to shifting expectations and practice. Educators and administrators across North America yearn for learning opportunities centered on research based practices and the environmental factors of blended learning, however the deeper understanding of pedagogical practices among blended learning teachers is still limited (Parks et al., 2016).

Chapter Summary

Students of the 21st century spend over 10,000 hours of their lives engaged in technology (Ceylan & Kesici, 2017). Education must capitalize on educational technology to shift the learning environment to align with student interests and skillsets. From video games to instant messaging, technology and the internet are important factors of students' everyday lives. As students learn through educational technology, they gain digital literacy as well as digital ethics and self-monitoring strategies. New skillsets for students should include problem solving, computational thinking, coding computers, and algorithmic thinking, which are all integral for digital literacy. Learning through technology and online resources supports students in developing the digital skills required for success in high school, college, and/or careers of the 21st century (Banditvilai, 2016).

Over 90% of district and building level administrators report that technology plays a vital role in preparing their students for success as aligned to their district and school level goals (Acree et al., 2017). Since blended learning schools are continuing to grow, it is important for hybrid schools to have measurable outcomes that are shared publicly (Gulsino & Miron, 2017). Blended learning is more effective than online or traditional learning environments (Boone, 2015). Blended learning increases student achievement as it provides students with increased access to learning and resources. The fundamental purpose of blended learning is to either transform, enhance, or enable the learning process (Owsten, 2018). The focus of blended learning is to create authentic learning experiences while embedding the use of technology (Ceylan & Kesici, 2017).

Authentic learning takes place beyond the instructional environment as students are able to apply their skills in real world situations (Boone, 2015). Additionally, technology integration in the blended learning setting supports interactions and cognitive development, significantly improving student achievement (Nortvig et al., 2018). Throughout the next 25 years, educational systems will continue to adapt as they become more mobile, disaggregated, personalized, and accessible at a global level with an increased focus on student learning outcomes (Boone, 2015).

Several characteristics regarding the learning, the environments, and the supports offered to the learner are vital for a student to have academic success through blended learning (Yusoff et al., 2017). The learner must be self-motivated, be able to self-direct learning, and take ownership of learning process. Additionally, the learner should enjoy the course content, be able to think critically, and have computer and technology skills to successfully use programs. The educator must provide timely feedback that is positive while family members must also offer support to help build a sense of community.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this study is to analyze teacher perceptions on the relationship between technology and student academic behaviors in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments.

This chapter provides descriptions of the research questions and null hypothesis, research design, population, instrumentation, data collection, and the analysis of the data.

Research Questions and Null Hypotheses

The following research questions and their corresponding null hypotheses relate to teachers' perceptions of student autonomy and student motivation in the blended learning environment:

Dimension 1: Student Motivation

Research Question 1: Is there a significant difference in participants' mean student motivation scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

$H_0$1: There is no significant difference in in participants' mean student motivation scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments.

Research Question 2: Is there a significant difference in participants' mean student motivation scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$2: There is no significant difference in participants' mean student motivation scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 3: Is there a significant difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$3: There is no significant difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 4: Is there a significant difference in participants' mean student motivation scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$4: There is no significant relationship in participants' mean student motivation scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 5: Is there a significant relationship between participants' student motivation scores and participants' age?

$H_0$5: There is no significant relationship between participants' student motivation scores and participants' age.

Research Question 6: Is there a significant difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

$H_0$6: There is no significant difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format.

Dimension 2: Student Autonomy

Research Question 7: Is there a significant difference in participants' mean student autonomy scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

$H_0$7: There is no significant difference in in participants' mean student autonomy scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments.

Research Question 8: Is there a significant difference in participants' mean student autonomy scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$8: There is no significant difference in participants' mean student autonomy scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 9: Is there a significant difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$9: There is no significant difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 10: Is there a significant difference in participants' mean student autonomy scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$10: There is no significant relationship in participants' mean student autonomy scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

Research Question 11: Is there a significant relationship between participants' student autonomy scores and participants' age?

$H_0$11: There is no significant relationship between participants' student autonomy scores and participants' age.

Research Question 12: Is there a significant difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

$H_0$12: There is no significant difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format.

Instrumentation

A survey consisting of 40 items focused on teachers' perceptions of student motivation and student autonomy within the blended learning environment. The instrument modified and combined the Perceptions of Student Motivation (PSM) Questionnaire and the Learner Autonomy Support Scale.

To measure student motivation the PSM Questionnaire was modified from Hardre, Davis, and Sullivan (2008). The PSM demonstrated external convergent validity and internal reliability across high schools in the United States and East Asia. Construct validity was analyzed using the Chi-square and found to be significant at $p<.001$ level. Cronbach's alpha reliability coefficients were found to have acceptable reliability with students' effort at α = .90, students' engagement at α = .83, and students' interest did not have an associated reliability coefficient as it was a single item on the PSM. The PSM is free for researches and educators, does not require licensing, nor does the PSM require specialized training.

To measure student autonomy the Learner Autonomy Support Scale was adapted from Oğuz (2012). The Learner Autonomy Support Scale demonstrated both construct validity and reliability. Construct validity was analyzed using the Chi-square and found to be significant at p<.001 level. Cronbach's alpha reliability coefficients were found to have acceptable reliability for "necessity" at α = .89, and "execution" at α = .92 for autonomy supportive behaviors. Written permission was given by Oğuz (2012) to use and reproduce the Learner Autonomy Support Scale.

Items 1 through 6 in the instrument were used to collect demographic information. Items 7 through 37 were based on a Likert-type scale response survey. The Likert scale consisted of six response areas including strongly disagree, disagree, somewhat disagree, somewhat agree, agree, and strongly agree. Items 7 through 26 measured student motivation and items 27 through 37 measured student autonomy. The last 3 items were open ended questions. The survey was designed in a way that provided participants with the option to not answer every question. A copy of the survey can be found in Appendix A.

Sample

The sample for this study consisted of two school districts that serve students in grades 9th through 12th in east Tennessee. Both districts included in this study are rural districts. One school district consisted of 83 teachers while the other school district consisted of 145 teachers. The sample of this study consisted of three high school across two districts in east Tennessee. The first high school has 78 teachers and 1,256 students. Of these students at high school 1, 20.3% are economically disadvantaged,

12.7% receive special education services, 5.3% are of minority backgrounds, and 0.2% are English Learners. High school 2 has 72 teachers and 1,208 students. Of these students at High School 2, 28% are economically disadvantaged, 16.4% receive special education services, 6.5% are of minority backgrounds, and 0.4% are English Learners. High school 3 has 61 teachers and 904 students. Of these students at High School 3, 22.6% are economically disadvantaged, 14.4% receive special education services, 14.8% are of minority backgrounds, and 1.3% are English learners. The three high schools all serve students in 9th through 12th grade. Two hundred and eleven teachers within these two districts were invited to participate in a survey (see Appendix A). The projected sample was selected because the high schools served students in grades 9th through 12th and the districts had access to blended learning environments.

Data Collection

Permission to collect data for this research via email was obtained by the Director of Schools for all participating school districts to prepare for the Institutional Review Board (IRB) approval process (see Appendix B). Prior to the commencement of this research, permission was received from the IRB. Following the IRB approval to begin research, a meeting with the Director of Schools for each school system that agreed to participate was held to identify additional components that needed to be addressed and to create a timeline for the survey. Then the survey was distributed to the Director of Schools for each participating school system and to corresponding high school principals. The survey was then emailed to all high school teachers within each district via an email from their principal that included a link to the survey in Google

Forms. A detailed informational letter was also included in the email to all teachers. Teachers were provided with the choice to participate in this survey. A 2-week window was provided for teachers to respond to the survey with a reminder email forwarded from the original email at the end of the first week and once again on the day the survey was to be returned.

Data Analysis

The data provided by the survey instrument were analyzed through a nonexperimental quantitative methodology. All data were analyzed through the data analysis software Statistical Package for Social Sciences (SPSS). The instrument measured teacher perspective on student motivation and student autonomy in the blended learning environment. The null hypothesis for each research questions was tested at the .05 level of significance. The following describes the statistical tests that were used to analyze each research question:

- Research Questions 1, 2, 3, 4, 6, 7, 8, 9, 10 and 12 were analyzed through a series of one-way analysis of variance (ANOVA). The grouping variables were comprised of the two dimensions (student motivation and student autonomy) and the dependent variables were the groupings. Research Questions 1 and 7 consisted of three groups of primary style of teaching (blended, online, or face-to-face). Research Questions 2, 3, 8, and 9 consisted of four groups of percentages of time technology was used in the classroom by students and teachers (25% or less, 26-50%, 51-75%, 76-100%). Research Questions 4 and 10 consisted of five groups

of percentages that a Learning Management System was used weekly (20% or less, 21-40%, 41-60%, 61-80%, 81-100%). Research Questions 6 and 12 consisted of three types of professional development (blended, online, or face-to-face).

- Research Question 5 and 11 were analyzed through Pearson correlation tests. The scores were used to measure the relationship between the age of the teacher and scores on the two dimensions.

Chapter Summary

This study was used to the analyze the relationship between technology and student motivation and student autonomy in the blended learning environment. The sample of this study consisted of high school teachers from two districts within east Tennessee. Data regarding the factors above were collected and analyzed through a survey. Research questions were analyzed through a series of one-way analysis of variance (ANOVA) and Pearson correlation tests.

CHAPTER 4

FINDINGS

The purpose of this study was to analyze teacher perceptions on the relationship between technology and student academic behaviors in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments. Participants of this study included 75 high school teachers within two different school districts within east Tennessee.

In this chapter, data are presented and analyzed to address 12 research questions by testing the 12 corresponding null hypotheses. Data were analyzed via an instrument that consisted of 40 items focused on teachers' perceptions of student motivation and student autonomy within the blended learning environment. Survey items 1 through 6 collected demographic information. A six-point Likert-type scale was used for items 7 through 37; 7 through 26 were focused on perceptions of student motivation while items 27 through 37 were focused on perceptions of student autonomy. The survey was distributed to high school teachers across two school districts over a 2-week period; 228 teachers were invited via email to participate in the survey and 75 teachers responded. Participants were advised that all responses were confidential and that no identifying information would be collected.

Research Question 1

Research Question 1: Is there a significant difference in participants' mean student motivation scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

$H_0$1: There is no significant difference in in participants' mean student motivation scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in the primary style of teaching and participants' mean student motivation scores. The factor variable, primary style of teaching, included three categories: blended, online, or face-to-face. The dependent variable was the participants' mean student motivation score. The ANOVA was not significant, $F(2, 70) = .70$, $p = .41$. Therefore, $H_0$1 was retained. The strength of the relationship between the teaching style and mean student motivation scale as assessed by n^2 was very small (<.001). The results indicate that there is not a significant difference in the perceptions of student motivation as compared by the primary teaching style of blended, face-to-face, or online (results in Figure 1). The means and standard deviations for the three groups are reported in Table 1.

Table 1.

Mean Motivation Scale and Primary Teaching Style

Type	N	M	SD
Blended Learning	20	72.08	12.52
Face-to-Face	52	68.77	9.85
Online	1	69.00	10.60

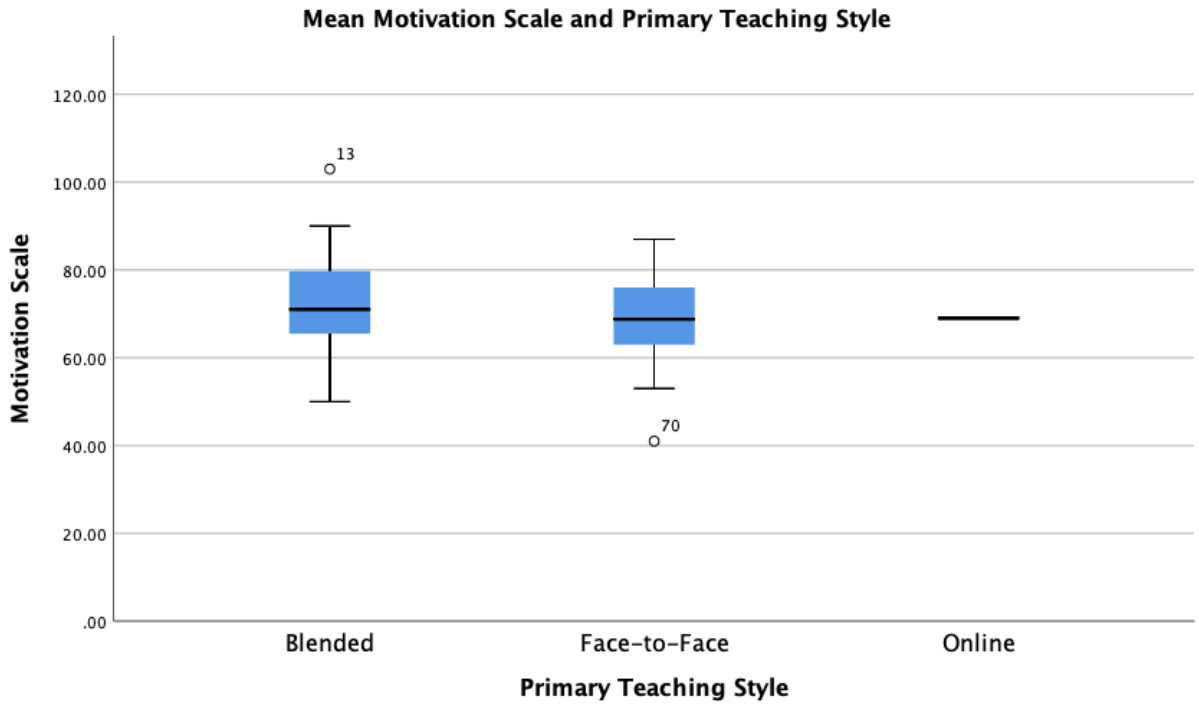

Figure 2. Participants mean motivation scale scores and primary teaching style

Research Question 2

Research Question 2: Is there a significant difference in participants' mean student motivation scores among teachers who use technology for instructional

purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$2: There is no significant difference in participants' mean student motivation scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student motivation scores among teachers who use technology for instructional purposes in the blended learning environment. The factor variables consisted of four groups of percentages of time technology was used in the classroom by teachers: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student motivation score. The ANOVA was not significant, $F(3, 69) = .265$, $p = .35$. Therefore, $H_0$2 was retained. The strength of the relationship between the teaching style and mean student motivation scale as assessed by n_2 was very small (<.001). The results indicate that there is not a significant difference in the perceptions of student motivation as compared by the percentages of time technology was used in the classroom by teachers (results in Figure 2). The means and standard deviations for the four groups are reported in Table 2.

Table 2.

Mean Motivation Scale and Percentage of Teacher Technology Usage

Percentage of Teacher Technology Usage	N	M	SD
25% or less	16	70.44	9.42
26-50%	20	67.90	12.62

51-75%	20	69.98	8.93
76-100%	17	70.71	11.51

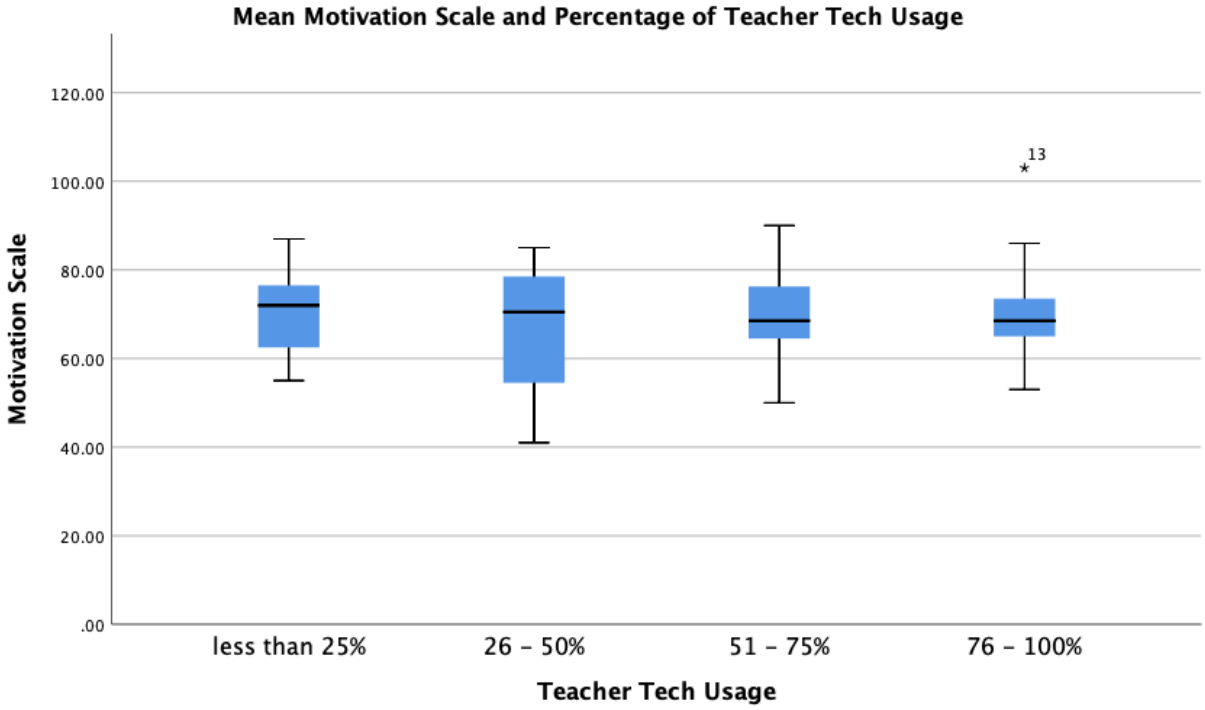

Figure 3. Participants mean motivation scale scores and percentage of teacher technology usage

Research Question 3

Research Question 3: Is there a significant difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$3: There is no significant difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student motivation scores among teachers who have their students use technology for instructional purposes. The factor variable, percentage of time technology was used in the classroom by students, consisted of four levels: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student motivation score. The ANOVA was not significant, $F(3, 69) = .265$, $p = .27$. Therefore, $H_0$3 was retained. The strength of the relationship between the teaching style and mean student motivation scale as assessed by n_2 was very small (.08). The results indicate that there is not a significant difference in the perceptions of student motivation as compared by the percentages of time technology was used in the classroom by students (results in Figure 3). The means and standard deviations for the four groups are reported in Table 3.

Table 3.

Mean Motivation Scale and Percentage of Student Technology Usage

Percentage of Student Technology Usage	N	M	SD
25% or less	27	70.56	7.79
26-50%	26	67.39	11.24
51-75%	13	71.65	11.70

76-100%	7	71.14	15.71

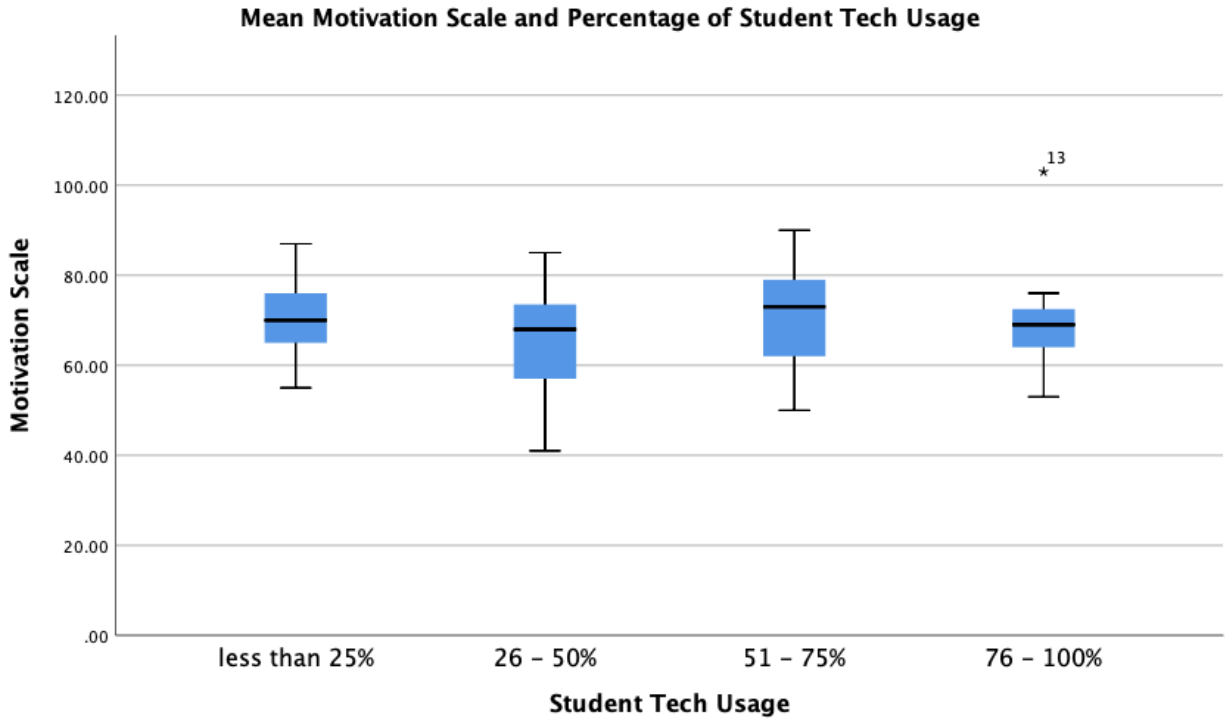

Figure 4. Participants mean motivation scale scores and percentage of student technology usage

Research Question 4

Research Question 4: Is there a significant difference in participants' mean student motivation scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$4: There is no significant difference in participants' mean student motivation scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the differences in participants' mean student motivation scores among teachers who use a learning management system. The factor variable, percentage of time a learning management system was used, consisted of four levels: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student motivation score. The ANOVA was not significant, $F(3, 69) = .636$, $p = .73$. Therefore, $H_0$4 was retained. The strength of the relationship between the teaching style and mean student motivation scale as assessed by n^2 was very small (<.001). The results indicate that there is not a significant difference in the perceptions of student motivation as compared by the percentages of time a learning management system was used (results in Figure 4). The means and standard deviations for the four groups are reported in Table 4.

Table 4.

Mean Motivation Scale and Percentage of Learning Management System (LMS) Usage

Percentage of LMS Usage	N	M	SD
25% or less	41	69.34	9.71
26-50%	16	69.50	10.50
51-75%	11	68.50	10.37
76-100%	5	75.60	18.65

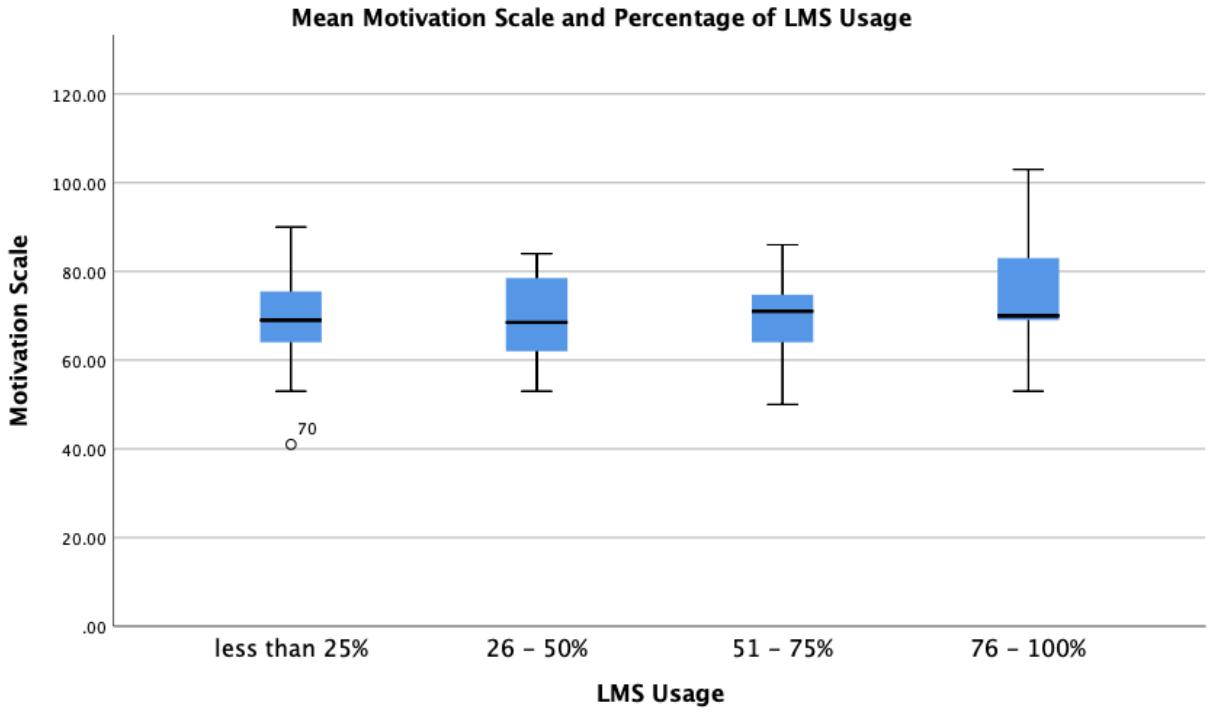

Figure 5. Participants mean motivation scale scores and percentage of Learning Management System (LMS) usage

Research Question 5

Research Question 5: Is there a significant relationship between participants' student motivation scores and participants' age?

$H_0$5: There is no significant relationship between participants' student motivation scores and participants' age.

A Pearson correlation test was conducted to analyze the relationship between participants' student motivation scores and participants' age. The factor variable was the participants' age. The dependent variable was the participants' mean student motivation score. A Pearson correlation test was computed to analyze the relationship between participants' student motivation scores and participants' age. The factor

variable was the participant's age. The dependent variable was the participants' mean student motivation score. The results of the correlation analyses revealed no significant correlation exists between participants' perception on student motivation (M = 69.68, SD = 10.60) and participants' age (M = 44.11, SD 11) and a correlation was not statistically significant [r(68) = -.049, p = .69]. Teacher ages are not necessarily associated with motivation scores. As a result of the analysis the null hypotheses was rejected.

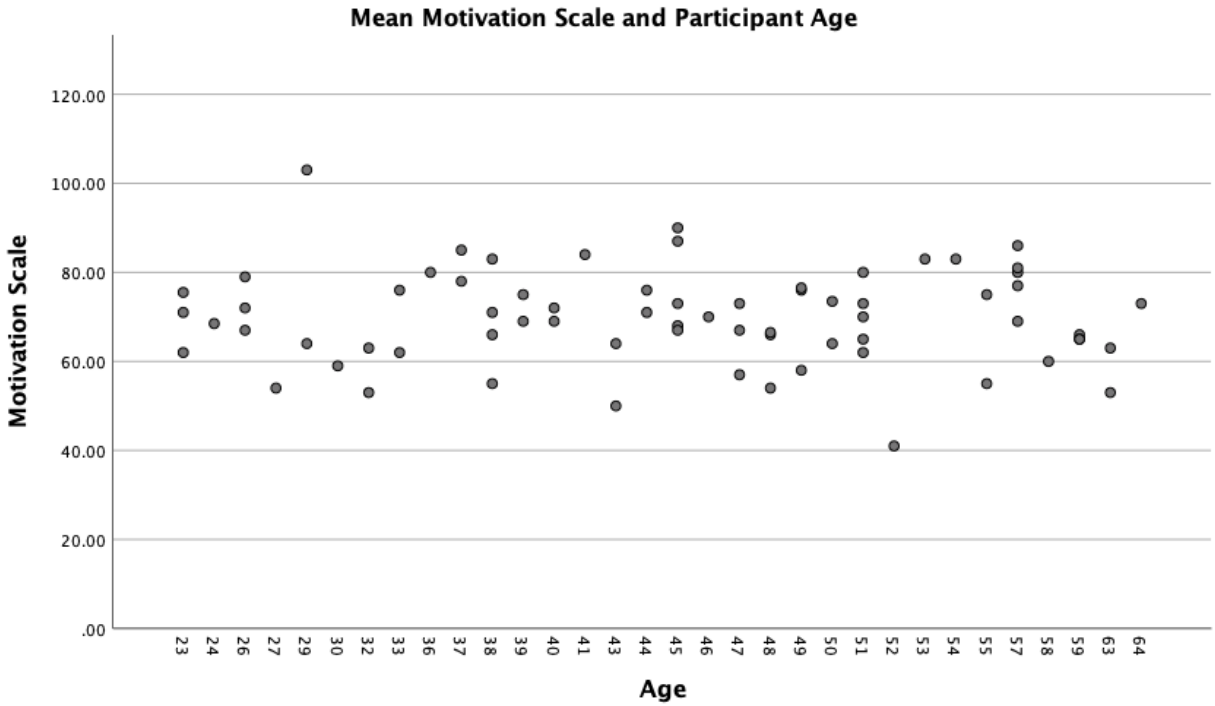

Figure 6. Mean Motivation Scale and Participant Age

Research Question 6

Research Question 6: Is there a significant difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

$H_0$6: There is no significant difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student motivation scores among teachers who have received professional development primarily through a face-to-face, blended, or online format. The factor variable, primary style of professional development received, included three categories: blended, online, or face-to-face. The dependent variable was the participants' mean student motivation score. The ANOVA was not significant, $F(3, 69) = 1.99$, $p = .12$. Therefore, $H_0$6 was retained. The strength of the relationship between the teaching style and mean student motivation scale as assessed by n_2 was very small (.01). The results indicate that motivation scores of teachers who received professional development primarily by blended learning was higher, but not significantly higher, than motivation scores of teachers who received professional development primarily by other means (results in Figure 6). The means and standard deviations for the four groups are reported in Table 5.

Table 5.

Mean Motivation Scale and Primary Professional Development Style Received

Type	N	M	SD
Blended Learning	17	74.44	7.95
Face-to-Face	25	69.88	10.98
Online	4	68.88	6.01

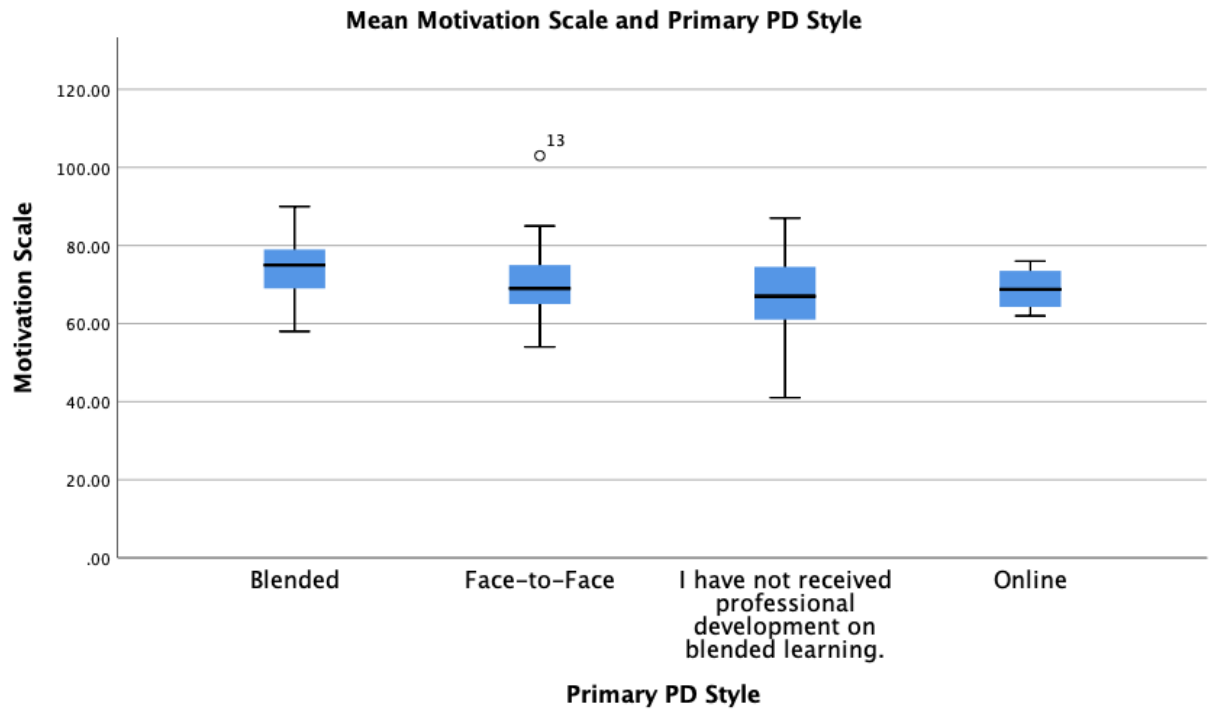

Figure 7. Participants mean motivation scale scores and primary professional development style received

Research Question 7

Research Question 7: Is there a significant difference in participants' mean student autonomy scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments?

$H_0$7: There is no significant difference in in participants' mean student autonomy scores among teachers who teach primarily through blended learning, online, or face-to-face instructional environments.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student autonomy scores and participants' primary style of teaching. The factor variable, primary style of teaching, included three categories:

blended, online, or face-to-face. The dependent variable was the participants' mean student autonomy score. The ANOVA was not significant, $F(2, 69) = 1.56$, $p = .22$. Therefore, $H_0 7$ was retained. The strength of the relationship between the teaching style and mean student autonomy scale as assessed by n_2 was very small (<.001). The results indicate that there is not a significant difference in the perceptions of student autonomy as compared by the primary teaching style of blended, face-to-face, or online (results in Figure 7). The means and standard deviations for the four groups are reported in Table 6.

Table 6.

Mean Autonomy Scale and Primary Teaching Style

Type	N	M	SD
Blended Learning	20	46.96	8.22
Face-to-Face	51	44.46	5.34
Online	1	51.00	.

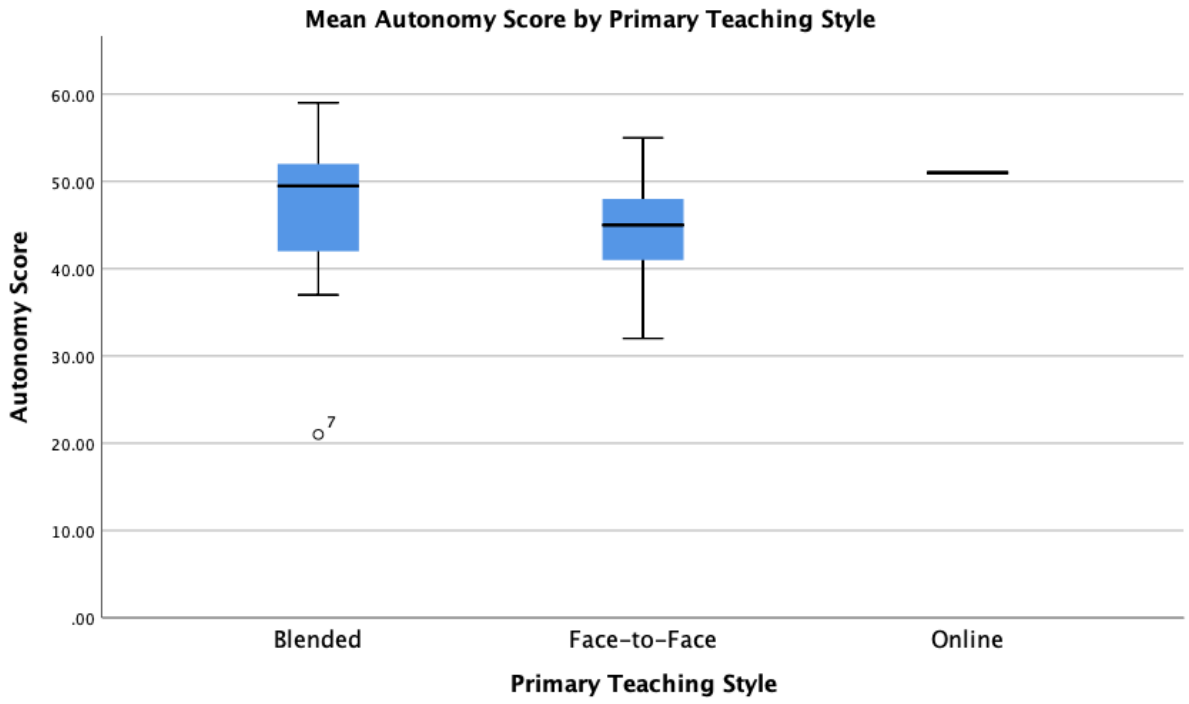

Figure 8. Participants mean autonomy scale scores and primary teaching style

Research Question 8

Research Question 8: Is there a significant difference in participants' mean student autonomy scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$8: There is no significant difference in participants' mean student autonomy scores among teachers who use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student autonomy scores among teachers who use

technology for instructional purposes in the blended learning environment. The factor variables consisted of four groups of percentages of time technology was used in the classroom by students and teachers: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student autonomy score. The ANOVA was not significant, $F(3, 68) = 1.31$, $p = .28$. Therefore, $H_0 8$ was retained. The strength of the relationship between the teaching style and mean student autonomy scale as assessed by n_2 was very small (.003). The results indicate that there is not a significant difference in the perceptions of student autonomy as compared by the percentages of time technology was used in the classroom by teachers (results in Figure 8). The means and standard deviations for the four groups are reported in Table 7.

Table 7.

Mean Autonomy Scale and Percentage of Teacher Technology Usage

Percentage of Teacher Tech Usage	N	M	SD
25% or less	16	43.13	4.69
26-50%	20	45.90	5.92
51-75%	20	47.00	6.51
76-100%	16	44.34	7.64

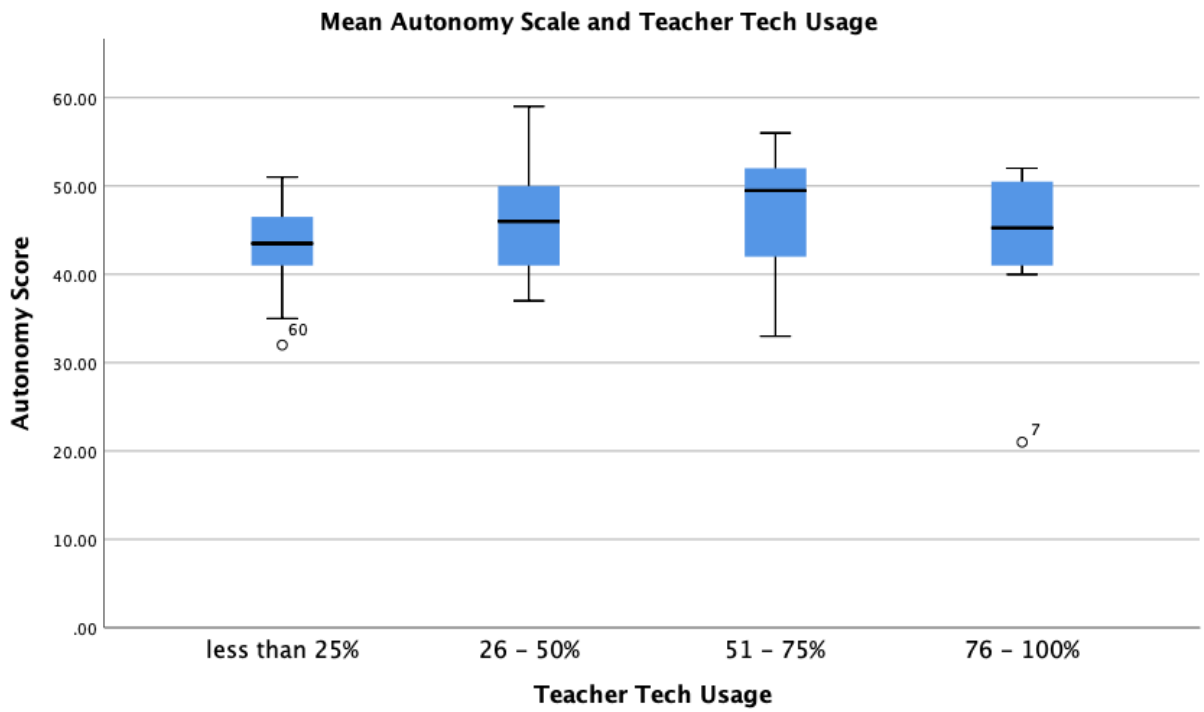

Figure 9. Participants mean autonomy scale scores and percentage of teacher technology usage

Research Question 9

Research Question 9: Is there a significant difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$9: There is no significant difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student autonomy scores among teachers who have their students use technology for instructional purposes. The factor variable, percentage of time technology was used in the classroom by students, consisted of four levels: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student autonomy score. The ANOVA was not significant, $F(3, 68) = .571$, $p = .64$. Therefore, $H_0 3$ was retained. The strength of the relationship between the teaching style and mean student autonomy scale as assessed by n_2 was very small (<.001). The results indicate that there is not a significant difference in the perceptions of student autonomy as compared by the percentages of time technology was used in the classroom by students (results in Figure 9). The means and standard deviations for the four groups are reported in Table 8.

Table 8.

Mean Autonomy Scale and Percentage of Student Technology Usage

Percentage of Student Tech Usage	N	M	SD
25% or less	26	43.96	6.00
26-50%	26	46.13	5.26
51-75%	13	45.92	5.47
76-100%	7	45.42	11.62

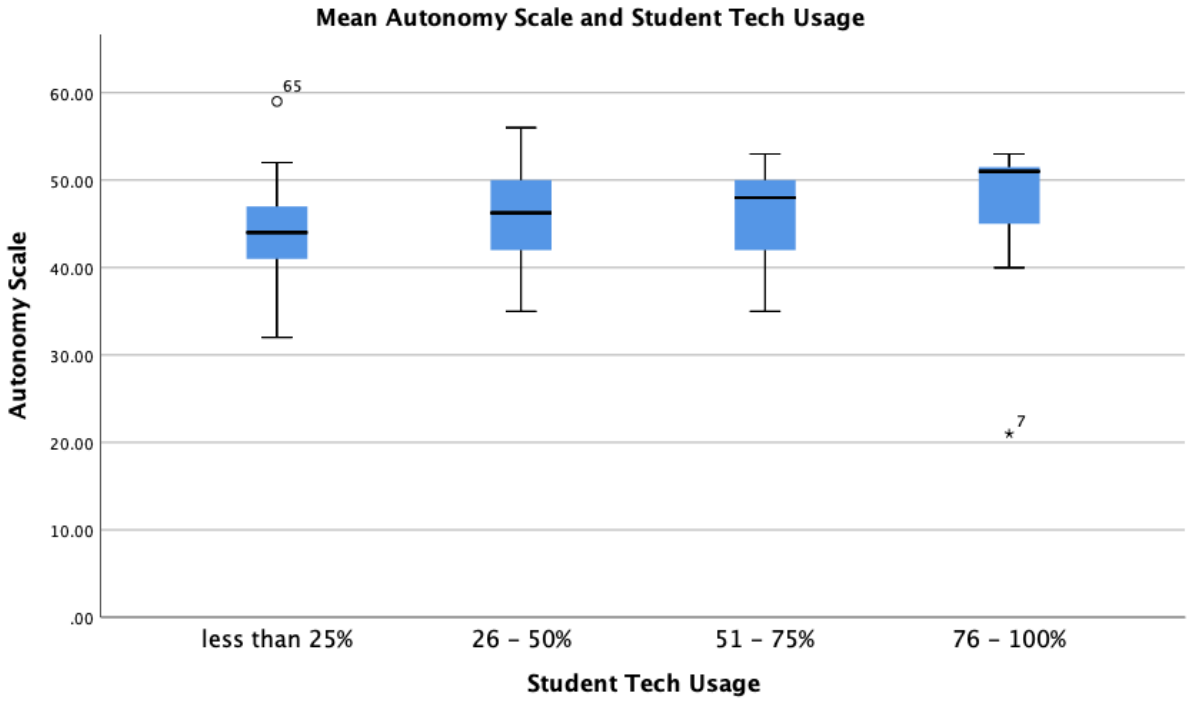

Figure 10. Participants mean autonomy scale scores and percentage of student technology usage

Research Question 10

Research Question 10: Is there a significant difference in participants' mean student autonomy scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment?

$H_0$10: There is no significant difference in participants' mean student autonomy scores among teachers who use a learning management system 25% or less, 26-50%, 51-75%, or 76-100% of the time in a blended learning environment.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student autonomy scores among teachers who use a learning management system. The factor variable, percentage of time a learning management system was used, consisted of four levels: 25% or less, 26-50%, 51-75%, 76-100%. The dependent variable was the participants' mean student autonomy score. The ANOVA was not significant, $F(3, 68) = 2.40$, $p = .08$. Therefore, $H_0 10$ was retained. The strength of the relationship between the teaching style and mean student autonomy scale as assessed by n_2 was very small (<.001). The results indicate that a mean autonomy score was lower, but not significantly lower, than other mean autonomy scores as compared by percentages of time a learning management system was used (results in Figure 10). The means and standard deviations for the four groups are reported in Table 9.

Table 9.

Mean Autonomy Scale and Percentage of Learning Management System (LMS) Usage

Percentage of LMS Usage	N	M	SD
25% or less	40	44.18	5.57
26-50%	16	47.03	5.75
51-75%	11	48.27	4.56
76-100%	5	41.40	12.70

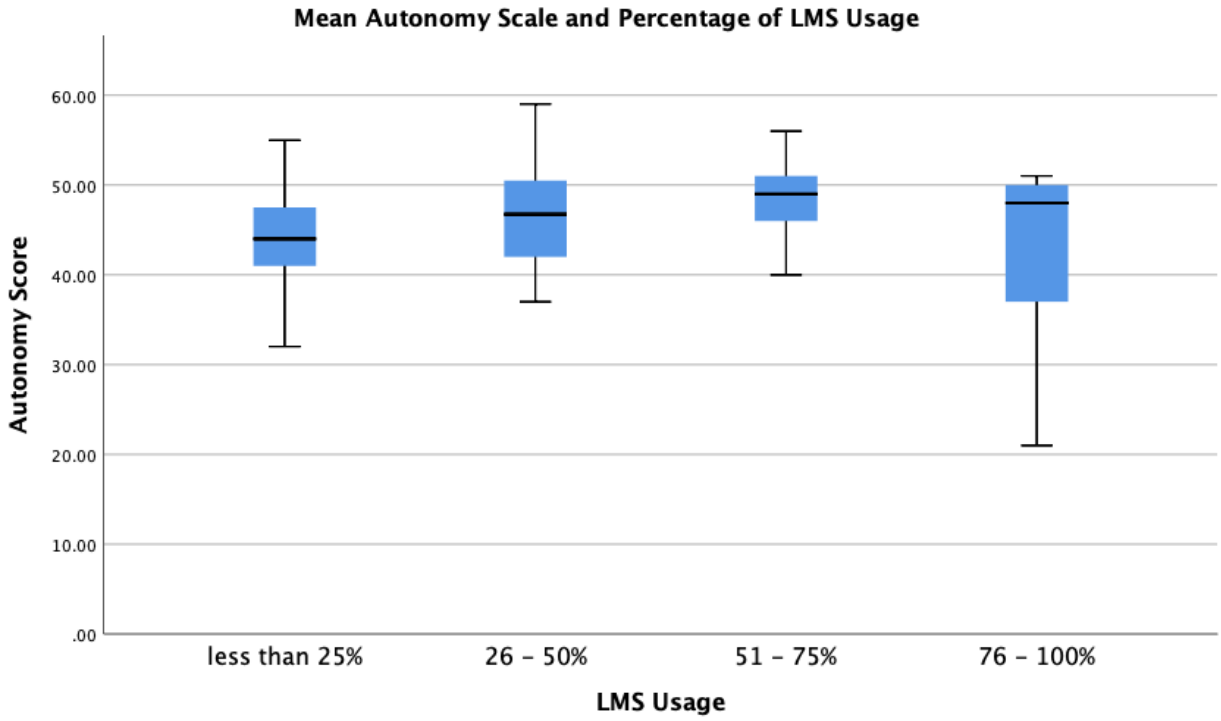

Figure 11. Participants mean autonomy scale scores and percentage of learning management system (LMS) usage

Research Question 11

Research Question 11: Is there a significant relationship between participants' student autonomy scores and participants' age?

$H_0$11: There is no significant relationship between participants' student autonomy scores and participants' age.

A Pearson correlation test was computed to analyze the relationship between participants' student autonomy scores and participants' age. The factor variable was the participant's age. The dependent variable was the participants' mean student autonomy score. The results of the correlation analyses revealed a negative correlation, but not a

significant correlation, between participants' perception on student autonomy (M = 45.24, SD = 6.32) and participants' age (M = 44.11, SD 11) and a significant negative correlation [r(68) = -.286, p = .02]. As a result of the analysis the null hypotheses was rejected.

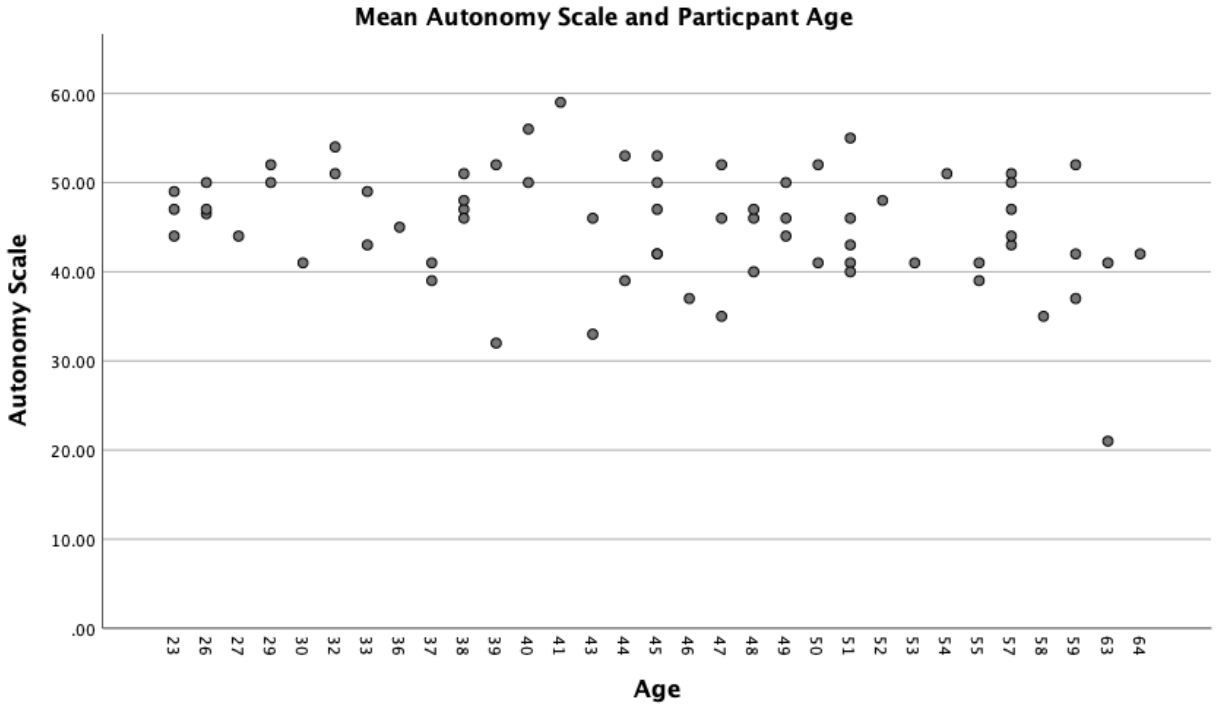

Figure 12. Mean Autonomy Scale and Participant Age

Research Question 12

Research Question 12: Is there a significant difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format?

$H_0$12: There is no significant difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format.

A one-way analysis of variance (ANOVA) was conducted to analyze the difference in participants' mean student autonomy scores among teachers who have received professional development primarily through a face-to-face, blended, or online format. The factor variable, primary style of professional development received, included three categories: blended, online, or face-to-face. The dependent variable was the participants' mean student autonomy score. The ANOVA was not significant, $F(3, 68) = 2.386$, $p = .08$. Therefore, $H_0$12 was retained. The strength of the relationship between the teaching style and mean student autonomy scale as assessed by n_2 was very small (.01). The results indicate that autonomy scores of teachers who received professional development primarily by blended learning was higher, but not significantly higher, than autonomy scores of teachers who received professional development primarily by other means (results in Figure 12). The means and standard deviations for the four groups are reported in Table 10.

Table 10.

Mean Autonomy Scale and Primary Professional Development Style Received

Type	N	M	SD
Blended Learning	17	46.71	6.51
Face-to-Face	25	45.02	5.40
Online	4	51.50	6.32

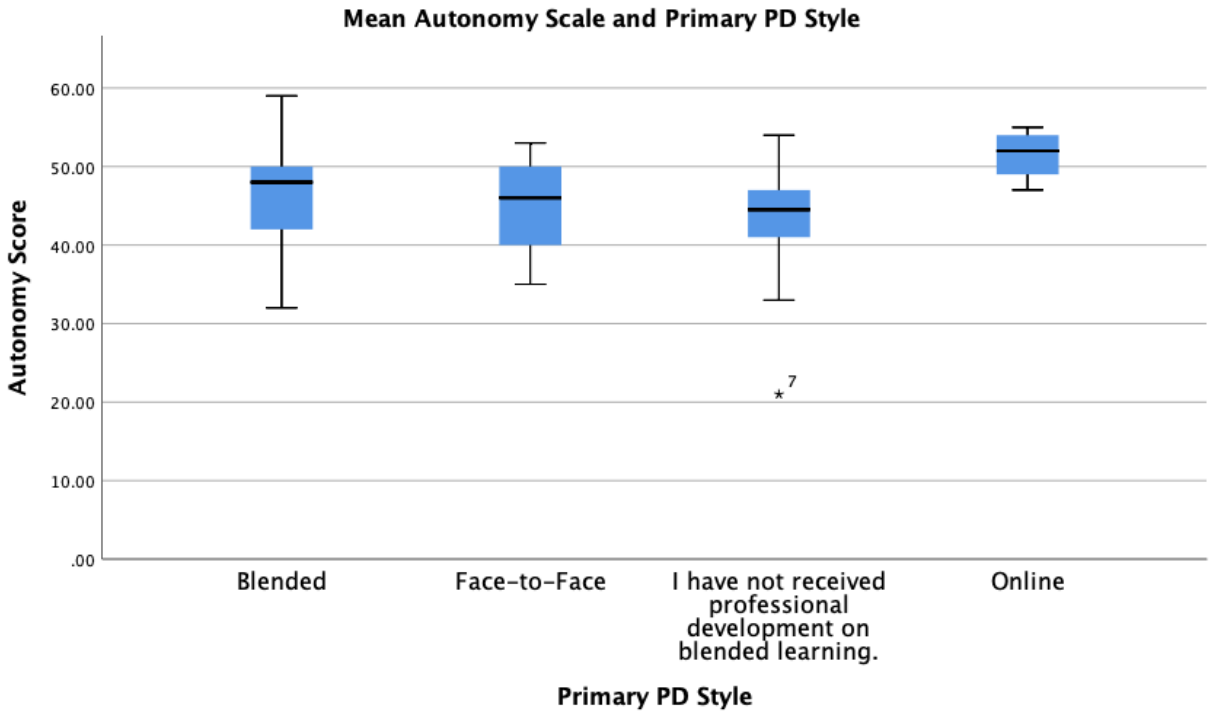

Figure 13. Participants mean autonomy scale scores and primary professional development style received

Chapter Summary

In this chapter, data was analyzed from 75 classroom teachers in 9th through 12th grades across two different school districts in east Tennessee. There were 12 research questions and 12 null hypotheses. Data were collected through an online survey using Google Docs that was distributed to teachers via email at each of the corresponding high schools.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to analyze teacher perceptions on the relationship between technology and student academic behaviors in the blended learning environment across 9th through 12th grade within east Tennessee and to identify the components of blended learning and pedagogical practices that enhance students' academic behaviors. Specifically, this study is an analysis of how student motivation and student autonomy relate to technology implementation and face-to-face instruction within blended learning environments. Participants of this study included 75 high school teachers within two different school districts within east Tennessee. This chapter includes a summary and a conclusion to this study focused on the perceptions of high school teachers on student motivation and student autonomy in relation to technology use by students and teachers, learning management system use, style of teaching, style of professional development, and participant age. Recommendations for practice and future research are also included in this chapter.

Summary

The sample of this study consisted of three high school across two districts in east Tennessee. The first high school has 78 teachers and 1,256 students. Of these students at high school 1, 20.3% are economically disadvantaged, 12.7% receive special education services, 5.3% are of minority backgrounds, and 0.2% are English Learners. High school 2 has 72 teachers and 1,208 students. Of these students at High

School 2, 28% are economically disadvantaged, 16.4% receive special education services, 6.5% are of minority backgrounds, and 0.4% are English Learners. High school 3 has 61 teachers and 904 students. Of these students at High School 3, 22.6% are economically disadvantaged, 14.4% receive special education services, 14.8% are of minority backgrounds, and 1.3% are English learners. The three high schools all serve students in 9th through 12th grade. All of the teachers at these three high schools were invited to participate in this survey.

The online survey was sent participants via email. The survey (Appendix A) used a Likert-type scale in which participants selected from the following response options: Strongly Agree, Agree, Somewhat Agree, Somewhat Disagree, Disagree, and Strongly Disagree. The survey used two dimensions (student motivation and student autonomy) to measure the perceptions of high school teachers towards blended learning. The survey contained 40 items, including six demographic items. Through the introductory email, participants were informed that all responses were confidential and that no identifying information would be collected (Appendix C).

Conclusions

The findings from the data in this study lead to following conclusions.

Research Questions 1, 2, 3, 4, 6, 7, 8, 9, 10 and 12 grouping variables were comprised of the two dimensions (student motivation and student autonomy) and the dependent variables were the groupings. For research questions 1, 2, 3, 4, 6, 7, 8, 9, 10 and 12, there was no significant difference in participants' mean scores on the student motivation and student autonomy dimensions.

Research Questions 1 and 7 consisted of three groups of primary style of teaching (blended, online, or face-to-face). There was no significant difference between the participants' perception of student motivation or student autonomy and the primary teaching style. However, blended learning mean scores on the student motivation and student autonomy scales were both higher than the mean scores for face-to-face instruction. This could be due to the limited number of participants or a misunderstanding of many teachers and school administrators as to what constitutes as blended learning. A similar study conducted by Tseng and Walsh (2016) found contrasting results in their study. Tseng and Walsh found that students in the blended course had significantly higher means of student motivation in the blended learning environment than in the traditional, face-to-face instructional setting. Specifically, among the ARCS model, the mean student motivation scores were significantly higher in student confidence and satisfaction. Another study conducted by Banditvilai (2016) found that blended learning, as opposed to online or face-to-face instruction, increased students autonomy as students' desire to engage and become more involved in the learning process increased. In contrast, these studies found that student motivation and student autonomy mean scores were significantly different than student motivation and student autonomy scores in the face-to-face or online learning environment.

Research Questions 2, 3, 8, and 9 consisted of four groups of percentages of time technology was used in the classroom by students and teachers (25% or less, 26-50%, 51-75%, 76-100%). There was no significant difference between the student motivation and student autonomy dimensions in relation the percentage of time that students or teachers use technology for instructional purposes. The mean scores for

perceptions of student motivation remained relatively consistent across the four groups of technology usage for students and teachers. However, the mean scores for perceptions of student autonomy increased for both teacher and student technology usage across the first three groups and then decreased for the 76-100% usage group. The possible reason for this is that technology is a significant tool for learning, but only if technology is integrated into instruction effectively. If technology is not effectively integrated into student and teacher practice, it may be disengaging to students and therefore appear to decrease student motivation and student autonomy. Francis (2017) had similar findings. Francis found that when technology was minimally implemented, students were less motivated, and students viewed the technology as being underutilized. However, the study finds that when technology is used, students across all academic levels are more motivated to learn. Tseng and Walsh (2016) found that blended learning, varying in technology use for students and teachers, is more beneficial than completely online learning that uses technology 100% of the time and face-to-face learning that does not routinely use technology for instructional purposes.

Table 11.

Percentage of Technology Usage and Mean Teacher and Student Technology Autonomy Score

Percentage of Technology Usage	Teacher Technology Usage Mean Autonomy Score	Student Technology Usage Mean Autonomy Score
25% or less	43.13	43.96
26-50%	45.90	46.13
51-75%	47.00	45.92

76-100%	44.34	145.42

Research Questions 4 and 10 consisted of five groups of percentages that a Learning Management System was used weekly (20% or less, 21-40%, 41-60%, 61-80%, 81-100%). The results indicate that there is not a significant relationship between the percentages of time a learning management system was used and the perceptions of student motivation and student autonomy. These results may be due to types of activities that students were using the LMS for and if the activities were used to build connections among students, between the students and facilitator, or as a tool to provide and receive feedback. Dang and Robertson (2010) found that increasing the usage of an LMS increased student autonomy. An LMS can build upon students' social habits. As digital natives, students reported that they were able to build the LMS into their daily routines by connecting studying through the LMS and socializing through online platforms. Additionally, Dang and Robertson report that student motivation and engagement increased as the LMS provided a structure for students to monitor their progress on online learning tasks.

Research Questions 6 and 12 consisted of three types of professional development (blended, online, or face-to-face). The results indicated that there was no significant difference between the perceptions of high school teachers towards student motivation and student autonomy in blended learning environments. The results may be impacted by the type of initial professional development teachers received and if professional development and collaborative experiences have been sustained. This may be the reason that no significant difference was evident in their perceptions of

student motivation and student autonomy in this study. An analogous study conducted by Kellerer et al. (2014) found similar found the opposite results. In the study, teachers reported that professional development that modeled blended learning opened teacher's eyes to how blended learning could support differentiation, and also found that having continuous training and connection with colleagues, student motivation in their blended learning courses has increased. Additionally, students are more likely to design their own pathways for learning and demonstrating their learning. This study finds that professional development that models effective blended learning has positively impacted student motivation and student autonomy in the participants' blended learning courses.

Research Question 5 and 11 were analyzed to measure the relationship between the age of the teacher and scores on the two dimensions. For research question 11 there was a significant difference in participants' mean student autonomy scores and the age of the participant. Participants' mean student autonomy scores decreased as participant age increased. For research question 5 there was no significant difference in participants' mean student motivation score and the age of the participant. This may be because teachers see other factors, such as peer factors and obstacles at home, as barriers that limit student motivation. Additionally, the accent of the digital immigrant may also be a barrier in teachers' ability to effectively communicate with students as the digital native. This may be the reason that no significant difference was evident between perceptions of student motivation and the participant's age. The results of a study contrast the results of a study conducted by Autry and Berge (2011) revealed receptiveness and understanding of technology in the learning environment was directly

related to age. The study revealed that learning through digital pedagogy increases student motivation while empowering students to take ownership over the learning process.

Recommendations for Practice

The following are recommendations for practice:

1. Technology should be implemented as a tool. Teachers should follow the 12 brain-based learning principles (Connell, 2009; Laxman & Chin, 2010) and use technology as an enhancement to quality instruction to further develop student understanding.
2. Teachers should provide positive social interactions, focused on the social and emotional needs of learners, through face-to-face instruction and online platforms to increase academic achievement and social emotional learning. Interactions should be connected to feedback and individual student learning needs.
3. Students should be provided with choices, in terms of space, pace, time, and learning activity, so that each student can demonstrate mastery in the mode in which each student is most successful. As students increase responsibility for the learning process, they will become more invested and independent learners.
4. Educators should meet the instructional needs of diverse learners as they use technology to individualize and personalize student learning experiences. Teachers should identify student strengths while helping students overcome barriers that may exist. Students should be taught how to use technology for

instructional purposes, have equal access to resources, and have learning experiences that are personalized to meet individual learner needs.

5. Students are able to actively engage in the learning process that is personalized and differentiated to meet individual student needs (Kaur, 2013).
6. Strategically implement blended learning through systems that connect programs and resources to all students.
7. The Triple E Framework should be implemented at the teacher and administrator to effectively integrate technology into instruction to increase student engagement and to enhance and extend student learning (Kolb, 2019).
8. School districts and administrators should provide continuous professional development that models effective pedagogical strategies through a blended learning format. In order for teachers to effectively implement a blended learning classroom, they must experience a blended learning environment. By modeling, teachers will develop a deeper understanding of blended learning and how to successfully implement pedagogical practices and blended learning models.

Recommendations for Future Research

The following are recommendations for further research:

1. As technology continues to evolve, research should continuously be collected to determine how technological changes relate to student academic performance, learning experiences, and student social and emotional needs.

2. A larger sample size should be used in future research to have a wider understanding of teacher perspectives of student motivation and student autonomy in the blended learning environment.
3. Future research could be conducted through a qualitative or comparative study to gain more understanding on student motivation and student autonomy, that can only be measured through perspective.
4. Future research could study the student perspective to see how technology integration impacts students' motivation and autonomy from the student voice.
5. Future research could also specifically analyze more specific teaching strategies that impact motivation or autonomy to see if there is a there is a difference between teaching practice and student academic performance.
6. Future research could expand to higher education and/or related arts.
7. Future research could specifically analyze administrator, teacher, student, and family perceptions about the immediate transition to online learning as a result of Covid19 Pandemic.
8. Future research could specifically analyze state and district readiness to transition to online learning as a result of the Covid19 Pandemic.

Chapter Summary

Technology can be an effective tool to enhance classroom instruction. As the implementation of technology into the classroom ignites student motivation, it is vital that educators and administrators effectively weave effective instructional practices with digital resources (Kolb, 2019a). Resources such as the Triple E Framework and ARCS

model can be used to create a successful blend. It is also imperative that professional development that models blended learning and effective instruction enhanced by technology continuously grows teacher practice (Moore et al., 2017). Blended learning can shift the educational experience for students, increasing student learning and achievement, as it creates a blend between technological, environmental, and instructional factors (Hill, Chidambaram, & Summer, 2016).

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APPENDIX A: Teacher Blended Learning Survey

Section 1 of 4

Student Motivation and Autonomy

The Teacher Blended Learning Survey will be used for research, and your participation is voluntary. All responses will be confidential as no identifying information will be collected in any way. Thank you for your participation.

1.) What is your current age?

Your answer

2.) What percent of time do you use technology for instructional purposes during the school day?

- ◯ less than 25%
- ◯ 26 - 50%
- ◯ 51 - 75%
- ◯ 76 - 100%

3.) What percent of time do students use technology for instructional purposes during the school day?

- ◯ less than 25%
- ◯ 26 - 50%
- ◯ 51 - 75%
- ◯ 76 - 100%

4.) How frequently do you use a Learning Management System per week?

- ◯ less than 25%
- ◯ 26 - 50%
- ◯ 51 - 75%
- ◯ 76 - 100%

5.) Do you primarily teach in a face-to-face, blended, or online environment?

- ◯ Face-to-Face
- ◯ Blended
- ◯ Online

6.) Have you received professional development on blended learning primarily through an online, blended, or face-to-face format?

- ◯ I have not received professional development on blended learning.
- ◯ Face-to-Face
- ◯ Blended
- ◯ Online

Student Motivation and Autonomy

Teacher's Perception of Student Motivation

Indicate how much you agree or disagree with the following statements by clicking the appropriate box next to each statement.

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
7.) The students in this class really try to learn.	☐	☐	☐	☐	☐	☐

8.) My students work at learning new things in this class.	☐	☐	☐	☐	☐	☐
9.) My students generally pay attention and focus on what I am teaching.	☐	☐	☐	☐	☐	☐
10.) The students in this class generally do class-related tasks and assignments willingly.	☐	☐	☐	☐	☐	☐
11.) The students in this class do not put much effort to learn the content.	☐	☐	☐	☐	☐	☐
12.) My students are often distracted or off task, I have to bring them back to focus on the topic or work at hand.	☐	☐	☐	☐	☐	☐

13.) In general, my students are genuinely interested in what they are asked to learn in my class.	☐	☐	☐	☐	☐	☐
14.) Generally, my students are unmotivated because their parents do not care about or value education.	☐	☐	☐	☐	☐	☐
15.) When my students are not engaged in school, it is because they don't see the value of what they are being asked to learn.	☐	☐	☐	☐	☐	☐
16.) If students are not motivated to learn in my class, it is often because they do not have aspirations that connect to education, like plans to go on to college.	☐	☐	☐	☐	☐	☐

17.) Students often lack effort at school because they don't have support at home.	☐	☐	☐	☐	☐	☐
18.) If students do not see the point of learning the content, then they are not motivated to learn it.	☐	☐	☐	☐	☐	☐
19.) Some of my students just have too many home problems to make school a priority.	☐	☐	☐	☐	☐	☐
20.) Most often, if students are not engaged in my class, it's because they don't see the relevance of the content in their world.	☐	☐	☐	☐	☐	☐

21.) Some of my students are not motivated to work in school because education has no place in the futures they see for themselves.	☐	☐	☐	☐	☐	☐
22.) Generally, the students in my class who are not interested in learning are that way because of peer pressure to devalue school.	☐	☐	☐	☐	☐	☐
23.) Most often, if students are not working in my class, it is because they do not see how useful this information can be.	☐	☐	☐	☐	☐	☐

24.) Negative peer pressure is one big reason why some of my students are not motivated to learn in school.	☐	☐	☐	☐	☐	☐
25.) Some students are not motivated to learn because they are lazy.	☐	☐	☐	☐	☐	☐
26.) Some students in my class just don't care about learning -- period.	☐	☐	☐	☐	☐	☐

Student Motivation and Autonomy

Teacher's Perception of Student Autonomy

Indicate how much you agree or disagree with the following statements by clicking the appropriate box next to each statement.

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
27.) Providing students with choices helps them learn.	☐	☐	☐	☐	☐	☐
28.) Students take responsibility for their learning.	☐	☐	☐	☐	☐	☐
29.) Students want to have a say in how they learn.	☐	☐	☐	☐	☐	☐

30.) Students can identify their academic weakness.	☐	☐	☐	☐	☐	☐
31.) Students can identify their academic strengths.	☐	☐	☐	☐	☐	☐
32.) Students can only learn with help from the teacher.	☐	☐	☐	☐	☐	☐
33.) Students can determine their own learning needs.	☐	☐	☐	☐	☐	☐
34.) Students self-evaluate their learning.	☐	☐	☐	☐	☐	☐
35.) Students make choices about learning activities.	☐	☐	☐	☐	☐	☐
36.) Students will use resources to find additional information.	☐	☐	☐	☐	☐	☐
37.) Students will take control of their learning.	☐	☐	☐	☐	☐	☐

Student Motivation and Autonomy

Blended Learning Free Response

38.) How has student motivation and/or autonomy changed as students have participated in your blended learning classroom?

Your answer

39.) How have your pedagogical practices changed since teaching in a blended learning classroom?

Your answer

40.) What influence has the professional development you received on blended learning changed your pedagogical practices?

Your answer

APPENDIX B: Permission for Learner Autonomy Support Scale

Aytunga Oğuz <aytunga.oguz@dpu.edu.tr>
Mon 1/6/2020 10:46 AM
To: McHone, Cheryl Anne <ZCAH3@mail.etsu.edu>

3 attachments (1 MB)
Öğrenen Özerkliğini Destekleme Ölçeği'nin Geliştirilmesi.pdf; Öğrenen Özerkliğinin Geliştirilmesi Makale İngilizce.pdf; scale.docx;

Dear Cheryl Anne McHone,

I allow you to use The Learner Autonomy Scale in your research study under the conditions you specify. You can use the scale with reference. I allow you to reproduce it in your dissertation appendix . I would appreciate it if you could send me the relevant information once you have completed your work. I wish you convenience in your work.

Sincerely.

McHone, Cheryl Anne <ZCAH3@mail.etsu.edu>, 5 Oca 2020 Paz, 01:16 tarihinde şunu yazdı:

> Dr. Oğuz,
>
> My name is Cheryl McHone, and I am currently a doctoral candidate at East Tennessee State University and a school administration in Pittsburgh, Pennsylvania. I am writing to request permission to use and reproduce the Learner Autonomy Support Scale from your work published in Developing a Scale for Learner Autonomy Support. A letter with more detailed information is attached. If these are acceptable terms and conditions, please indicate so by replying to me through e-mail at zcah3@etsu.edu.
>
> Thank you for your consideration,
>
> Cheryl McHone

APPENDIX C: Initial Email Inviting Teachers to Participate

Dear Educator:

My name is Cheryl McHone, and I am a Doctoral candidate currently working on my dissertation through East Tennessee State University. I would like to invite you to participate in my research to determine the relationship between teacher perspective of student motivation and autonomy in classrooms with varying degrees of technology integration.

This survey is designed to collect your perspective on student autonomy and student motivation as well as some demographic information.

Participation in this survey is voluntary. If you choose to participate, please complete the online survey by clicking here. This link will take you to an online consent form. If you agree to participate, you will then be able to access the survey. You may choose not to participate at all, or you may choose to only answer certain questions. All responses to this survey will be confidential and anonymous.

The survey will be available for a two-week period. The survey will be open until (date to be entered here). If you have any questions regarding this survey or research, I may be reached via email at zcah3@etsu.edu or via phone at 423-483-6438. Thank you for your consideration and support.

Sincerely,

Cheryl McHone

https://docs.google.com/forms/d/e/1FAIpQLSemUtPEPsX6JH2ki-xup-PHpPMqBv3ehx-vlaiqihPMwZMf9Q/viewform?usp=sf_link

VITA

CHERYL MCHONE

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	M.A. Special Education, East Tennessee State University, Johnson City, Tennessee, 2008
	B.A. Interdisciplinary Studies, East Tennessee State University, Johnson City, Tennessee, 2015
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Professional Experience:	Assistant Principal, West Allegheny High School; Imperial, Pennsylvania, 2018-current
	Principal, South Central Elementary School, Washington County Schools, Tennessee, 2017-2018
	District Canvas Administrator, Washington County Schools, Tennessee, 2015-2016
	Assistant Principal, Daniel Boone High School Washington County Schools, Tennessee, 2016-2017
	Design Camp Developer/Teacher, Daniel Boone High School Washington County Schools, Tennessee, 2014-2016
	Mathematics Teacher, Daniel Boone High School
	Innovative Educator Network TN Department of Education, Tennessee, 2014-2015

Washington County Schools, Tennessee, 2013-2016

Special Education Teacher, David Crockett High School

Washington County Schools, Tennessee 2010-2013

7th Grade Social Studies Teacher, Greeneville Middle School

Greeneville City Schools, Tennessee, 2009-2010

4th, 5th, and 6th Grade Teacher, Ashley Academy

Johnson City, Tennessee, 2004-2009

Summer Camp Director, Ashley Academy

Johnson City, Tennessee, 2004-2006