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Personalized Learning: An Engagement Strategy for At-risk Student Populations

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Personalized Learning: An Engagement Strategy for At-risk Student Populations

By

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Abstract

Personalized learning in the United States experienced a resurgence in the educational landscape as a result of increased technology access and computing power. The availability of affordable technology, software solutions, and access to the Internet led to the infiltration of technology into personalized learning approaches and provided a new platform for personalized learning advocates. Engagement and student agency were components of personalized learning attracting many educators to reinvest in personalized learning opportunities. This study focused on a rural, western Kentucky school district which piloted personalized learning through a blended learning environment. The study sought to measure engagement levels of both low at-risk and high at-risk students in a secondary school using an observation protocol. The dataset included 68 low at-risk and high at-risk student engagement observation scores from two types of learning environments; blended and traditional. The study used a two-way ANOVA and descriptive statistics analysis. The analysis did not result in significant statistical differences, the descriptive statistics showed engagement scores were slightly higher in blended learning environments providing support for personalized learning as an alternative learning environment for both high and low at-risk student populations. The study suggests implication for secondary schools that blended learning environments engage students as much as traditional learning environments. This study further suggests that personalized learning offers schools, teachers, and students flexibility to differentiate learning through pace, place, and path without sacrificing student engagement. In other words, this study supports the use of personalized learning, specifically blended learning strategies for low and high at-risk student populations in secondary schools.

Keywords: at-risk, personalized learning, blended learning

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Chapter I: Introduction

Students are diverse and, like generations of students before them, have unique characteristics that describe how they learn, communicate, collaborate, and engage with life. Many students enrolled in primary and secondary schools in the United States today set out on career paths that have yet to be imagined (Valek & Sladek, 2012). For many of these students, life without a constant stream of information, media, and technology bombarding every possible moment was unimaginable (Barnes, Marateo, & Ferris, 2007). While every generation had distinguishable attributes, the current generation (Generation Z) has left many in the education field to ponder if and how our system of education could support and engage students in the learning process (Patrick, 2019).

To define an entire generation with generalizable characteristics can be a challenge. However, a benefit of considering generalized generational attributes in education was the likelihood of support for instructional strategies appropriate for current students. Generation Z was defined as people born between 1995 and 2012. Generation Z students were characterized as having spent more time with electronics and the Internet than any other generation (Eckleberry-Hunt, Lick, & Hunt, 2018).

In addition to the increasingly diverse student population, our educational system has seen an influx of trends that have inundated the educational landscape. Since 2012 the following trends in education have emerged: (a) deeper learning approaches, (b) blended learning designs, (c) rethinking how schools work, (d) redesigning learning spaces, (e) coding as literacy, (f) students as creators, (g) proliferation of open educational resources (OER), (h) bring your own device initiatives, (i) Science, Technology, Engineering, Art, Math (STEAM) learning, (j) collaborative learning, (k) advancing cultures of innovation, (l) growing focus on measuring

learning, (m) rapid acceleration of intuitive technology, (n) impact of social media on communication, and (o) importance of technology skills. These trends are indicative of the zeitgeist of modern education reform in response to current research on brain development, the beginning shift of economic drivers, and student disengagement within the learning process (Dilly, Fishlock, & Plunker, 2016).

Brain Research

The trend to focus on deeper learning was propagated by brain research. Previously, intelligence was considered by many as a fixed trait; whereby one was either born intelligent or not (Turnaround for Children, 2018; Ng, 2018). It was believed that intelligence was quantified as IQ and little would change a person's IQ. Current research showed malleability and plasticity of the brain as two reasons why the former thinking was erroneous. Research supports the notion that the development of the brain, or lack thereof, was a result of factors such as environment, context, and emotion (Turnaround for Children, 2018; Blackwell, Trzesniewski, & Dweck, 2007).

Research from psychology, cognitive psychology, and neuroscientific research showed that learning changed the physical structure of the brain (Breznitz, 2007). The brain was shown to develop at its fastest rate during early childhood. This development depended on both genetics and the environment. While brain development was strongest during early childhood, research has shown the brain continues to form and develop throughout a person's life. This growth was enabled by the neuroplasticity of the brain (Division of Behavioral Social Sciences Education, 2000; Ng, 2018).

In adolescent years it was discovered that the brain hits a second phase of rapid development lasting well into an individual's twenties. During this second phase of

development, the production of neurons, dendrites, and synapses occurs in the brain. It was believed that the production of neurons, dendrites, and synapses led to the retrieval of information and ultimately deeper understanding. This was a critical brain development time when students build beliefs, interests, abilities, and skills (Roaten & Roaten, 2012). Unique to this generation was the way in which technology infiltrated not just what they did, but how they thought and interacted on multiple levels. Brain research evolved in the recent decade to inform educators and researchers about the way students learn (Turnaround for Children, 2018).

Technology Education

As more information continues to be made available concerning how deeper learning occurs, it becomes natural to look at factors that could limit the learning process. Technology, specifically digital technology such as computers, smart phones, and tablets, offered students some cognitive benefits. However, empirical evidence mounted concerns with regard to the negative effect these technologies may have on the brain. In a study by Hembrooke and Gay (2003), students with closed laptops recalled significantly more lecture material. In a related study conducted by Bergen, Grimes, and Potter (2005), students recalled 10% less information when they viewed screens of information with visually complex, multimethod formats. Students who used technology during class to multitask were not focused cognitively on learning and were considered to be cognitively truant.

Cognitive neuroscience suggested that digital technology could restrict the way students read and think. Wilmer, Sherman, and Chein (2017) recognized the possibility that technology could affect children, more so than adults, due to the heightened neural plasticity in a child's and adolescent's brain. One of the biggest concerns raised by neuroscientists was how technology shaped the development of the brain and possibly weakened students' analytic skills. Research

concerning cognitive development and technology usages was relatively too new to be conclusive. The current Generation Z student had been exposed to streams of content and a flux of grazing for data. This exposure has been believed to create a fast-twitch brain process problematic for deeper thinking (Cavanaugh, Giapponi, & Golden, 2015).

Economic Shift

In addition to improved research on how the human brain functions and implications for how students learn, sociologist have increased research on the *Knowledge Society,* thus promoting a pedagogy steeped in growth mindset. This term references the knowledge revolution which occurred in social, economic and political fronts across many countries as they moved from the industrial to the post-industrial age. Knowledge, or intellectual capital, replaced tangible assets such as labor, land, or money as key drivers for economic growth (Gilbert, 2007).

For example, the Canadian Education Association (CEA) looked specifically at underlying issues with school systems in modern times in a study that attempted to define both the purpose of schooling and the desired achievement that was expected for all children (Williams, Friesen, & Milton, 2009). The world in which these students will work will have far fewer applications for recalling facts or remembering content. For this reason, it has been suggested that five habits of mind should be cultivated for the future: (a) the disciplined mind, (b) the synthesizing mind, (c) the creating mind, (d) the respectful mind, and (e) the ethical mind (Gardner, 2008).

The five types of mindset that Gardner (2008) described were those of value to students in the new knowledge-based economy. The assertion was that students entering secondary school aspired to attain more than a high school diploma. In the study, *The Opportunity Myth* (The New Teacher Project [TNTP], 2018), 94% of secondary students surveyed aspired to attend

college and 70% of high school students had career goals that required at least a college degree. However, this study also found that students spent most of their time in school without access to four key resources: (a) grade-appropriate work, (b) strong instruction, (c) deep engagement, and (d) high expectations from school staff. When students did not have access to these four key resources, they tended to underperform and struggled to meet college benchmarks. For example, at least 28% of high school graduates enrolled in two-year or four-year colleges were dual enrolled in remedial English or math courses, and fewer than half of the students left with a degree (TNTP, 2018).

Student Disengagement

When students do not gain post-secondary credentialing (diploma or certification), they are at-risk for a negative financial future. In the spring of 2018, the Kentucky Center for Education and Workforce Statistics produced *Education Detours to the Workforce.* This report detailed what happened when Kentuckians detoured from the typical education-to-workforce path. This longitudinal study followed 2010 senior graduates and identified three stages of educational derailment: (a) high school, (b) post-high school, and (c) postsecondary. The results presented an unnerving trend for many Kentuckians. About nine percent of the 46,826 high school seniors did not graduate high school "on-time". Of those not "on-time" graduates, only three percent continued to graduate beyond their initial cohort year. A mere 36% of seniors in the graduating class of 2010 went on to college and earned timely credentials (Kentucky Center for Statistics, 2018).

There was no single reason why students dropped out of school. According to the research by the Civic Enterprises conducted for the Bill & Melinda Gates Foundation in 2006, students who dropped out of school did so for various reasons including: (a) a lack of connection

to the school environment, (b) a perception that school is boring, (c) feeling unmotivated, (d) academic challenges, (e) and the complexities of real world issues (Bridgeland, Dilulio, & Morison, 2006). A lack of access to grade-appropriate work exacerbates each of these reasons.

For example, 94% of students from the study had plans after high school that involved college. Of those students, 71% succeeded on assignments in school; however only 17% of the assignments completed were at grade-level standards (TNTP, 2018). Grade-level standards were a way to ensure students were prepared for college-level work, and when assignments were below grade-level, the chance to reach college-readiness decreased. In addition, the study found that over a single school year the average student spent more than six months of learning time on assignments that were not grade-appropriate (TNTP, 2018).

Engagement Challenge

The challenge for educators, schools, districts, states, and national education systems was multifaceted. First, there was a need for schools to prepare students for a new economy, requiring students to have the ability to perform the *Four C's*: (a) collaboration, (b) creativity, (c) critical thinking, and (d) communication (Dilly et al., 2016). These four domains were difficult to measure and create a strain on school systems, who had focused success on state assessments scores for over a decade. This lacked the very essence the *Four C's* embodied. In a culture of testing; the characteristics of time, focus, training, and support were limited, if not absent, from the landscape of education systems across the country. In addition to development of skills for graduates, there was a need for the education system to deeply engage students cognitively, academically, socially, and affectively. When students became disengaged in school, their risk for not finishing increased (Finn & Zimmer, 2012).

High At-Risk Students

Improving teaching and curricula to make school relevant and engaging, as well as bridging the gap between school and work, were two ways schools could reach kids who were high at-risk (Bridgeland et al., 2006). Blended learning provided students the opportunity to learn in part online, at least 80% of contact time, with some element of student control over pace, place, and time of their learning (Hall, Loschert, & Murray, 2018). Blended learning was a pedagogy-driven strategy aimed at changing the role of the student and his or her experience in the classroom. It encouraged students to build academic knowledge but also personal habits and skills to become life-long learners (Nolan, Preston, & Finkelstein, 2012). Blended learning supports teacher productivity with increased access to data used to inform instruction personalized to each student's need, a task that was difficult to achieve in the traditional face-to-face setting (Bailey, et al., 2015).

For the high at-risk student population, students needed to be convinced that active engagement in learning would be worth their time. Student learning must be highly relevant and specific to student's individual needs. Blended learning allowed the student to work at their own pace, path, and place and provided teachers the opportunity to redesign learning for students to engage in high interest activities like work-based learning (Nolan, et al., 2012).

Some of the factors which have led to many schools, districts, and states investing in various forms of personalized learning included: (a) research on brain development, (b) beginning shift of economic drivers, and (c) student disengagement within the learning process. Personalized learning has swept the landscape of innovative education reform in attempts to address some of the various issues related to student engagement. Personalized learning was

designed for the pace, preference, and interest of individual learners; it represents a methodology rather than a set of goals and at its heart is student-centered (Bailey et al., 2015).

As with any type of reform, there is always a need to provide evidence to support the movement. If a school implements personalized learning, what is the evidence that student achievement is improved? What research is available to show personalized learning would not have a negative impact on student achievement? From a practitioner standpoint, a need to understand the impact of personalized learning on student achievement in the classroom is vital to support furthered investment.

Context of Study

In a small rural district in western Kentucky, high at-risk student populations are provided additional supports through an academy known as Learning, Excelling, Achieving, and Differentiating (LEAD). LEAD has operated in the rural school district for almost two decades utilizing many small-group, online, and blended learning environments. The current program uses online curriculum-based instruction in social studies, math, and English. Students hava the opportunity to be placed in fully online courses for credit recovery and social studies with a certified teacher as a monitor. Students also have the choice to take blended learning classes in math and English, in addition to the traditional courses offered to all students at the high school. For a list of online courses offered over the course of the LEAD program, see table 1A.

Purpose

The purpose of this study was to investigate engagement levels of at-risk students in blended learning environments. More specifically, this study sought to accomplish three goals. The first goal was to determine if high at-risk students demonstrated increased engagement in blended learning classrooms. The second goal of this study was to provide evidence that student

engagement was not dependent on a student's level of risk. The third goal of this study was to provide evidence to support the use of blended learning as an engagement intervention for at-risk students.

The study aimed to answer the general question, *Was blended learning a suitable engagement strategy for at-risk student populations?* Specifically, the following research questions were addressed:

Research question 1. Was there a difference between the levels of student engagement for blended learning environments compared to traditional learning environments?

Null hypothesis 1. There will be no significant difference between the levels of student engagement in blended learning environments compared to traditional learning environments.

Research question 2. Was there a difference between the engagement levels of low at-risk students and high at-risk students?

Null hypothesis 2. There will be no significant difference between the student engagement levels of low at-risk student compared to high at-risk students.

Research question 3. Was the impact of the learning environment on student engagement the same for all students regardless of student at-risk classification?

Null hypothesis 3. There will be no significant interaction between learning environment and a student risk classification when considering student engagement levels.

Summary

Schools have the opportunity to address student learning with a variety of methodologies. These options have increased as a result of advancements in instructional technology. These advancements have led to more schools pursuing personalized learning options such as blended learning. Schools continue to work with their most at-risk student populations in attempts to re-

engage the students with the learning process and by so doing to mitigate the drop-out rate in schools. Engagement has been identified as a key characteristic in student achievement (Finn & Zimmer, 2012).

Schools need support in the selection of a methodology to engage their students. With a heavy emphasis from state, federal, and philanthropic organizations to include personalized learning in schools, guidance is needed to determine who best to serve with what types of learning environments. Chapter I introduced the reader to the various components that have led to blended learning and the desire to personalize learning for students. Chapter II provides a review of literature related to personalized learning, engagement, and at-risk youth.

Chapter II: Literature Review

This chapter explores the role between personalized learning, specifically blended learning, and secondary education in the United States. A brief overview of learning throughout the history of the United States education system in context of personalized learning and the impact political influence and policy has had on personalized education practices is discussed. In addition, personalized learning is defined and its applications are described. Moreover, this chapter examines the influence personalized education has on student engagement. An exploration of student engagement specifically detailing the use of personalized learning with respect to academic achievement is provided.

History of Personalized Learning

In 1779, Thomas Jefferson wrote *A Bill for the More General Diffusion of Knowledge* in the Commonwealth of Virginia. Addressed in this bill was a call for every county to elect three aldermen to divide out the land so that children within the newly created boundaries could attend school daily. Every student was required to be taught reading, writing, and arithmetic in addition to becoming familiarized with Grecian, Roman, English, and American history. This bill outlined how the schools would be formed, who would form them, how they would be accounted for and who they would serve.

Jefferson noted specifically that the alderman for the county would select someone to oversee the school and described the management of the teacher's pay, lodging, and meals, and relinquished control over to the communities in which the school was located. Jefferson's focus was for all students to be worthy to promote knowledge for educational opportunities regardless of a person's wealth, accidental condition, or circumstance to be afforded by the commonwealth. (Jefferson, 1961).

The bill further reiterated the role of the community with regard to the education of its people. It was the responsibility of the Commonwealth to educate these individuals as they would become vital for the advancement of the public. Though this bill was not passed in the manner in which Jefferson wrote it, it did document the desire for universal public education and the notion that public welfare was dependent upon the education of its people (Jefferson, 1961).

By the early 1800s, the United States began to recognize deficiencies in its educational system. States began to put into laws mechanisms for government to support education. In New York the Law of 1795 became the first statute regarding the development of elementary schools. In 1805, New York City passed an act which included the Public School Society, whose purpose was to provide free school for the education of poor children who were not being serviced by a religious group (Fitzpatrick, 1969).

The evolution of the educational process from one controlled and supported by the church to one controlled and supported by the state took almost an entire half-century to develop. Without state support the schools were not adequately equipped to educate students, and the teachers were not adequately trained to educate students. In 1813, the Common School Fund was established which provided funding and a mechanism to encourage compliance with the law (Fitzpatrick, 1969). By 1870, free public schools had become established in almost every state in the Union. Common School Funds were established as a general fund to provide financial support for public education (Swift, 1911). The catalyst for this change is attributed to the increase in philanthropic, political, social, and economic forces converging in the individual states during this time.

The rebirth of the common school movement, influenced by Horace Mann, William T Harris and others, called for the role of schools in the 1800s to prepare children for work by

developing competencies in self-control, organization, punctuality, obedience, and other skills modern educators would consider *soft* skills (Tyack, 1979). Policymakers during this time period grappled with how to provide education in a scalable manner with an accountability for organizing teachers and students to meet generally common educational goals (Dockterman, 2018).

Early models. In a multitude of ways, the schools which developed during this period in time represent an early example of personalized learning. By providing students with specific instruction geared toward student interests and providing a path for students to enter the workforce, these schools represented early examples of personalized learning (Cubberley, 1919). During this time, several educational models also emerged. One of the more notable models was the Monitorial, or sometimes referred to as Lancastrian. These models empathized student progression based upon ability rather than age, similar to the mastery-based education reform efforts of the modern era.

The Monitorial model arranged students according to their needs while anticipating and planning for other psychological and social factors that could affect learning. John Lancaster, an educational reformer, developed this system to organize students into competencies, recognizing that students come to school with varying knowledge and skills. Lancaster noted there were two types of instruction in his schools. The first type included a progressive series of lessons designed to meet the future interests of the students with knowledge that would support their studies. The second form of instruction was designed more to support the mental improvement of the students in the school (Lancaster, 1805).

Lancaster's ability to offer scalable instruction to hundreds of students was possible in part due to the use of monitors. Monitors were students who exhibited a strong understanding in

specific subject knowledge and were used to support the instruction of other students. These mentor training schools later lead to normal schools, which were used to train future educators (Lancaster, 1805). William Shearer, also an education advocate, wrote in support of reform that would accommodate variations in place of learning, allowing students to switch into faster or slower classes, ability tracking, and flexible student reclassification (Dockterman, 2018).

The Monitorial model was comprised of a large body of students, anywhere in range from 200 to 1000 students. Students were sorted and placed in rows and seats and assigned a monitor, often an advanced student, to instruct and look over the five to ten students in his row. The curriculum was produced in such a manner that easily enabled any dedicated individual to become a successful teacher. This model represented a scalable example of how to organize and manage students in a public setting, giving further support to public schools (Cubberley, 1919).

The Monitorial model was very common in the 1800s in both the United States and England. It was envisioned to provide scalable education solutions to the poor at low costs. Providing education to the poor was important for many countries who were staving off potential revolutions (Lederer, 1975).

In the 1900s, schools began to move to an age-based system; where similar aged peers were expected to have the same knowledge and progress at the same pace so students could be taught at the same time. This concept can be traced back to Europe (Dockterman, 2018). In addition, political pressure was beginning to mount for secondary schools to become more accessible. As the demand for inclusion in secondary schools rose, so to grew the desire for secondary schools to develop pre-college preparatory curriculum along with practical education and training for business and industry. Additionally, a struggle to define the role of public school became evident. On one hand, public schools were to serve the political role to prepare

citizens for their place in society, and on the other hand, the private role to help students pursue interests and attain status in the economic market place (Labaree, 1988).

With an increase in secondary schools in the United States at the turn of the 20th century, a concern arose with the lack of standardization in the public schools. In 1892, the Committee of Ten was formed to provide an agreed upon philosophy for secondary education. This committee, based upon recommendation of subcommittees, defined curriculum for college prep students. In addition, the committee recommended curriculum progression so subjects could be taught in sequence. The goal of this committee was to answer 11 questions concerning when subjects should be taught, what subjects should be taught, college entrance requirements, methods of teaching, testing, and the amount of time devoted to each subject. The committee focused on the college preparatory aspect of secondary education, although recognizing that some students would be better suited for vocational studies (Briggs, 1931).

Around the same time that the Committee of Ten was established, the National Education Association commissioned the Reorganization of Secondary Education. The Cardinal Principles of Secondary Education were a result of this commission and identified seven principle objectives of secondary education: (a) health, (b) command of fundamental processes, (c) worthy home membership, (d) vocation, (e) citizenship, (f) worthy use of leisure, and (g) ethical character. While these two reports aimed at clarifying the purpose of secondary education for the growing student enrollment, it also highlighted the struggle of defining the role of secondary education in the United States. A growing feeling in the United States during the early 1900s was that secondary school could serve society better than it had previously (The Reorganization of Secondary Education, 1977).

Challenges. Elwood Cubberley, professor of education at Stanford University, wrote in 1919 about concerns regarding the age-based system, stating that about 70% of students should progress to grade level expectations. The remaining 30% would either be trailing behind or accelerating beyond their peers. Interestingly, a study by researchers at John Hopkins School of Education in 2016, alluded to a similar finding with the current education model. This current research reported that between 20% and 40% of elementary and middle school students perform at least one grade level above their current grade, and 11% to 30% score at least one grade level above in math (Makel, Matthews, Peters, Rambo-Hernandez & Plucker, 2016). This suggests that throughout the 20th century and into the 21st, the public education system has struggled to meet the needs of every student.

During this time another educational shift in the United States emerged, focusing on the child rather than the subject. Schools became a part of the student's life, and for the first time were being viewed as a new institution to support a child's welfare (Cubberley, 1919). In the 1930s, Cubberley championed the notion of a comprehensive high school as the only way to meet the needs of a diverse student body while infusing the norms of democracy (Tyack, 1979). Comprehensive high schools emerged as a result of new economic realities brought forth from the industrial revolution and as a response to educate the youth for employment in an industrial age. This time also gave rise to the vocational education movement (Wraga, 1994).

Reform. Throughout the 20th century, a range of reforms to accommodate variations for students' learning paces were being explored (Dockterman, 2018). As the age-based, graded school system in the United States grew, so did research and educational reform concerning students whose needs were not being met by the current system through equity, quality of instruction, and standardization of curriculum (Sunderman, Levin & Slee, 2010) . Cubberly and

Lancaster both were concerned with student self-confidence in an age-based system and noted that in a competency-based system, students may move slower in one area but not necessarily in all areas.

In the 1920s, the Winnetka Plan was introduced by Carleton W. Washburne, superintendent of schools in Winnetka, Illinois. He recognized an essential component of personalized learning, that every child should have an opportunity to master the subjects on his own terms (Meuer & Tubergen, 1998). The Winnetka Plan allowed students to take diagnostic placement tests to determine which goals and activities students should attempt. With this program, students were placed into two sections of curriculum: essential and creative (Meuer & Tubergen, 1998). In the essential lessons students worked towards mastery and then moved onto the next concept. In the creative activities students were provided flexibility to do activities based on interest. This paper-and-pencil based program was an early attempt at personalized learning.

Education reform is a consistent theme in education. After the Soviet Union successfully launched the world's first satellite into orbit, Americans began to worry that they were not producing enough scientists. This event triggered reform efforts that looked at not just providing more science education, but also took a deeper look into the type of teaching techniques and curricula that were being used. It began to look at factors that caused kids to become disengaged with science and sought methods that would increase engagement. This desire to engage the learners is a common trend that reappears in various reform efforts in the United States moving forward, and it is at the heart of the personalized movement in the modern educational landscape (Escobar, 2016).

During this same time, B.F. Skinner and Sidney L. Pressey created teaching machines which both believed would provide students immediate feedback, personalized attention from teachers, and flexibility in pace (Boninger, Molnar, & Saldana, 2019). Teaching machines were devices designed to tutor students without assistance from a human. While both Skinner and Pressey harnessed technology to personalize education, their approaches to learning theory were quite different. Pressy favored multiple choice questions for its ability to produce a higher significance. Skinner preferred that students construct answers instead of relying on recognition (Fry, 1960)

The introduction of the teaching machine coincided with the emergence of scientific management theory, which looked to reimagine the factory model of schools by measuring and controlling teacher and student behavior. Fredrick W. Taylor developed the scientific management theory to standardize labor. The primary principle of this management approach was to eliminate opportunities for chance by planning for as many details as possible. This method was useful in jobs that required skilled labor and repetitive movement because it broke tasks down into singular, quantifiable actions with measurable outputs. As this trend moved through business models, it also moved through educational reform models (Trujillo, 2014). The result of this movement was an increase in reliance for data to measure school outcomes; a trend that was overwhelmingly prevalent in the modern school system (Cuban, 1988).

As the trends in education looked for measurable outcomes, two researchers, Cronbach and Snow developed a method to predict educational outcomes from a combination of aptitudes and treatments. Cronbach and Snow developed and implemented the Aptitude Treatment Interaction in 1979. They supported the idea that students can differ in a multitude of ways cognitively, psychologically, and environmentally. Cronbach and Snow provided the seminal

paper on the guidelines for research on interactions. Their specific interest was looking at individual differences in learning and instruction and found that students high in general ability excelled when they were made to organize and interpret the lesson. However, students who were low in general ability performed better in highly-structured settings with more detailed explanations (McLeod, 1978). Understanding that students responded differently to tasks and different forms of instruction laid the foundation for later research and development in the world of computer-based, adaptive learning (Dockterman, 2018).

Current Educational Trends

The aforementioned personalized instructional models were successful in isolation but were not developed into a scalable system (Dockterman, 2018). Current attempts to personalize learning reflect educational goals similar to those of 20th century educators. The difference between the early efforts of the 1920s, later efforts in the 1970s, and current efforts to develop personalized learning models is the use of technology in a more adaptive and readily available manner through cloud-based computing, increased computing power at lower costs, and widely accessible Internet access. Increases in the capability of technology, coupled with progress the nation made to increase high-speed Internet connectivity at schools and the lower cost of digital devices has led to surge of technology-based, personalized learning approaches among schools, districts, and states (United States Department of Education, 2017).

The technology currently available is much more robust and accessible than technology in the mid-20th century. Adaptive technology allows students to experience personalized learning specific to their needs based upon algorithms in the software that adapt questions and content based on individual student's responses. At the turn of the 21st century, schools have lain witness to many advances in technology, moving the discussion from whether technology should

be used in learning to how should it be used (United States Department of Education, 2017). Since 2010, the National Education Technology Plan has noted remarkable progress in the field of learning sciences, software, and the availability of high-quality interactive educational technology tools and applications.

The advances that have been made to adaptive learning software continue to improve to allow educators, students, and parents access to feedback and assessment results in efficient manners. Current technology capabilities that emerged in educational technology have many educators, educational reformists, and educational theorists believing that personalized learning could finally offer scalable solutions for schools across the country. Personalized learning finally could help achieve a vision for the educational system in the United States that has been sought after since the turn of the 20th century. Susan Patrick, president of International Association for K-12 Online Learning (iNACOL), believed this generation might be the first generation to have the tools necessary to achieve a k-12 school system which worked for all students due to accessibility and low-cost solution (Patrick, 2019). The future of educational technology is not focused on the type of technology students have available but rather on the use of technology to support learning and improve skills deemed as necessary for a 21st century learner. Those students who are taught to use and understand technology to increase creativity, collaboration, critical thinking, and communication skills fare better in post-secondary settings compared to their counterparts (P21 Partnership for 21st Century Learning, 2017).

Personalized Learning in Secondary Education

Personalized learning focuses on the continuous improvement, student mastery of academic standards and skill attainment in addition to connection within the community through work-based learning opportunities (Patrick, 2019). Digital education has many in the education

field curious as how to leverage its efficiency and effectiveness to support learners, specifically engaging students on an individual level. Research shows very little evidence as to any significant impact on student learning, whether the learning occurred online or face-to-face (Cusatis, Harness, & Joosten, 2018). However, despite this lack of evidence, the buzz surrounding personalized learning still remains. Technology is central to the contemporary definition of personalized learning and has been proven successful in various sectors in society to meet the diverse needs of many people. The notion of technology enabling mass personalization in education through online learning is for many a dream within reach (Horn & Staker, 2017).

Most online programs in post-secondary institutions have continued to see growth or maintain stable enrollments; however, evidence has shown the significant growth is beginning to slow as 18% of two-year public, post-secondary institutions reported declines in online enrollment between the 2016 and 2017 academic year (Garrett & Legon, 2018). Despite the peak potential of online enrollment in post-secondary education, there is evidence that younger generations rely on the use of technology to gain information. A recent study (Center for Digital Education, 2017) showed that most students in the United States age eight and older had mobile phones or access to some form of technology through which they consumed content. For many educational technology activists, this notion of a technology-connected student serves as a rally cry for technology education and technology integration.

The personalized learning movement has deep pockets of financial support from politically connected backers. The popularity of personalized learning is proliferated across the United States by lobbyists in the technology industry and through philanthropic dollars. The Bill and Melinda Gates Foundation, educational technology vendors, and an unconstrained policy environment all have invested in the personalized learning movement (Boninger, et al., 2019).

The 2017 National Education Technology Plan noted that technology in education could level the playing field for students by providing access to high-quality instruction, advanced coursework, embedded assessments, increased feedback, and access to more instructional support. Technology has the potential to become one of the most important factors and draws for individuals in the education field. In addition, when strategically integrated, technology can expedite, increase, and widen the effect of best teaching practices to benefit even more students (US Department of Education, 2017).

Personalized Learning Defined

Personalized learning is designed for the pace, preference, and interest of individual learners; it represents a methodology rather than a set of goals and at its heart is student-centered (Bailey et al., 2015). Core components of personalized learning includ (a) student perspective, (b) curriculum or digital platform, and (c) flexibility provided by the school system to accommodate for strengths, weakness, interests, and motivation of each student (Cavanagh, 2014). The Bill and Melinda Gates Foundation committed over $300 million to support research and development of topics aligned with personalized learning, and had one of the more widely accepted working definitions of personalized learning (Dockterman, 2018). The Gates Foundation, alongside policymakers, philanthropic organizations, and researchers in the technology education realm such as the Michael and Susan Dell Foundation and EDUCASE, identified four pillars to define personalized learning. Those pillars were (a) students create and maintain a learning profile used by all stakeholders to identify strengths, (b) weaknesses, preferences, and goals, (c) students utilize an individual learning plan (ILP) that encourages goal setting; students should follow a competency-based progression focused on their ability to

demonstrate mastery of a topic, and (d) flexible student learning environments and structures to support their individual interests (Herold, 2016).

A learner's profile is often associated with the work of personalized learning and consists of a student's collection of work, self-assessments, goals, motivations, academic information and feedback of the individual learner (Cavanah, 2014). The learner profile plays an important role in supporting the customization of learning for the student. Data collected in the learner profile is used to tailor instructional achievement to the individual student and to help support personal motivation and engagement (Bailey, et al., 2015). The learner profile plays an integral part in supporting student agency to become a lifelong learner and one that can potentially navigate the rapidly changing world in which knowledge is readily available and workplace skills quickly become obsolete (Horn & Staker, 2017). These profiles are dynamic in nature in order to gain new knowledge and create a more holistic data story, with data collected by software and the teacher, to support the teacher's individualized instruction for each student (Herold, 2014).

Standards-based education and competency-based education often times are used interchangeably to describe the same concept. However, there is an important distinction to note between the two educational learning theories. Standards-based education relies solely on the mastery of standards whereas competency-based education relies not only on the mastery of standards but also the acquisition, application, or creation of knowledge, skills, or dispositions prior to moving to the next topic (Horn & Staker, 2017). Competency-based education is synonymous with mastery-based, performance-based, or proficiency-based education and is designed to ensure all students develop the skills needed for college, career, and life in an equitable manner. All students need to be provided with is the opportunity to learn in a manner appropriate to guide them into the next phase of their lives and to support the future demands of

the workforce. This paradigm shift in education theory reinforces inextricably the relationship between competency-based learning and personalized learning (Casey & Sturgis, 2018).

Competency-based schools work to create climate and culture where growth, inclusion, and student empowerment are the norm. These schools work hard to ensure that learning is transparent, students are knowledgeable about what will be learned, what level of learning will be expected, and how they have grown. Another important tenant of competency-based learning is the student's ability to communicate learning and intrinsic motivation. These traits support the development of a lifelong learner. Competency-based schools are focused on timely feedback of learning for their students. These schools also focus on a progression through subjects based on learning which includes the use of differentiated instruction and active learning (Casey & Sturgis, 2018).

Although competency-based learning and personalized learning are interconnected in many ways, other components of personalized learning are also prevalent and integral to the process such as curriculum and platforms that exist to support and carryout the individualized, differentiated instruction personalized learning requires. When technology is added to personalize learning, it provides a powerful support for achieving the goal to meet the needs of a growing student population with diverse needs, a range of academic ability, and in some cases language barriers (Cavanah, 2014). Specific categories of technology used to support personalized learning include learning management systems, assessment software, and content suppliers.

Learning management systems (LMS) help students and teachers organize files, distribute content, host collaboration and discussion all in one online platform (Center for Digital Education, 2017). Assessment software utilizes algorithmic-powered adaptive programing to

personalize learning, assessment banks, or both. Examples of these types of programs include Northwest Evaluation Association (NWEA) and Renaissance (STAR). These types of assessment software are often used to monitor student progress towards state proficiency benchmarks. Many schools use data from these software programs to support interventions and individual education plans. Content delivery systems provide students with online content, allowing students to work at their own pace, place, and in their own interests. Some additional examples of education technology companies that provide content include Edgenuity, Edmentum, and APEX. Many districts that adopte digital education technology products give-up control to vendors. Such loss of control centers around curriculum decisions, assessments, and course sequencing (Strauss, 2019). Schools rely on the output of software developed tests without having first vetted the test to ensure alignment with curriculum.

Blended Learning

Beyond the role that technology has in ensuring personalized learning success, the flexibility of the educational system plays an equally important role. Schools must support student learning in a multitude of ways, including ways that are different than the traditional, seat-time, age-based approach prevalent in many school districts in the United States (Casey & Sturgis, 2018).

For example, schools have the opportunity through incentives from the federal government, state assessments, and low-cost technology with greater computing power, to offer students more options for online learning. The Federal Communications Commission offers funds to school districts to increase broadband service and wireless networks and provide additional support for rural schools that struggle to afford fiber-optic cables at affordable rates. This is known as the E-rate program (Herold, 2016). In addition to federal funding to support

access for online learning, state assessments also provide incentives for districts to consider this medium as a viable learning environment. States like Kentucky have begun to shift state assessment to an online platform. This move could impact the number of schools, in an attempt to mirror the state test environment, who choose to give tests online and in turn shift digital instruction even more (Bailey et al., 2015).

Blended learning, a form of online learning, is a means for student learning to occur in part online with students having some control over time, place, path, or pace (Hall et al., 2018). Blended learning leverages teacher talent and intentional change in delivery of instruction to increase learning. This mode of learning represents a pedagogy-driven strategy which disrupts the nature of students' educational experiences. The student role in blended learning transforms from the receiver of knowledge to the seeker, thinker, and producer of knowledge. The teacher became the facilitator of learning, spending more time on discussion, formative assessment, small group instruction, and one-on-one support, rather than the content deliverer (Nolan et al., 2012). Blended learning aims at making the learning experience more productive and meaningful for the student, teacher, and school while also being more effective financially for the school and community (Bailey et al., 2015). For many schools blended learning is a form of personalized learning that seems reasonable to attempt at first. As research points out, there are more similarities between blended learning and traditional learning than differences (Anthony, 2019).

Blended learning is a form of online learning comprised of different personalized learning approaches and differed from technology-rich instruction. Several models are familiar in educational settings such as (a) flipped classrooms, (b) station rotation, (c) lab rotation, (d) individual rotation, (e) *a la carte*, (d) enriched virtual, and (f) flex model (Hall et al., 2018).

While there are various versions of blended learning, this form of personalized learning often times is confuse with a technology-rich classrooms.

Former United States Secretary of Education Arne Duncan believed technology was a force multiplier that when used carefully and correctly could accelerate, amplify, and broaden the effect of teaching practices for the learner (United States Department of Education, 2017). Blended learning increases opportunities for students when systems are in place to support the teacher, student, and school. At the turn of the 21st century, online learning was stagnant. Some believed this was due to obstacles such as low interest among faculty, few models to choose from, and financial implications for institutions. Some of these same barriers are still being felt 20 years later as schools and districts continue to push for new methods of learning delivery (Lorenzo, 2010). Teachers, schools, and districts are continually searching for evidence-based, effective online practices that influence student success (Cusatis et al., 2018).

Policy and Politics

Personalized learning has seen an increase in attention in recent years, not just due in part to the increased accessibility of technology, but also due to policy changes and large philanthropic donations. The United States Department of Education gave half a billion dollars to districts that embraced personalized learning (Dockterman, 2018). Financial backing is not only important but necessary to support districts and schools that decide to shift to more technology-centric personalized learning approaches.

In addition to financial support, there are other commitments to personalized learning that philanthropic organizations support. Michael and Susan Dell Foundation, Bill and Melinda Gates Foundation, and EDUCASE support personalized learning through financial means and work together to establish a working definition of modern personalized learning. The working

definition, commonly referenced in personalized learning, rests on four pillars: (a) student learning profiles, (b) each student sets and manages personal academic goals, (c) progression of learning focusing on competency-based learning to demonstrate mastery of a topic, and (d) a flexible learning environment that allows students opportunity to support personal goals (Herold, 2016). The importance of establishing a common working definition is very important to widening the spread of personalized learning.

The promotion of personalized learning by these foundations and policymakers has led to the increase in educational technology industry lobbying and marketing by third-party vendors (Strauss, 2019). This increase in educational technology is in part a response to the reauthorization of the Every Student Succeeds Act (ESSA), which requires districts and schools to use evidence-based solutions to close achievement gaps, especially when it comes to educational technology in the school and classroom (United States Department of Education, 2017). ESSA, enacted in 2015, also gave states and localities flexibility to reimagine what student success was defined as, to create new assessment pilots, and to work with their local communities on a more flexible, responsive and connected education system (Gross, Tuchman, & Patrick, 2018).

While policy and philanthropic efforts went a long way to support the redesign of school structures in the frame of personalized learning, policy areas remain to be addressed. The first is the issue of interoperability, the standardization of formatting and handling data, and the need to create a common standard framework for interoperability (Herold, 2016).

Interoperability is critical to personalized learning efforts. Currently, it is common for a district, school, teacher, or student to use several technology platforms to manage various components of online learning. For instance, a student accesses an online curriculum through

one sign-on, uses another system to send assignments and communicate with their teacher, and finally the teacher takes the information from the online curriculum and puts that data into another system which records grades. The grades are then reported to key stakeholders. The need for data to go between systems and provide a more streamlined access is essential if personalized learning is to be a tool that is beneficial to students and teachers in an efficient and scalable manner (Krotov, 2015).

Many states have begun to mandate that standardized tests be delivered online. Schools trying to mimic the testing environment of high-stakes accountability testing have shifted instructional assessments to online formats (Bailey et al., 2015). High-stakes testing mandates has increased the number of schools moving to one-to-one computing. Implementation is an issue for school districts who lack fiscal resources. To help districts off-set cost, especially with regard to technology infrastructure, the federal government has made a huge effort to increase access to high-speed Internet and free online teaching resources, particularly for rural and remote schools. In 2014, the Federal Communication Commission (FCC) overhauled the E-rate program which collects fees on consumer phone bills to fund more than $30 billion in prioritized broadband service and wireless network support. The result was an increase in the number of libraries and schools applying for E-rate funds to support wireless network equipment (Herold, 2016). In addition to the FCC and online assessment mandates, some states implemented policies requiring students to participate in a form of online learning in order to graduate. This policy is an example of the relative relationship personalized learning and online learning share and the value states and policy-makers are putting into technology-centric personalized learning models (Gudivada, 2017).

Seat-time policies are a barrier to personalized learning. Policy makers have begun to address the seat-time issue that many pro-personalized learning gurus believe need to be changed. For example, in the Commonwealth of Kentucky schools collect Support Education Excellence in Kentucky (SEEK) money for students based-off seat-time. SEEK is collected by daily attendance, or by student performance in performance-based classes determined by mastery of coursework (Barnette & Devine, 2018). Policies like the one in Kentucky provide the flexibility schools need for anytime, anywhere learning. However, most states still base their school-funding structures on student enrollment and not student learning, leaving school budgets that rely solely on the number of students who attend school onsite (Taylor & Parson, 2011).

Implementation of Personalization

Personalized learning, specifically blended learning, require educators to alter their delivery methods for instruction to support learning. In order to support teachers' transition to blended learning, schools and districts need to provide access to online resources, increase Internet access, devote time to building and implementing a plan to support various types of blended learning, invest in teacher development and training, and make available some level of adaptive assessments (Bailey et al., 2015). Blended learning is another means to support the instructional vision of the district. The use of technology through blended learning provide one more strategy for schools to leverage technology and instruction when seeking ways to engage students in the learning process (Hall et al., 2018).

One of the first things a district looks at when implementing blended learning is the district's instructional vision. All decisions are based from this vision. Districts support schools by building capacity with the local community to help teachers provide opportunities for students. Districts provide parents and other key stakeholders information concerning the

different component of blended learning and how the pedagogical shift support students' academic success and personal growth (Hall et al., 2018). One of most important supports districts provide for schools and teachers wishing to implement blended learning is to encourage teachers and schools to instill a growth mindset. When schools or teachers set-out to blend learning through technology, districts need to provide a safe environment for them to begin implementation. This type of environment which embodies a growth mindset consists of a *fail forward* mentality, providing support through time, human capital and financial capital. Districts need to be patient with implementation, understanding that growth is key to ensuring scalability and sustainability (Center for Digital Education, 2017). Beyond the visionary work, districts need to put into practice ways to vet educational software in all stages: purchasing, deployment, and evaluating (Hall et al., 2018).

Blended learning is a pedagogy steeped in strategy. This learning environment is aimed at altering the student experience and building academic and personal habits and skills needed to become a lifelong learner and contributing member of society (Nolan et al., 2012). A large portion of personalized learning involves competency-based education, sometimes referred to as mastery-based, proficiency-based, or performance-based education. Competency-based education is designed to provide equitable means for all students to develop academic and soft-skills needed for college, career and life. This educational system is rooted in the learning sciences. Competency-based education centers on safety and belonging for students while promoting active learning and building student skills to manage learning and increase intrinsic motivation (Casey & Sturgis, 2018). Competency-based education allows students to develop grit and perseverance since students must demonstrate mastery of the content prior to moving on

to the next topic, which is very different than the traditional educational pathways (Horn & Staker, 2017)

Teachers need to demonstrate their own competencies when utilizing technology and online learning environments because of the transitory nature of online learning. Teachers and administrators collaborate in multiple mediums to enhance learning environments (O'Byrne, Roberts, Labonte, & Graham, 2015). Despite these very specific competences, good teaching will always be good teaching regardless of whether it is done in part or completely online. There are decades of research and meta-analyses that show no significant difference between face-to-face and online instruction (Barnes et al., 2007). The notion that there might be more similarities between blended learning and traditional learning tends to be a large reason why many schools wishing to implement personalized learning start with blended learning (Anthony, 2019). The RAND Corporation only found small differences between personalized learning and "traditional" settings (Strauss, 2019). The impact of the teacher on student learning is by far greater than the impact of the school or the curriculum regardless of the mode in which the teacher operates (Hattie, 2018). Best practices that teachers implement in traditional settings should still be encouraged and utilized in classrooms when blended learning is implemented (Anthony, 2019). Keys for a teacher when implementing personalized learning are similar to those when establishing a classroom environment. The teacher needs to ensure they: (a) develop appropriate relationships with the students, (b) connect the curriculum with student interests, (c) provide tools to monitor student's progress, (d) support learning with specific instruction, (e) provide practice, and feedback, (f) ensure they learn rigorous academic content and skills, (g) provide flexibility, (h) employ multiple instructional approaches, and (i) use technology

effectively to connect students to real-world applications, in order to successfully implement personalized learning (Future Ready School, 2017).

A teacher, school, or district can choose multiple blended learning models to implement. Stakeholder's need to focus on which model to choose, not whether or not blended learning would work (Anthony, 2019). The Clayton Christensen Institute identified seven blended learning models. These models are (a) station rotation, (b) lab rotation, (c) individual rotation, (d) flipped classroom, (e) flex, (f) *a la carte*, and (g) enriched virtual (Clayton Christensen Institute, 2018). Blended learning models offer an array of ways technology can be used to sustain innovation relative to a face-to-face classroom and models that can be viewed as disruptive to the traditional classroom (Mengel, 1997).

Station rotation, lab rotation, and individual rotation are very common structures found in traditional classrooms, especially elementary classrooms. These models allow students to move through various stations, both in a group or individually, using a set schedule and offering at least one station using online instruction. Online instruction is set on an individualized basis either by the teacher or a software algorithm. In a flipped classroom students learn at home through various online learning environments doing the work that is commonly done in a face-to-face setting. When the student returns to class, the time is used to complete teacher-guided practices, remediation, or higher-order thinking tasks (CCI, 2018). The flipped classroom blended learning model requires a lot of upfront preparation time for teachers and a commitment from students to ensure that work is being done outside of the class day. The Flex model allows students to work at their own pace through an online environment as well as with a teacher who facilitates small learning clusters on an individual need basis. The *a la carte* model allows a student to take some courses online and others face-to-face. This model provides flexibility in

the student's schedule. The last blended learning model, enriched virtual, allows for students to complete almost all courses online outside the school building, but requires students to attend face-to-face learning sessions with the teacher on a set schedule. (CCI, 2018)

Blended Learning Strengths

Blended learning, personalized learning, and competency-based learning all have strong educational merits that are highlighted throughout this chapter. As with any model there are pros and cons to blended learning. The notion of increased teacher productivity through the access of data to better inform instruction is a strong draw for many school districts, leaders, and teachers (Bailey et al., 2015). The data that is produced helps to inform all stakeholders with real-time information about a student's performance (Taylor & Parson, 2011). For students the draw to blended learning is the personalized aspects, allowing student control over the pace, path, and place in which they learn (Casey & Sturgis, 2018).

Districts and states view blended learning, personalized learning, and competency-based learning as an opportunity to rethink education, in part because of grants funded through efforts made available by ESSA but also due to the accessibility of cost-effective technology and new software with more adaptive capabilities (Center for Digital Education, 2017). It is apparent the foothold online courses have in post-secondary institutions, where most online courses have grown or at least remain stable (Garrett & Legon, 2018). This plays another role in the growth of online learning in secondary education. In several states like Rhode Island, New Hampshire, and Vermont, personalized learning appears in state regulations, and others states have made progress towards competency-based learning, a central component to personalized learning. Across the United States, schools continue to experiment with personalized learning in an attempt to better meet the unique needs of students and ensure broader access to a world-class

education (Gross et al., 2018). Districts are lured to the prospect of personalized learning to help close achievement gaps with students with diverse needs, academic ability, language barriers, and varying starting points (Cavanagh, 2014).

Blended learning, personalized learning, and competency-based learning finally provide educators with an avenue to focus more on deeper learning strategies like: (a) discussion, (b) facilitation, (c) formative assessment, (d) small group instruction, and (e) one-on-one interactions that educators have searched to provide for their students for decades (Nolan et al., 2012). Adam Gay, vice-president for product marketing and strategy at McGraw-Hill, echoed the belief that personalized learning was a scalable option for schools (Molnar & Herold, 2018). When students master material in a traditional school setting with a small student-to-teacher ratio and flexible grouping, personalized learning is possible but very strenuous for the individual teacher who provides the new learning experience. This traditional learning example illustrates the struggle traditional learning environments have with personalized learning. However, blended learning, through technology solutions, personalized work for students who move beyond the pace of the class or additional work is provided for students who need to catch-up to the class (Horn & Staker, 2017). Beth Rabbit, CEO of The Learning Accelerator, a national nonprofit personalized learning organization, alluded to the issue with traditional learning environments in an article from *Education Week*, she noted that educators have attempted to personalize what they are doing in the classroom with kids for centuries, if not longer (Molnar & Herold, 2018).

Students in a blended learning, personalized learning, and competency-based learning environment experience many positive educational opportunities. Personalized learning provides flexibility, allowing students who need to work or have commitments outside of school to continue both in a more manageable manner (Nolan et al., 2012). Students exhibit better

productivity because work is tailored to the individual student's needs, never too hard nor too easy (Bailey et al., 2015). Online learning experience exposes students to connections well outside their school and make anywhere in the globe a potential resource (Taylor & Parson, 2011). In a traditional setting students usually wait to fail the class before they received support, but through personalized learning, support is ongoing and students do not progress until they have mastered the content. This model is based on meeting students where they are and designing instructional strategies for their development, social emotional skills, and academic foundations (Casey & Sturgis, 2018). Students are also given the opportunity in a personalized learning environment to develop time management, organization, self-monitoring, and persistence during classwork. The student-centered approach of blended learning offered students the chance to be the seeker, thinker, and producer of knowledge and understanding. Students also are able to develop skills with technology and digital citizenship by having to analyze and evaluate their online identities and digital footprints, and collaborate with peers online (Nolan et al., 2012).

Blended Learning Concerns

Personalized learning offers the promise of something that eluded educators for a century. Despite the double-digit growth in the first decade of the new millennium in the popularity of Internet-based education, skepticism regarding the effectiveness of personalized learning still exists (Lorenzo, 2010). Some argue against personalized learning for certain demographics of students. Cox contended that extending geographical access was not the same as increasing educational opportunities, especially when it came to less advantaged students, online learning must do more than just provide an opportunity (Lorenzo, 2010). There is also a concern that the classroom loses intensity because it diminishes the need to have a shared space

because individual learners are encouraged to invest in their specific progression, creating a void in the classroom's collective identity (Thompson & Cook, 2017). There is a concern with the lack of system-wide data on personalized learning that makes it difficult for advocates, practitioners, and policy-makers to address needs in the future (Gross et al., 2018).

Concerns with specific components of personalized learning also are expressed, such as with the amount of control students have in some personalized learning models. Eighty percent of elementary and middle school classrooms across the country show few measurable signs that students are proceeding through content at their own pace and a little more than 60% of classrooms show signs that students are able to take ownership of their learning (Gross et al., 2018). Additional concerns have been expressed with the over reliance on technology and adaptive software that uses algorithms to determine student placement. Many districts have little to no knowledge of how those algorithms are established. The lack of oversight and regulation has raised concern, especially with the use of big data (Herold, 2014). Big data is the term used to describe the unpresented level of data generated by software systems, such as student information systems, which collect student personal data. Often software companies use big data and algorithms to personalize pathways for students (Gudivada, 2017; Herold, 2014). One of the main concerns with big data being collected in personalized learning environments becomes who should get that information and how it should be maintained.

Kettle Moraine, a personalized school district in Milwaukee, experienced an abundance of educational technology vendors who fell short on their promise on what could be delivered to the classroom. Their story is not uncommon, but their message is worth noting; the importance of educators and their ability to know each student and their needs versus a software program dictating needs based-off an algorithm (Cavanah, 2014). Yong Zhao feared that too much

reliance on adaptive software leads to misguided judgements about children, a lack of appreciation for how mistakes can actually support the learning process, and the amount of time and money pulled from things parents and educators really cared about (Herold, 2014). With the increase in personalized programs that proliferate the United States educational system, a vetting process to ensure programs meet standards is needed (Strauss, 2019). Districts need to be wary of giving too much control to vendors when it comes to curriculum, assessment and student progression decisions. Public schools spent more than $3 billion dollars per year on digital content, so it is justifiable to take a cautionary stance when it comes to personalized, blended, and competency-based learning (Herold, 2016).

Learning Engagement

Despite these cautionary tales, the allure of personalized learning for educators as they try to adapt to meet the needs of an ever changing and increasingly diverse student population is all too promising in allowing tech-centric personalized learning to go unnoticed. One of the draws for educators is the notion of engaging or re-engaging students. Since the turn of the 21st century, research and educational theorists have written about the next generation and the different methods by which these students learn and engage life. Some theorists have gone so far as to term these students the *net generation* (Barnes et al., 2007). Students in this generation grew-up in a world with different rules of engagement than any generation prior and most of those changes are due in part to the technology-centric society that emerged (Taylor & Parson, 2011). Research went as far as to predict that these students, by the time they reach adulthood, will have spent over 10,000 hours playing video games, sent over 200,000 emails, watched 20,000 hours of TV, and consumed over 10,000 hours on cell phones (Barnes et al, 2007).

Many proponents of personalized learning support the notion that students in the modern era think differently, act differently, and learn differently. In addition, proponents believe these differences make the traditional lecture in front of rows of students no longer appropriate for a modern instructional strategy. This image became a rally cry for innovation in the educational system. Personalized learning is a central mechanism for this movement and in large part due to engagement factors that are addressed by the model. With such an emphasis for engagement in the learning system, a need arises to understand engagement, to define engagement, and to apply strategies to ensure students are engaged in their learning (Tapscott, 1998).

Defining engagement is tricky, as it is multidimensional and is often times confused with motivation. Motivation is closely linked to engagement, but the concepts are different (Willms, Friesen, & Milton, 2009). Motivation is intrinsic in nature, drawn from an inner desire to learn and that drives students to engage in the learning process. This desire becomes a catalysis for engagement rather than a component of engagement. Academic motivation denotes an internal disposition to succeed in academic work and other tasks associated with school, wherein academic engagement moreover suggests malleable behaviors that can be manipulated to increase academic success (Finn & Zimmer, 2012). While this is important to note when discussing and researching engagement, it too bares to mention a debate exists between the relationship of engagement and motivation, and not all theories concerning engagement recognize a difference between the two (Willms et al., 2009).

Engagement, historically, is researched to pinpoint the relevancy of academic engagement on student achievement (Reschly & Christenson, 2012). Various models of engagement are present in educational research, some value narrow definitions while others use a broader stroke to define engagement. For the purpose of this research, student engagement is

defined as the level at which students attend to, invest in, and expound upon the work required to contribute interpersonally and collaboratively to the learning environment and system (Marks, 2000).

Types of engagement.

Beyond just defining engagement, it is also important to identify the types of engagement. Four types are presented in this research: (a) academic, (b) social, (c) cognitive, and (d) affective engagement (Finn & Zimmer, 2012). Academic engagement is behavior exhibited by students which directly impacts the learning process. This form of engagement includes such common daily tasks as being attentive in class, following directions, completing classwork/homework, and even extending learning through extracurricular (Finn & Zimmer, 2012). Academic engagement is derived from the goal of enhancing every students' ability to learn or become lifelong learners (Gilbert, 2007).

Social engagement references the extent to which a student follows the written and unwritten norms of the classroom. In the Danielson framework *Managing Classroom Procedures* speaks to this type of engagement. This framework, while written to evaluate a teacher's effectiveness, describes the procedures, environment, and atmosphere in which both the student and the teacher should participate in to create opportunities for high levels of engagement. Social engagement references the exemplary status of this indicator, outlining such attributes as students understanding and initiating routines and students supporting instruction through management, transition, and system process for ensuring instructional time was maximized (Danielson, 2011). Another aspect of social engagement is attending class on a regular basis, being punctual and interacting with the teacher and peers appropriately (Finn & Zimmer, 2012). In the Danielson framework the role of the student's behavior in establishing an

engaging classroom environment is present. The attributes outlined in the exemplary column of the framework describe a student's social engagement as one which the student monitors his behavior and others against the classroom rules (Danielson, 2011).

Cognitive engagement is the amount of energy a student devotes to high levels of thinking and complex ideas in order to push beyond compliance (Finn & Zimmer, 2012). Cognitive engagement is less observable than other forms of engagement, which make it harder to measure and to account for during the learning process. Cognitive engagement includes internal factors such as self-regulation, relevance of schoolwork to future work and the value of learning and personal goal setting. While less focus is placed on cognitive research, there is evidence to support the relationship between cognitive engagement, goal setting and students' investment in learning to increase school performance (Willms et al., 2009).

The last type of engagement is affective engagement, which references the learner's level of emotion and feelings in relation to the learner's involvement in the school. This form of engagement provides students with a meaningful reason to participate and persist in school (Finn & Zimmer, 2012). Affective engagement is also considered emotional engagement and contains aspects of student's attachment to peers, teachers, and the school as a whole (Appleton, Christenson, Kim, & Reshly, 2006).

Identification of specific types of engagement support the concepts presented in personalized learning. In this research personalized learning is described as having four pillars: (a) Students create and maintain a learning profile that is used by all stakeholders to identify strengths, weaknesses, preferences, and goals, (b) Students utilize an individual learning plan (ILP) that encourages goal setting, (c) Students should follow a competency-based progression focused on their ability to demonstrate mastery of a topic, and (d) Flexible student learning

environments and structures support their individual interests (Herold, 2016). Cognitive engagement, academic engagement and affective engagement are all clearly indicated in this description. Interestingly cognitive and affective types of engagement prove to be difficult to measure compared to traditional forms used to measure engagement.

Engaged student.

Charlotte Danielson's framework is designed around student engagement in learning as the center piece for teaching where all other components contribute to engagement. Her framework reinforces the importance of engaging students in the learning process (Danielson, 2011). The question becomes who are the engaged students? How did practitioners know when students were engaged in cognitive and affective engagement?

Generally, children who believe in the efficacy of effort and who understand reasons for task involvement and completion are characterized as engaged students (Patrick, Skinner, & Connell, 1993). Some engagement theorists believe students who are enveloped in learning by being "in the zone" are displaying total engagement. This "in the zone" characterization speaks to the increased intrinsic motivation and extreme-level of immersion in an activity that the student forgets needs such as food and lose track of time (Taylor & Parson, 2011).

In the Danielson Framework cognitively engaged students are characterized by how they respond to activities and assignments, work within their student groups, utilize materials and resources, and learn within the structure and pace of the class. Students who are engaged in learning are characterized by what they are doing as a result of the teacher's lesson. High-forms of intellectual engagement are seen by such activities as debate, discussion, and answering open-ended questions. Students who are exhibiting cognitive engagement are also reflecting on their

learning, initiating inquiry relative to the content, choosing how they complete tasks, and supporting, as a resource, other learners (Danielson, 2011).

The Danielson Framework breaks down characteristics of cognitively engaged students to a foundational level. The educator needs to have knowledge of their student in order to prescribe the correct lesson plan that maximizes student engagement. An engaged student in the modern classroom needs social engagement, an aspect of intellectual engagement, because students are extremely social and interactive learners (Taylor & Parson, 2011). Digital-age learners desire more variety in task completion, communication and reporting. Many of these students became easily bored with traditional forms of instruction (Oblinger & Hagner, 2005). In addition, these students self-reported preference for immediacy. This form of conditioning made them less capable of deferred gratification (Barnes et al., 2007).

As described by the Danielson Framework, there are structures and routines that teachers use to create opportunities for students to engage in learning. But why did students choose to engage? Students can be exposed to external factors that motivate them to engage in a task. Such external factors can include rewards, threats, bribes, and punishments. Students also can exhibit internal motivations which contribute to their engagement. Such internal factors student can experience include tasks focused on processes and not outcomes, and perceive control and autonomy. All of these indicators can increase engagement. Student engagement does not always stay in these neat categories. Some external factors that cause students to engage transform into internal factors after the student internalize the task into their personal value system. The task then becomes internal because it is personally important to them.

Student emotion is also key to understanding why students engage in learning. Patrick et al., (1993), suggested four specific emotions critical to engagement during the learning process.

Those four emotions were (a) positive emotions, (b) boredom, (c) distress, and (d) anger. The importance of these emotions with regard to behavior suggests a positive correlation exists and the need for educators to understand the correlation. When students felt anxious or sad, students sometimes withdraw from the situation. When students feel interested in a task or activity, students tend to work harder.

A student with the ability to perceive control and autonomy also has the ability to persevere in difficult times, focus attention on tasks, remain optimistic and follow through with learning activities. For students who lack these specific abilities, tasks tend to be associated with fear, tension, and pressure. These negative emotions lead to defensive strategies and steps to avoid the activity all together. Students with these negative emotions also exhibit feelings associated with lack of control.

Control, choice as it is mentioned in the Danielson Framework, is important for engagement (Danielson, 2011). A student who is in control internalizes the task and finds meaning for task completion. A student who lacks this skill and who exhibits feelings such as worry or anger tends to also feel that control is based on luck. These students struggle to make the connection between strategies to produce success because they view life through luck and see themselves as hopelessly unlucky. A student who never self-reflects deeper than surface level luck never internalizes what factors lead to successful engagement in a task. These students lack confidence in their ability to know how to use strategies to become successful and avoid failure in school (Patrick et al., 1993).

Disengaged student.

Boredom, a lack of intrinsic motivation, is an emotion often identified in disengaged students. Students who are bored report more external and fewer intrinsic reasons for

engagement. However, students who report boredom and lack involvement in the task tend to suggest that it is not due to a lack of understanding of the task (Patrick et al., 1993).

In the early 1980s, student engagement, and inversely student disengagement, are suggested as a means to understand and reduce student dropout, boredom, and alienation (Finn & Zimmer, 2012). As a result of this conceptualization of student engagement, the focus on high school completion results in a specific focus on secondary education, where disengagement generally is a concern (Lee & Shute, 2010). A student dropping out of school is identified as an endpoint of the learning process; a process that started for many in elementary grades. It is understood that student engagement in school helps to determine, earlier rather than later, student risk for not completing high school. Early focus on student engagement considers academic engagement factors, such as grades (retention), and social engagement factors such as student behavior (discipline referrals) and attendance. Disengaged students tend to enter school without the skills (social, cognitive) needed to learn basic engagement behaviors. These students, who do not participate in class, do not cognitively engage in learning, and do not feel a sense of belonging to the school, display behavior that is at times inappropriate and counterproductive in the classroom and school (Finn & Zimmer, 2012).

Additionally, a focus on engagement is directed towards academic and social engagement. With personalized learning the current trend has shifted the focus on cognitive and affective engagement, recognizing the multidimensionality of engagement and the need to address all aspects of student engagement to ensure students not only complete high school but achieve academic success in school and in life. Measuring cognitive engagement and affective engagement requires students to self-report due to the internal nature of the action. This makes it

more difficult to measure successful strategies and supports designed to engage students within these frames (Appleton et al., 2006).

The appeal for educators trying to combat dropout risks with engagement strategies is that engagement can easily be manipulated. Behaviors can be shaped. The behaviors needed to engage in school hold no difference in this manner. By acknowledging this factor, it empowers educators to apply strategies and behavior modification techniques to support students who display early signs of risk for dropping out of school. Educational risk factors, referenced in this chapter, are outcomes that appear at one age or grade and impact on future academic achievement and educational attainment (Finn & Zimmer, 2012).

In the modern educational era, there exists a vast array of activities that demand the time and attention of students and promote a student's need for immediacy. Student's absence of patience with a learning task that they do not connect directly to their chosen interest increases the likelihood for the student to become disengaged (Barnes et al., 2007). How an educator provides opportunity for students to have or perceive control and autonomy in the classroom helps to predict the student's feelings, motivation, behavior, and emotion, all of which support student engagement (Patrick et al., 1993). Educators can promote and encourage engagement in their students through one of two ways, engaging pedagogy or engaging curriculum (Taylor & Parson, 2011).

Engagement in the classroom.

Educators who utilize routines and structures to maximize motivational interventions to support students' engagement increases student autonomy in the classroom. Such simple structures as providing opportunities for student success are utilized in this manner. Educators achieve success for all students regardless of the student's level by providing easy entry

questions that pull from prerequisite skills and knowledge or even by simply providing choice in task completion. Additionally, support for autonomy in the classroom includes student choice, respect for the student's agenda, personalized and relevant learning goals, and a lack of coercion from the teacher. When educators can support student autonomy, even the perception of student autonomy, they increase the likelihood the student will exhibit some form of learning engagement (Barnes et al., 2007).

In the Danielson framework a key component of engagement is the respect and rapport the teacher and students create in the classroom (Danielson, 2011). Many students who have grown up in a technology rich society prefer to have independence and autonomy in their learning styles. Educators who recognize this aspect do well to develop and exploit these skills which impact a wide range of educational choice and behavior. This range of choice can be as simple as how a student choses to be assessed, to what kind of education they participate in, and to the place, pace, and path with which they engage in the learning process (Carlson, 2005). Common strategies to improve student engagement fall into six general themes: (a) interaction, (b) exploration, (c) relevancy, (d) multimedia, (e) instruction, and (f) authentic tasks (Taylor & Parson, 2011).

Educators should shift their pedagogical focus to incorporate more autonomy in the learning process. Tools are required to support this shift to move away from a didactic, "sage on the stage" form of teaching to a more communal, constructivist form of learning (Taylor & Parson, 2011). In personalized learning this is a point of emphasis with how the teacher's role is defined. The teacher becomes the facilitator of learning, organizing, supporting and guiding students to increase learner agency (Herold, 2016).

Classrooms with increased use of inquiry-based, problem-based, and exploratory practices report increased student engagement (Willms et al., 2009). When a student is provided the time to explore a concept and establish the relevancy of their learning, they often move beyond and go further into the larger community and fields they study (Taylor & Parson, 2011). These types of classroom practices are thoughtfully designed learning tasks which require and instill deep thinking, inquiry, connection to the world around the student, and an appropriate level of rigor that challenges, yet satisfies, the learner's needs (Gilbert, 2007).

Respect and rapport can go a long way, both virtually and personally, to improve student engagement (Taylor & Parson, 2011). Gilbert, in 2007, noted several characteristics students are seeking in their learning experience relative to relationships and rapport. Students desire strong relationships with their community, peers, and teachers. Students want their teachers to know them as people, know them as learners, and to take into consideration their current understandings and misconceptions and to use that information to guide their learning. Students desire their teachers to support learning environments that develop norms related to interdependent relationships and that promote a culture of learning (Gilbert, 2007). In the Danielson framework a culture of learning is characterized by the importance of content and learning, expectations for learning and achievement, and pride exhibited by students through their work (Danielson, 2011).

By understanding how to engage students in learning, schools can develop plans and directions for supporting students who have risk factors associated with non-completion of their learning process. Adopting a dropout prevention strategy focuses on improving school climate factors with the most influence in supporting high levels of engagement and increasing the opportunity for students to develop a mindset of learning. A supportive and caring relationship

fostered by respect, fairness, trust, and a strong disciplinary climate where teachers have a shared sense of responsibility for ensuring a culture of learning creates a rippling impact on the entire school culture and climate. This success is in large part due to the nature of the students, who expect and respect challenging, rigorous, disciplined, positive, and safe learning environments (Taylor & Parson, 2011).

Engagement and Students At-Risk

School systems and educators historically focused on engagement to help increase student achievement, positive behaviors, and belonging to support students to stay in school (Taylor & Parson, 2011). The levels of student engagement have had a profound effect on student achievement and student persistence (Patrick et al., 1993). Inversely, the consequence when students become disengaged in the learning process result in a dire situation (Gilbert, 2007). Engagement is the corner stone of the learning process and in return becomes the cornerstone for educational reform (Willms et al., 2009).

The connection between engagement, achievement, and learning spans across all levels of socioeconomic advantage and disadvantage. With such a focus on closing the achievement gap across the nation, the essential nature of engagement in the learning process to support all students from all backgrounds and socioeconomic status, makes engagement a major tool for educators to increase achievement. In addition, the relationship engagement has on student's persistence to stay in school makes it an integral component of the learning environment.

The focus on engagement is critical at every level on the P-20 educational spectrum as many non-graduates begin the process of disengagement well before they enter the ninth grade. While the high school graduation rate has not changed over the past 30 years, identifying low engagement prior to high school may provide school systems opportunities to alter high at-risk

student trajectories and increase the likelihood high at-risk students succeed in the learning process. Engagement provides a means for educators to understand and to intervene when early signs of student disengagement with the learning process are recognized (Willms et al., 2009). The three indicators that provide the strongest forms of predictability for whether or not a student will drop out of school are (a) attendance, (b) behavior, and (c) performance in coursework (Appleton et al., 2006).

Engagement is also imperative for schools and educators as they provide psychological support for students, a major aspect of cognitive engagement and the social welfare of students. Practitioners focus on variables related to the development of the whole student in order to provide students the opportunity for optimism and a positive outcome (Willms et al., 2009). The myriad of factors, both individual and contextual, explains the extent to which students are committed to and participate in learning and educational achievement (Dunleavy & Milton, 2009).

Chapter II Summary

This chapter presented, explored, and discussed the literature that served as the basis for this dissertation study. Exploring personalized learning is imperative to provide context for the reoccurring themes within education reform in the United States. It provides perspective to understand the issues that have consistently appeared and the attempts to move beyond those issues within the constructs of the time.

Once the history of personalized learning was established, the literature explored special topics looking at specific personalized learning strategies such as blended learning. A key part of this study, as alluded in other studies, was the identification of definitions for personalized and

blended learning. In addition, the literature provided an opportunity to understand the modern definition and stakeholders involved in the development of the definition.

Personalized learning in its modern form provides many alluring qualities for educators; however, another aspect of this research is to explore potential issues concerning personalized learning, especially the use of big data in education and the lack of regulation and oversight for many vendors in the educational technology sector. Besides big data, out-of-date policies and unforeseen pitfalls of the current and future models have been discussed.

A key component of personalized learning is student engagement. Thus, it is imperative for the literature to define and describe engagement in the school setting. Through the literature review of various studies relating to student engagement, this research identified types, characteristics, and modalities of engagement. The implication for the literature review serves as a precursor to the research for this dissertation study and provides a foundation to develop meaningful insights and context as the study unfolds.

Chapter III: Methodology

The purpose of this chapter is to introduce the research method for this observational study regarding blended learning as an engagement strategy for high at-risk students. This approach allowed for a deeper understanding of the implication a student's learning environment has on student engagement. The purpose of the study, research design, data collection, variables, population, and ethical concerns are major components of this chapter.

Purpose of the Study

According to the Foundation for Excellence in Education (2015), the shift to blended learning made students, teachers, and schools more productive academically and financially (Bailey et al., 2015). This series suggests that there were 10 drivers to blended learning. One of those drivers, improved student engagement and motivation, is the keystone for the design of this study (Bailey et al., 2015; Jee & O'Connor, 2014).

The purpose of this study was to investigate the impact of blended learning on student engagement levels. Engagement, for the purpose of this study, was defined as the level at which students attended to, invested in, and expounded upon the work required to contribute interpersonally and collaboratively to the learning environment (Marks, 2000). In addition, this study looked specifically at academic engagement, which was the exhibited behavior of students during learning such as following directions, completing classwork/homework, and attentiveness in class. An unengaged student exhibited behaviors such as sleeping, playing games, socializing about non-academic topics, or completing non-academic tasks. Moreover, this study sought to accomplish three goals: (a) provide evidence that students demonstrate increased engagement in blended learning classrooms compared to traditional classrooms, (b) provide evidence that

student engagement was not dependent on a student's level of risk, and (c) provide evidence that blended learning impacts engagement, regardless of a student's risk factor.

Table 3.1

Description of Participants

Risk-level Classification					
Low			High		
	n	%		*n*	%
Gender			Gender		
Male	18	51	Male	21	64
Female	17	49	Female	12	36
Learning Environment			Learning Environment		
Traditional	18	51	Traditional	14	42
Blended	17	49	Blended	19	58
Subject Area			Subject Area		
English Class	20	57	English Class	15	45
Math Class	15	43	Math Class	18	55
Grade Level			Grade Level		
10th	8	22	10th	12	36
11th	10	29	11th	12	36
12th	17	49	12th	9	28

Research Design

The researcher selected a quantitative observational research model appropriate for a small dataset. The observation data consisted of 68 student observations. There were two independent variables, learning environment and student at-risk level and one dependent variable, student engagement. This study used a classroom observation tool to collect student engagement data for students of different risk levels in different learning environment. Classroom observations have been used in school districts across the United States to conduct evaluations of teaching and learning. For example, the Measure of Effective Teaching (MET) study (2013) identified classroom observation as one of three tools used to measure teaching and learning effectiveness (Rothstein & Mathis, 2017). The observation tool in this study was used to measure student engagement. This component of student learning has been positively associated with academic success and habits that support a student later in life (Wang & Holcombe, 2010). Table 3.1 describes the sample that was observed.

Data Collection

For this study, the researcher used an observation protocol to measure high school student engagement in both the traditional and blended learning environments. The protocol was devised to measure observable academic engagement for three students at a time over a 15 minute observation. Each student was observed for intervals of two seconds spanning a 50 second period. The observations were rotational, so student A was observed for two seconds followed by a six second period for the observer to track the score and identify the next student. Student B was then observed for two seconds, followed again by six seconds of score recording and transition to student C who also was observed for two seconds followed by the six second period. Student observations continued in this fashion for the entire 15 minutes, allowing the

observer to tabulate 30 engagement points per student. When a student was identified as engaged, a check mark was denoted. When a student was identified as unengaged, a dash was denoted.

Table 3.2
Classroom Observation Frequencies

	Learning Environment	
Characteristic	Blended Learning	Traditional Learning
Course		
Math	5	6
English	9	5
Block		
8:00 am-9:25 am	2	1
10:10 am-11:30 am	1	8
11:35 am-1:35 pm	7	2
1:40 pm- 3:05 pm	2	2
Lesson Stage	All Learning Environment	
Beginning		9
Middle		8
End		8

The data collectors followed the same exact protocol for every observation. If a class had only one or two identified students from the study sample present in class to observe, a third student was selected to ensure timing was accurate. Students were not informed during the process that they were being observed. Teachers were only made aware of the observation when the observer walked into the classroom. This was done to minimize the impact of the observer

on the learning environment. The observer did not interact with students or teachers during the observation period. Behaviors and actions of students and teachers were not directly impacted by the observer. Table 3.2 describes the various observation sessions used in this study.

If a student was on task as demonstrated by participating in the lesson or being attentive to the classroom discussion, the observer recorded a check mark. Appendix B displays the collection table used to record student engagement scores.

Three observers were selected to gather data for this study. All three observers had previously completed evaluation training per the district certified evaluation plan. This training consisted of six hours of professional learning specific to teacher evaluation that included sample classroom videos with mandatory scoring. The observers' scores were compared to those of highly trained experts from across the United States who reviewed and scored the same video lesson (Teachscape, 2014). All observers involved in this study received a passing score on the evaluation training. In addition, all observers commonly observed in the school prior to this study.

The observation protocol was distributed and collected by the researcher. The researcher assigned the students to the individual observers and the timing of the observation was determined by the class period. Student assignment was based on the class period of the observation and the student's attendance. The school involved in the research had 85-minute class blocks on an alternating day schedule.

Data was entered into a spreadsheet as soon as the observer returned the protocol to the researcher. The spreadsheet used a coding system to identify the students, and the following information was collected: (a) grade, (b) course, (c) course type, (d) engagement score, (e) GRAD score, (f) component scores, (g) date of collection, (h) gender, (i) teacher, (j) program

enrollment, and (k) course period. The collection period spanned about three months and involved eight teachers. Observations occurred in all four periods of the school's scheduled day.

The timing of the observations was controlled. Observations did not occur during major testing, when a substitute teacher was present, or right before major holiday breaks in the school calendar. Observations were made at different intervals of the class period, during the first 30 minutes, middle 30 minutes, or the last 30 minutes. All observed classes followed the same class timing structure.

Teachers were either English teachers or math teachers, and the classrooms that were observed were English II, English III, English IV, advanced placement language, algebra II, geometry, or college and career readiness math. These courses were selected because both blended and traditional versions of the course were offered or because students in both high at-risk and low at-risk categories populated the rosters. All teachers in this study were tenured teachers, meaning they had at least five years of experience in teaching.

Variables

In this study the researcher looked at two independent variables; Graduation Related Analytic Data (GRAD) score and learning environment. The learning environment was the type of class the student was enrolled in: blended learning or traditional. The dependent variable researched in this study was engagement.

Dependent variable: Engagement. Student engagement was identified as the dependent variable for this study. An observation protocol was used to identify student engagement in both blended learning and traditional learning environments. Student engagement scores could range from 0 to 30; the higher the number the more observed engagement moments the student exhibited.

Independent variable: Learning environment. Blended learning and traditional learning environments represented the two types of learning environments in this study. Blended Learning environments were generally identified by students working individually at their own pace through online curriculum while the teacher facilitated student learning through one-on-one and small group learning sessions. Traditional learning environments were generally identified by the teacher's guidance of students through a series of content activities. As the teacher led the activities and controlled the pace of the class, all students progressed through the material at the same time.

Independent variable: GRAD score. A GRAD score was a summation of a student record with a single numerical score representing the likelihood of that student completing high school. A student with a low score was one which exhibited risk factors associated with peers who had failed to successfully promote to the next grade level. Likewise, a student with a high score was one which exhibited few factors associated with peers who failed to successfully promote grade levels. This score was known as a Graduation Related Analytic Data (GRAD) score (Campus Portal, 2019).

Students in this study were selected based upon an at-risk GRAD score in the Early Warning Tool provided by the Commonwealth of Kentucky's student information system (SIS). The Early Warning Tool provided a GRAD score for schools and districts to support dropout interventions for students who accrue multiple risk factors. These risk factors mirror those from prior students who have and have not successfully graduated in the past. In the Commonwealth of Kentucky, schools could utilize this report for students in secondary grades. This tool was designed to be used by key stakeholders to identify appropriate interventions in a proactive manner to combat dropout risks.

The Early Warning Tool used dynamic data, data that changed as often as the student record changed, to assign a risk score based on the following risk factors: (a) enrollment, (b) school, (c) identity, (d) attendance, (e) behavior, (f) course performance, (g) household demographics, (h) student engagement, (i) guardian involvement, and (j) standardized tests. Each student was assigned a single number, ranging from 50-150, indicating the likelihood a student may not be promoted based upon the same measures of other students in the SIS. The GRAD score compiled predictive factors to determine if the student would leave school early before graduating. Risk factors could impact individual student scores differently depending upon other risk factors a student may have already had on his record (Kentucky Department of Education, 2020).

For the purpose of this study, a student score of an 88 and below was considered to have high at-risk factors for not promoting. A student with a score of 108 or higher was considered very low at-risk for promoting to the next grade level (KDE, 2019).

The Early Warning Tool utilized the GRAD score in addition to categorical scores in attendance, behavior, curriculum, and stability. Categorical scores were designed to help schools provide the correct interventions for students with high at-risk scores (low score) in a specific category. For instance, a student with a GRAD score of 58 might have a low score in both attendance and curriculum. This information would allow schools to identify specific interventions focused on both those categories to support the student accordingly. Research from the Consortium on Chicago School Research, the Center for Social Organization of Schools at Johns Hopkins University, and the Philadelphia Education Fund identified three key factors that were good predictors of student outcomes. Those factors were (a) attendance, (b) behavior, and (c) course performance (Bruce, Bridgeland, Fox, & Balfanz, 2011).

Validity of early warning tool. This study identified the student population based upon a GRAD score obtained from the school student information system (SIS). The schools SIS automatically analyzed large amounts of historic student data on students who had dropped out or who had completed school. This system learned which data and combination thereof resulted in student dropout. A summary of student educational records from multiple schools, districts and states were compiled from the past and current students. The SIS frequently updated the student information and assigned a student a risk score as soon as enough data was entered into the system. The SIS database was informed by data from districts across the Commonwealth of Kentucky as well as other states which utilized the same SIS (KDE, 2020). The Early Warning GRAD score was based on the individual student's record and past students with similar scores who dropped out or completed school.

The Early Warning Tool used a national prediction model which included outcomes based on student data across all the SIS customers, which improved the quality of the GRAD score and the category scores. This tool used algorithms to analyze anonymous data which was applied to the individual district data and then to individual students (KDE, 2020).

Population

This study took place in a rural, western Kentucky high school with a student enrollment of about 1,200 students. The school in this study was in its second year of a district initiative to provide a Chromebook to every student in grades five through twelve. Every student in the school was issued a Chromebook and could take the Chromebook home with them.

Students in this study were selected based on results of each student's at-risk GRAD score in the Early Warning Tool provided by the Commonwealth of Kentucky SIS. The sample size was first determined by involvement in the LEAD program. Additional students were then

selected whose GRAD score and course type fit either of the four domains: high-risk/blended learning, low-risk/blended learning, high-risk/traditional, low-risk/traditional. When possible, students were selected randomly for domains which had multiple students to select from such as the domain low at-risk/traditional. Random selection was completed by using a random number generator to identify the student from class rosters. This study consisted of 68 individuals.

The researcher identified the mean GRAD score for the population and then selected students who were above and below the 95% confidence interval. Student scores which fell below the confidence interval were labeled as low at-risk. Student scores which fell above the confidence interval were labeled as high at-risk. The range for low at-risk students was a score 50-88. The range for high at-risk students was a score 108-150.

LEAD program. LEAD used a small learning community, maintaining a total enrollment of 100 students every year, to create a personalized learning environment for high at-risk students. LEAD used a report from the Commonwealth of Kentucky's student information system known as the Early Warning report in order to identify students who may be at-risk of not graduating from high school or promoting to the next grade level. This tool in addition to teacher and parent recommendation helped to identify future LEAD students. Administrators, from both LEAD and the district's middle school narrowed down students who were at-risk by using the GRAD score and recommendations of teachers, administrators, and family members. The program tried to maintain no more than 25 students per grade level. The district had dedicated a principal and two teachers, and the program shared the high school guidance counselors to support the small learning community.

LEAD was physically housed in the district's main high school and provided students the opportunity to take advantage of the small learning environment in addition to traditional

learning environments offered by the district's high school. Students in LEAD operated under the district's high school policies and the building principal; however, these students were provided an additional principal that worked closely with the LEAD students and families in order to build relationships and the sense of belonging.

In 2018, the district noticed several factors that caused the administration both at the district and school level to refocus the LEAD program. The district had been tracking home school enrollment (Figure 1A) and noticed an upward trend in the homeschool population. In addition, only about 19% of students identified on the Persistence to Graduate report were being serviced in LEAD. The Persistence to Graduate report was another Early Warning Tool designed to identify students at-risk from not graduating. This tool used indicators and rules to calculate a risk value for individual students. Table 2A identified the point values for each associated risk factor collected to calculate the score. A school level concern was the use of LEAD specific administrators being used for other school level tasks which resulted in less time to develop relationships with LEAD students.

In the spring of 2019, a team consisting of: (a) LEAD principal, (b) LEAD teachers, (c) a guidance counselor, and (d) a district instructional supervisor visited two schools which utilized a blended learning approach to provide a more personalized education for students. The LEAD team then developed a plan to incorporate a more personalized approach to learning for the students in the program. The results of the plan included the redesign of two courses, LEAD math and LEAD English, and allowed students to utilize on-line curriculum to work at his or her own pace while receiving support and small group instruction from a certified math or English teacher.

LEAD support was organized in a tiered system. Students who were enrolled in LEAD had a specialized learning plan identified with input from the LEAD principal, guidance counselor, teacher, students, and parents. Students selected from traditional course options, online course options, and blended learning environments in math and English courses. Students had tiered support throughout the school year. These students had two dedicated teachers who serviced LEAD specific courses for all grade levels. LEAD teachers, guidance counselors, and support staff also provide bi-weekly progress checks with students. Progress checks were designed to provide a regularly scheduled time for students to develop long and short-term goals with the assistance of an adult.

LEAD students were provided their own Chromebook as part of the district's technology integration initiative. The one-to-one device program had provided LEAD the opportunity to integrate different learning environments at a larger scale, such as blended learning. The district had also purchased a learning management system (LMS), Schoology, designed for teachers as a platform to house course work, assignments, notes, lectures, and provide a safe environment for online discussion and collaboration. Additionally, the district supplied LEAD an online curriculum, which offered all core courses as well as several elective credits.

In addition to the bi-weekly progress checks, LEAD students also were exposed to monthly guidance counselor lessons. While these lessons varied in topics, generally the sessions were designed to address social and emotional learning. These quick 20 to 25 minute lessons were usually done at the beginning or end of a LEAD specific class. Other supports were available to LEAD students such as the LEAD mentor program and Jobs for Kentucky Graduates (JKG). The LEAD mentor program was organized by the high school's Family Resource Youth

Service Center (FRYSC), which aimed to provide an adult mentor to each student in the LEAD program. These mentors met periodically throughout the school year to develop positive adult relationships through various social engagements. Jobs for Kentucky Graduates (JKG) program was also offered for high at-risk student in the high school. This program, while not specific to LEAD students, did support high at-risk students as they prepared for employment post-graduation.

Procedures for Data Analysis

The researcher used a two-way ANOVA to identify possible interaction effects between student engagement and the independent variables; learning environment and student at-risk level. The researcher preformed an analysis of the descriptive statistics to determine if all six assumptions were met as required by the two-way ANOVA. The first three assumptions were meet as described by the study design. The remaining three assumptions required the researcher to analyze the descriptive statistics of the data-set.

The researcher set-up the two-way ANOVA by indicating all low at-risk students as a one and all high at-risk students as a two. The same set-up was used for learning environments, blended learning was a one and traditional learning was a two. The researcher used the raw engagement score as the continuous dependent variable. Table 3.3 summarizes the 2X2 design.

A residual analysis was performed to test for the assumptions of the two-way ANOVA. Outliers were assessed by inspection of a boxplot, normality was assessed using Shapiro-Wilks's normality test for each cell of the design as well as graphical analysis, and homogeneity of variance was assessed by Levene's test. The interaction effect between learning environment and at-risk level on student engagement was also analyzed to determine statistical significance, $p<.05$. The unweighted marginal means of student engagement scores for blended learning high

at-risk, blended learning low at-risk, traditional high at-risk, traditional low at-risk were considered. Main effects and interaction effects were used to test the study's hypothesis. All effects were considered at the p>.05 level (Yockey, 2008).

Table 3.3
2x2 Matrix Design

	Learning Environment	
At-Risk Level	Traditional *n*=32	Blended Learning *n*=36
Low *n*=35	18	17
High *n*=33	14	19

Confidentiality and Anonymity

In order to maintain confidentiality, all data collected was stored in a secure double-locked office at the school district office on a computer, which was password protected. To ensure anonymity, only administrators who had previously conducted observations and evaluations in the school building were used to collect data for this study.

Chapter IV: Results

This chapter presents the results of the study for each of the research questions and hypotheses. This study sought to answer the overarching question of whether blended learning was a suitable engagement strategy for at-risk student populations. This study investigated the relationship between the learning environment (blended or traditional) and student engagement as well as at-risk levels of students and student engagement. The interaction between student at-risk level and learning environment was also considered.

To determine the learning environment effect on student engagement dependent upon the student at-risk level, a two-way between subjects ANOVA was performed. Engagement was the dependent variable and student at-risk level (high at-risk, low at-risk) and learning environment (blended, traditional) were the independent variables. The researcher was interested in finding the main effect of student at-risk level, the main effect of learning environment, and the interaction between student at-risk level and the learning environment.

Assumptions

Assumptions related to normality and homogeneity of variance were tested. The Shapiro-Wilks test was used to test normality and the Levene's Test of Equality of Error Variances was used to verify homogeneity of variance. Table 4.1 and 4.2 report the findings of these tests.

The Shapiro-Wilks test indicated that normality assumptions were violated. A cross validation process was used to assess the impact of outliers on the ANOVA. Outliers were identified as engagement scores 1.5 times the interquartile range from the mean. These were removed from the analysis and the ANOVA was ran with and without the outliers with the same result. Because of the robust nature of the ANOVA and nature of the results, it was determined

to carry on with the analysis (Lund & Lund, 2018). As a result of this finding the outliers remained in the data set.

Table 4.1
Tests of Normality

		Shapiro-Wilk		
GRAD Score	Learning Environment	Statistic	df	Sig.
High At-Risk	Blended	.92	19	.10
	Traditional	.82	14	.01
Low At-Risk	Blended	.86	17	.01
	Traditional	.84	18	.01

Note. *This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Levene's Test of Equality of Error Variances was used to verify homogeneity of variance. The results were reported in Table 4.2. Levene's test was not significant (F=1.62, p=.19) so there was no adjustment made to the ANOVA.

Table 4.2

Levene's Test of Equality of Error Variances

Engagement Score	Levene's Statistic	df1	df2	Sig.
Based on Mean	1.62	3	64	.19

Statistical Analysis

A two-way analysis of variance was used with learning environment by student at-risk level for student engagement. Results are summarized in Table 4.3

Main effects. The level of student engagement was considered based on different learning environments and different student at-risk levels. Neither learning environment, ($F(1,64)$=.60, p=.44), nor student risk level, ($F(1,64)$=3.10, p=.08) was found to have a statistically significant impact on student engagement when considered independently.

Interaction. The interaction between learning environment and student at-risk level was considered. The analysis did not detect a statistically significant interaction between student at-risk level and learning environment for student engagement score (*F(1,64)=.05, p=.82*) (see Table 4.3). While the results ended in a non-statistically significant interaction effect, it does not mean that interaction effects between variables did not exist. Figure 4.1 illustrates how the trend lines towards the groups were not parallel but could eventually intersect.

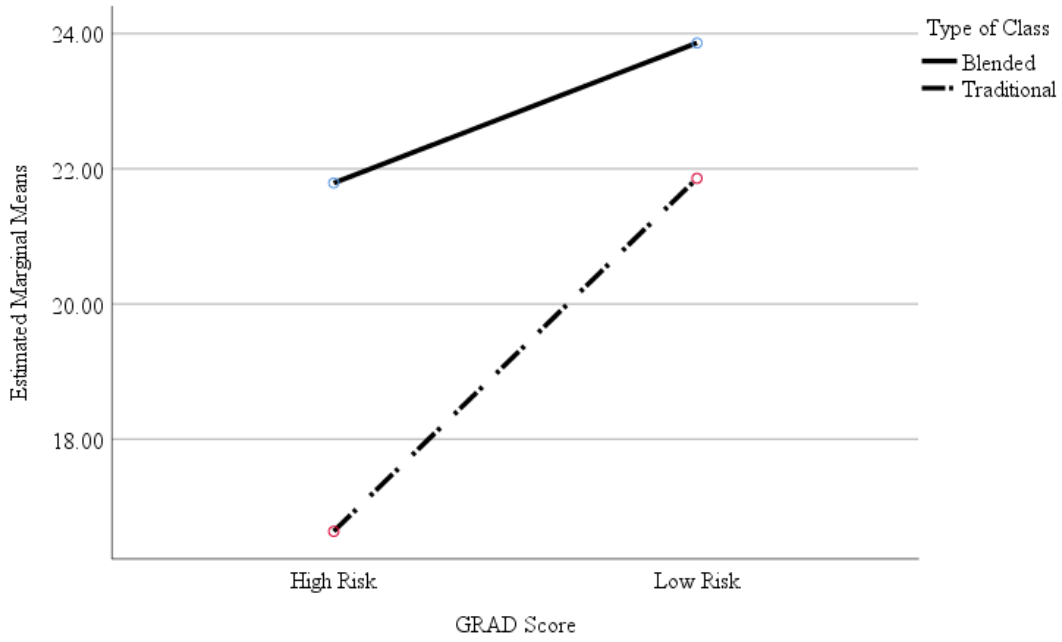
Table 4.3
Between-Subject Effects

Source	Type III Sum of Squares	df	F	Sig.	Partial Eta Squared
Learning Environment	32.60	1	.60	.44	.01
Student Risk Level	168.47	1	3.10	.08	.05
Learning Environment * Student Risk Level	2.83	1	.05	.82	.00
Error	3477.80	64			
Total	35792.00	68			
Corrected Total	3667.24	67			

Note. a. R Squared = .052 (Adjusted R Squared = .007)

The analysis of the descriptive statistics found in Table 4.4 and illustrated in Figure 4.1 suggested that the mean engagement score was slightly higher for blended learning environments compared to that of traditional learning. High at-risk students mean engagement score were lower than their low at-risk peers in both traditional learning and blended learning environments. Figure 4.1 shows the relationship of mean engagement score for each at-risk level in both learning environments.

Figure 4.1 Estimated Marginal Means of Engagement Score



Summary. A two-way ANOVA between learning environment and student at-risk level (independent variables) were measured by the dependent variable, student engagement. A test for interaction between the two independent variables and student engagement suggested no significant differences found between groups and no interaction. The Shapiro-Wilks test indicated normality assumptions were violated. The Levene's Test of Equality of Error Variances suggested homogeneity of variance was not significant. Outliers were identified but due to the robust nature of the ANOVA remained in the data-set.

Table 4.4

Descriptive Statistics

Learning Environment	Risk Level	Mean	Std. Deviation	N
Blended	High At-Risk	20.95	7.31	19
	Low At-Risk	23.71	6.54	17
	Total	22.25	7.00	36
Traditional	High At-Risk	19.14	8.91	14
	Low At-Risk	22.72	6.87	18
	Total	21.16	7.90	32
Total	1.00	20.18	7.94	33
	2.00	23.20	6.63	35
	Total	21.74	7.40	68

Research Question One

Was there a difference in student engagement between blended learning environments and traditional learning environments? This question sought to determine if student engagement increased or decreased depending upon the methodology used to deliver the learning. Students were selected for this study based upon his/her enrollment in a traditional or blended learning English or math class. The student sample was carefully selected to ensure both high at-risk and low at-risk students would be observed. A behavioral observation protocol was used to measure the level of academic engagement of each student. Each student had 30 data points collected. Both Table 4.4 and Figure 4.1 indicate that there was a difference between the blended learning environment and the traditional learning environment. However, the measure of difference,

($F(1,64)$=.60, p=.44) for student engagement scores in blended learning and traditional learning environments was not significant. This result did not reject the null hypothesis, there will be no significant difference between the level of student engagement in traditional learning environments compared to blended learning environments.

Research Question Two

Was there a difference between the student engagement levels of low at-risk students and high at-risk students? This question sought to determine if student engagement increased or decreased based on the GRAD score of the student. The student engagement scores of students with high GRAD scores were compared to the engagement scores of students with low GRAD scores. Students with low GRAD scores were considered to be high at-risk for not graduating from high school. A behavioral observation protocol was used to measure the academic engagement of each student.

Both Table 4.4 and Figure 4.1 show there was a difference in student engagement for students who were low at-risk versus those who were high at-risk. However, the measure of difference between high at-risk and low at-risk student levels ($F(1,64)$=3.10, p=.08) was not significant. This result did not reject the null hypothesis, there will be no significant difference between the student engagement levels of low at-risk students compared to high at-risk students.

Research Question Three

Was the impact of the learning environment on student engagement the same for all students regardless of student's at-risk classification? This question sought to determine the interaction of student at-risk level and learning environment for student academic engagement. There was no significant interaction of the student learning environment and the student at-risk level, ($F(1,64)$= .05, p =.82). The result did not reject the null hypothesis, there was no

significant interaction between learning environment and a student risk level when considering student engagement score.

Design Limitation

The limitations of this study included the student and teacher behaviors, the subject matters taught, and the potential for observation bias. To minimize the teacher variability due to experience, the study was designed to ensure observations occurred in blended learning and traditional learning environments taught by tenured teachers. In order to minimize course discrepancies, students were only selected from math and English courses. Student variability was harder to control due to factors such as attendance and behavior characteristics often related to high at-risk populations. The observer was also a variable that had to be considered. While the observers had been trained on the engagement tool, observational bias still had to be taken into consideration. To minimize this impact, a limited number of observers (three) were used and all observers had previously conducted observations for the school in the study. Finally, the time at which the observation occurred had to be considered. The study was conducted in such a way that observations were made at the beginning, middle, and end of the lesson. Classes at the school in the study lasted a total of 85 minutes.

Chapter V: Conclusion and Discussion

Conclusion

The purpose of this research study was to investigate engagement levels of high at-risk students in blended learning environments. Engagement, for the purpose of this study, was defined as the level a student spends attending to, investing in, and expounding upon the work required to contribute to the learning environment (Marks, 2000). The results of this study were intended to support districts and secondary schools in their search for a strategy for at-risk populations.

Engagement was the dependent variable because of its strong and necessary relationship to learning. In general, there had been a positive correlation between behavioral engagement and academic achievement, findings were noted by several studies (Connell, Spencer & Abers, 1994; Marks, 2000). Such linkage to achievement had rendered engagement a key component to increased learning outcomes for students making it a hallmark for many education reform efforts (Marks, 2000; TNTP, 2018).

Engagement was a multifaceted construct encompassing academic, social, cognitive, and affective engagement which impacts the degree of learning undertaken by the student (Finn & Zimmer, 2012). Engagement is a strong link to academic outcomes. For at-risk students, studies indicated that engagement was considerably lower than that of their peers, if not absent altogether.

The researcher found blended learning to be a suitable strategy to engage students in learning. Students who participated in blended learning displayed a higher observed engagement mean score than students in a traditional learning environment. This was found to be true for both high at-risk and low at-risk populations. The researcher would recommend schools or

districts to consider blended learning for student populations that require flexibility in learning due to pace, place, or path.

The major finding, while not statistically significant, does provide instructional leaders with confidence to pursue blended learning options in schools. The research supports blended learning as an equivalent learning environment when compared to a traditional learning environment. It should also provide leaders with an additional option to differentiate learning for students. At a time in history when change is constant, blended learning provided schools and districts an equitable and flexible method to deliver learning.

Study Limitation

Research involving engagement, while valuable, is limited especially when the study isolates the measure of engagement to a single component, such as this study has done. Even though research suggests that types of engagement overlap, the isolation of components could limit the full picture of student learning. Academic engagement without social, cognitive, and affective engagement could result in student passive learning, which was not an outcome that leads to student achievement. (Fredricks, Blumenfeld, & Paris, 2004).

In this study, a behavioral observation protocol measured the dependent variable, which was engagement. While behavior observations were common in the educational field and provide insight into a student's engagement with the learning environment, there were some limitations recognized with such a tool.

The first limitation with this tool was that of the observers themselves. The introduction of a person into a classroom who is not a regular fixture in that environment can impose unintended outcomes, some which could directly impact student engagement with learning. In an attempt to limit this variable, the study limited the number of observers to three individuals,

all who conducted routine observations in the school on a regular basis. One additional issue with observational measures was the potential bias that an observer may exhibit. Personal preference about learning, preconceived notions about student attitudes and/or behaviors, and other value judgements that influence how the observer collects evidence could be considered observational bias (Teachscape, 2019). Peterson, Swing, Stark and Waas (1982) conducted a study which drew attention to the notion that student appearance of off-task behavior during class was not highly associated with student achievement. The study's findings suggest that an observer may mismark a student as off-task when in fact they had been engaged in a deep cognitive state.

The observers in this study all had been certified through Teachscape modules to minimize bias during observations. Teachscape was a software program designed to support and train school administrators to conduct instructional observations. Teachscape was rooted in the Danielson Framework for Teaching. Per the policy of the district in which the school in this study resided, all evaluators were required to participate in annual certified evaluation training. Observations were limited to three individuals who completed observations in the school prior to the start of the study. In addition to the mere presence of the observer, the time selected to observe the students could impact the results of the observation.

The study was designed to observe students in a particular course, which limited when during the school day the observations could take place. The study was also designed so that observations were collected at various times during the class. Observations were completed for individual students at either the beginning, the middle, or the end of the class. However, observations were conducted so that all parts of the class period were accounted for in the observation results. This particular school's schedule was a modified block. Classes lasted 85

minutes, making the distinction of beginning, middle, and end of class a little less than 30 minute increments. The observations occurred during the months of November, December, and January. No observations were conducted on days that were aligned to a long break nor during school events such as mid-term testing, state testing or holiday parties which might impact engagement results.

An additional limitation of this study related to sample size of the students in the study. Due to the nature of the high at-risk population, ensuring a large enough sample size for analysis was a challenge. In particular, the subdomain high at-risk in a traditional learning environment proved difficult because many high at-risk students had already been pulled out of traditional courses and placed in alternative learning environments such as blended learning or on-line learning. In addition to the type of learning environment selected for the student, poor attendance by students, especially those who were high at-risk, proved challenging. Several students who were slated to be a part of the initial study dropped out of school, transitioned into an alternative school, or were removed for long-term placements in behavioral facilities such as Juvenile Justice or other facilities during the period of this study.

Pedagogical Limitation

While the study had limitations, so did the implementation of blended learning in the school. Teachers implementing a blended learning environment in their classroom had limited exposure to online instructional design. Both math and English blended learning teachers had been able to visit districts in Kentucky and Georgia to observe blended learning classrooms and speak with blended learning teachers. However, neither teacher participated in any ongoing personalized learning training.

As schools use technology to support more personalized learning approaches and non-traditional instruction needs increase, so does the need for training educators in methodologies to support student learning in these environments. As with anything, teachers trying new approaches through trial and error will become the basis for development of methodology which can then be integrated into professional development and possibly teacher preparation programs.

Practical Implication

This study cannot conclusively show that blended learning environments provide stronger engagement for at-risk students. However, this study did show support for blended learning environments to be used as a strategy in schools as it does provide a similar opportunity for student engagement as compared to a traditional learning environment. For a school or district eager to provide support for some of their most high at-risk students, blended learning is an option.

Blended learning environments provide students an opportunity to learn at their own pace, path, and place. For students who were high at-risk, and for students in this study, having a means to access and continue learning from outside the classroom is essential. In this study, several students were hard to track down because they were absent from the classroom setting. For those students sitting in an alternative setting but enrolled in a blended learning class, their learning continuum was never interrupted. Those students could continue to work through their instructional units and achieve learning targets.

One teacher in a blended learning environment noted that she saw an increase in the amount of work students were able to do when they were placed in alternative settings. The continuation of learning for students who might benefit from flexibility was a worthy note for schools and districts to consider when identifying strategies to meet their most high at-risk

students. The same teacher referenced the peculiarity of students who missed class due to absenteeism. She noted students who had missed would come back to class unfamiliar with where to start. This was in contrast to what she had anticipated, noting that students had to be reminded of what they were doing. However, she did acknowledge that those students with chronic absences were not missing out on content because they were picking up where they left off and not having to delve into content based on the entire class progression.

In addition to the potential benefit of personalized learning environments, such as blended learning for high at-risk students, it showed that all students could potentially benefit from alternate approaches to learning in the future. Students who sought opportunities beyond a traditional school day or who had become disenfranchised with the current educational system could look to blended learning opportunities to provide differentiation in their learning environment.

P-20 Implications

As the need grows for personalized learning and as consumers begin to demand more freedom and flexibility with their learning, P-20 leaders must equip themselves with research to make the appropriate decisions regarding personalized learning. This study, along with future studies, can support P-20 leaders in uncovering the appropriate learning path for students in their institution. P-20 leaders should take into consideration the fluidity of personalized learning as students move along the learning continuum. Leadership should leverage personalized learning to maximize output but should also proceed with caution as new technologies produce new issues.

Future Implications

Given the context of the pandemic which occurred during the writing of this dissertation, it must be mentioned the implication for future use of personalized, blended learning environments. Schools, districts, and states turned to various personalized learning models to deliver remote learning during the 2019 novel coronavirus outbreak. The historic event had further propelled the use of blended learning methods into the educational spotlight. It was important to note that remote learning was not synonymous with personalized learning. The sudden shift in learning environments at the time of this dissertation was too early to understand the full impact the pandemic had on student learning and the design of future learning.

Future Studies

Based on the findings of this study, it would be possible to suggest some directions for future research in the area of personalized learning, specifically blended learning. First, research is needed to focus on blended learning for high at-risk student populations who exhibit specific combinations of categorical high at-risk factors. Research is needed to identify if specific student categorical risks or combination thereof improve through the use of blended learning. Such research could help the use of the Early Warning Tool's categorical data to identify specific intervention strategies suited for individual student. Targeting various combinations of categorical risk could help schools more efficiently provide students with the proper intervention strategy.

In addition, a future study related to the effects of blended learning and the age of a student on engagement would have many practical applications. Identifying the point during a student's learning continuum that blended learning provided the largest gain in student

engagement could help district and schools appropriately apply blended learning methodologies. This would prove extremely beneficial for schools looking to implement personalized learning.

Another area for future research would include a focus on the educator. A study to identify specific educator attributes with positive correlations to student achievement in blended learning environments. Furthermore, identifying the professional trainings, certifications, credentialing, and personal inclinations that lead to high levels of engagement in specific blended learning courses would provide support to the field. This work should be done to support both current educators and those preparing to become educators.

Final Remarks

The purpose of this study was to investigate engagement levels of high at-risk students in blended learning environments. More specifically, this study sought to accomplish three goals: (a) provide evidence that students demonstrate increased engagement in blended learning classrooms compared to traditional classrooms, (b) provide evidence that student engagement is not dependent on a student's level of risk, and (c) provide evidence that blended learning impacts engagement, regardless of a student's risk factor. Prior to conducting this study, the researcher had worked with faculty for several years to identify methods to increase academic success of high at-risk students. Fortunately, the researcher and faculty were part of a forward-thinking and innovative district that supported inquiry into different methodologies.

The school in this study continues to refine course offerings to provide more opportunities, not just through content, but also through delivery of learning. This district, along with other districts, need to be supported with research and training that mirror the practicality of a technology enhanced personalized learning approach. In the midst of budget strains,

enrollment lulls, and instability of future workforce, personalized learning will continue to be brought into the tapestry of modern education systems.

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Appendix A

Table 1A

LEAD Current and Historical Online Course Offerings

School Year	Online Course Offered
19-20	Blended Math & English, Online Social Studies
18-19	Online Social Studies
17-18	Online Social Studies (minus US History)
16-17	Online Social Studies (minus US History)
15-16	Online Social Studies (minus US History)
14-15	Online Social Studies
13-14	Online Social Studies
12-13	Online Social Studies
11-12	Online Social Studies & Integrated Science
10-11	Online Social Studies & Integrated Science
09-10	Online Math, Online Science, Online Social Studies
08-09	Online English I and II, Science I and II, Social Studies II and III, Math 9-11
07-08	Online English I and II, Science I and II, Social Studies II and III, Math 9-11

Table 2A

Persistence to Graduate Value by Category

Demographic	
LEP	1
Student is two years older than expected for grade level	1
Attendance	
5% to 10% of class time missed current or prior academic year	1
More than 10% of class time missed current or prior academic year	2
Behavior	
One to four in- school removals in current or prior academic year	1
Five or more in-school removals in current or prior academic year	2
One to four suspensions in current academic year	1
Five or more suspensions in current academic year	2
Performance	
10% to 14% failing term grades	1
15-24% failing term grades	2
24-34% failing term grades	3
35-44% failing term grades	4
45-54% failing term grades	5
55% or more failing term grades	6

Figure 1A. Homeschool Numbers

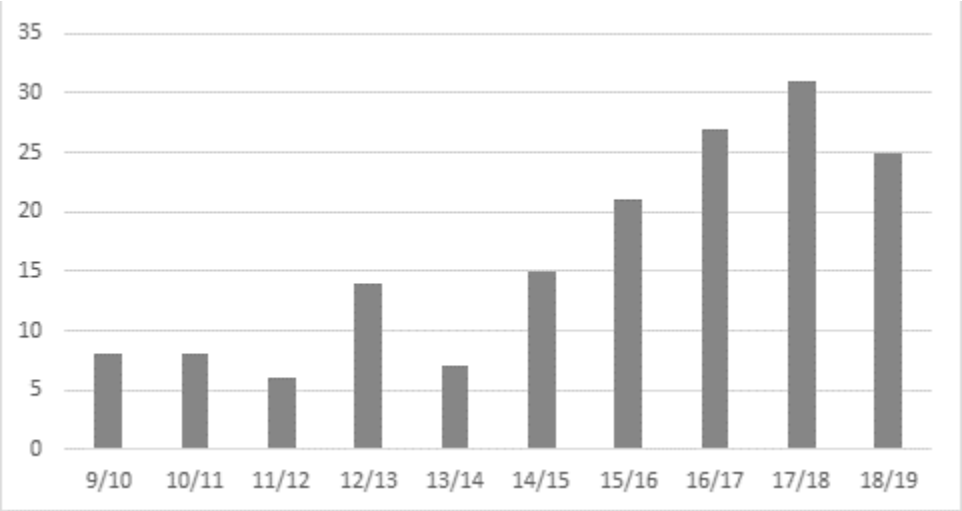

Figure 1A. Number of Students Enrolled in Homeschool Residing in District.

Appendix B

Table 1B

Two-way ANOVA Collection Table

Student	Group	Score	Student	Group	Score	Student	Group	Score	Student	Group	Score
1	1	6	18	2	22	35	3	23	52	3	25
2	1	8	19	2	29	36	3	4	53	3	20
3	1	13	20	2	24	37	3	15	54	4	17
4	1	21	21	2	28	38	3	30	55	4	23
5	1	21	22	2	29	39	3	29	56	4	10
6	1	23	23	2	19	40	3	15	57	4	29
7	1	26	24	2	30	41	3	12	58	4	21
8	1	27	25	2	28	42	3	5	59	4	30
9	1	28	26	2	28	43	3	6	60	4	25
10	1	28	27	2	25	44	3	7	61	4	23
11	1	29	28	2	15	45	3	29	62	4	4
12	1	16	29	2	28	46	3	29	63	4	17
13	1	17	30	2	30	47	3	24	64	4	27

14	2	18	31	2	29	48	3	23	65	4	24
15	2	24	32	2	6	49	3	28	66	4	27
16	2	17	33	2	24	50	3	23	67	4	20
17	2	23	34	2	28	51	3	27	68	4	28

Note. Group 1: Blended Learning High Risk, Group 2: Blended Learning Low Risk, Group 3: Traditional High Risk, Group 4: Traditional Low Risk.

Appendix C

Figure 1C. Histogram of Engagement Score

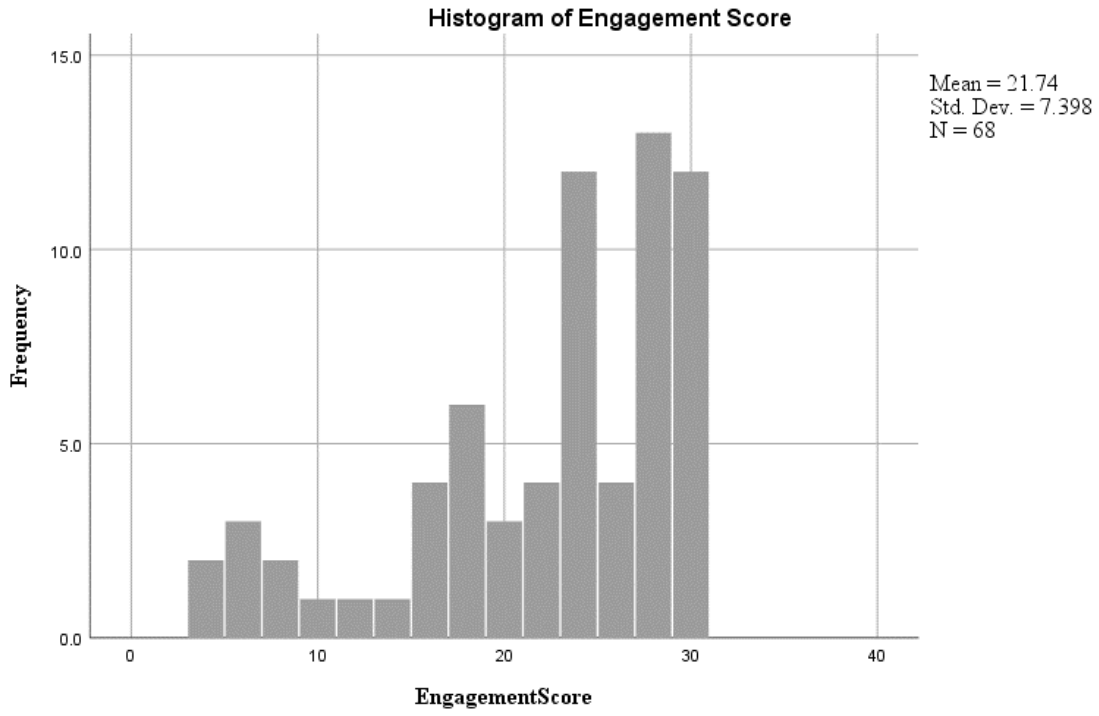

Figure 1C. Histogram of engagement score for study population.

Appendix D

MURRAY STATE UNIVERSITY

Institutional Review Board

328 Wells Hall
Murray, KY 42071-3318
270-809-2916 • msu.irb@murraystate.edu

TO: Robert Lyons
College of Education and Human Services

FROM: Institutional Review Board
Jonathan Baskin, IRB Coordinator JB

DATE: October 29, 2019

RE: IRB # 20-063

Determination: Program Evaluation - Activity is not research as defined in 45 CFR 46.102(d)

The MSU IRB has reviewed your student's application entitled, *Personalized Learning: An Engagement Strategy for At-Risk Student Populations*. Based on the information supplied on this application, it has been determined that your student's project does not involve activities and/or subjects that would require IRB review and oversight. Your IRB application will be kept on file in the IRB office for a period of 3 years.

Please note that there may be other Federal, State, or local laws and/or regulations that may apply to your project and any changes to the subjects, intent, or methodology of your project could change this determination. You are responsible for informing the IRB of any such changes so that an updated determination can be made. If you have any questions or require guidance, please contact the IRB Coordinator for assistance.

Thank you for providing information concerning your student's project.