NO BELLS: CLOSING THE ACHIEVEMENT GAP WITH PERSONALIZED COMPETENCY-BASED LEARNING IN A SMALL RURAL HIGH POVERTY SCHOOL DISTRICT

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AUTHORIZATION TO SUBMIT

DISSERTATION

This dissertation of Jeffrey Lyle Dillon, submitted for the degree of Doctor of Philosophy in Education with a major in Educational Leadership and titled "No Bells: Closing the Achievement Gap with Personalized Competency-Based Learning in a Small Rural High Poverty School District," has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies.

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ABSTRACT

Poverty has been identified as a barrier for at-risk student achievement across America. Can personalized competence-based learning provide at-risk students the skills and knowledge needed to close the achievement gap on the state assessment in Mathematics and English Language Arts/Literacy (ELA) for students after a two-year treatment? The research study conducted was a quantitative, quasi-experimental study of a rural school district's 100% Free/Reduced Lunch student population. The district provided a pathway to move students through learning by way of mastering content as they demonstrated competency of standards before progressing onto the next standard or content, rather than the traditional aged-based seat time for credit system. The district provided a technology rich personalized competency-based, where students moved base on mastery, with no seat time requirement for credit, no bells for transitioning students, or grade level identification. The personalized competency-based learning environment instructed students at their Zone of Proximal Development, provided through online platforms, project-based activities, or worksheets as determined by each student's preference. The findings suggest there were no significant differences between the pretreatment and the post treatment scores for ELA or Mathematics for the at-risk students, and the gaps between the state's not at risk students and the district's at risk students were compared before and after the treatment. The comparison of at-risk student and the state not at-risk student's scores indicated there were more gaps that increased than decreased.

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Introduction

In 2016 the official poverty rate for the United States was 12.7 %, equating to 40.6 million people living in poverty. This official measure of poverty was developed in 1960, based on a set of thresholds to measure families of different compositions and sizes that are compared to before-tax cash income to determine a family's poverty status. The United States Census Bureau (2014b) calculates this based on the poverty threshold indicators by the size of family ranging from $16,414 to $54,550. When focusing on children, the threshold data indicates that there are 15 million children under the age of 18 living in poverty (United States Census Bureau, 2014a). Minority children, also an at-risk population, made up a staggering 87% of 15 million children identified as living in poverty (National Center of Educational Statistics [NCES], 2013).

For these school-age children, identified as both living in poverty and having minority status, a gap in testing scores has been established. These students underperform in school compared to their non-minority, higher socio-demographic peers, as early as kindergarten extending through high school (Barron, Finch, & Stone, 2012; Cuthrell, Stapleton, & Ledford, 2010; NCES, 2013; Rothstein & Jacobsen, 2006; Koukouli, Vlachonikolis, & Philalithis, 2002). According to Strickland (2001), students of poverty are more likely to have a linguistic disadvantage when they enter school because of limited reading readiness and literacy experiences. In addition to educational disadvantages, students of poverty on average, according to researchers, have a lower birth weight, higher infant mortality, stunted growth, learning disabilities that include developmental delays, and experience more emotional and behavioral problems (Brooks-Gunn & Duncan, 1997; Chase-Lansdale & Brooks-Gunn, 1997).

A key factor that contributes to the achievement gap for at-risk students on the Scholastic Aptitude Test (SAT) is the socio-economic status (SES), according to Hanover Research, (2014). The lower the family income, the lower the SAT score was for critical reading, mathematics, and writing (College Board, 2014). National Assessment of Education Progress (NAEP) test data from 1990-2013 indicate little has changed in the achievement gap for students who are economically disadvantaged compared to those who are not (Sousa & Armor, 2016). However, Li and Hasan (2010) stated achievement gaps have become greater for at-risk students of poverty, which ultimately limit the ability for these students to compete in a global market place.

The achievement gap remains stagnate for the sub-population groups across the United States. It is important to note that the percentages of these sub-population groups vary between districts and schools depending upon the demographics and cultural dynamics of each community. The larger the sub-populations of a district or school, the larger number of students who fall within the achievement gap and the larger the challenge is to close that gap. The literature review for this study addresses largely unsuccessful strategies which have been used in attempting to close the achievement gap, the lack of success the federal support has delivered, and ultimately how traditional learning systems can be re-imagined changing the trajectory and achievement gap of at-risk students.

Statement of Problem

Poverty has been identified as a barrier for at-risk student achievement across the United States in traditional classroom settings. School leaders continue to look for ways to close this achievement gap (Barron et al., 2012; Brooks-Gunn & Duncan, 1997; Cuthrell et al., 2010; Freeland, 2014; Rothstein & Jacobsen, 2006). Lopez, Patrick, and Sturgis (2017) state:

> The strategies used by districts in response to state accountability exams under No Child Left Behind (NCLB), including one-size-fits-all instructional strategies and delivering grade level curriculum regardless of what students know, exposed the traditional system for what it is: a sorting system (p. 9).

Consequently, Sousa and Armor (2016) found in their research synthesis, and supplemented by the NAEP longitudinal data (1990-2013), that across the United States there has been little to no success in closing the achievement gap for at-risk students.

One growing and promising approach in closing the achievement gap is adopting a personalized, competency-based system of teaching and learning (Freeland, 2014; Sturgis, 2012). This system builds and creates opportunities to move learning at a flexible, personalized pace by providing supplemental content for students who have fallen behind or want to move ahead (Domenech, Sherman, & Brown, 2016; Freeland, 2014). The competency-based system additionally increases formative assessments when the focus is to demonstrate mastery in real-world examples and settings (Freeland, 2014; Sturgis, 2012).

Several researchers have demonstrated success with an innovative competency-based learning approach. This strategy allows students to differentiate and personalize their learning and master content simultaneously. Mastery is attained when students complete a designated level of proficiency on a standard, and personalization is achieved when students maneuver and plan their learning. This methodology has increased both teacher and at-risk student engagement, while producing increased academic rigor resulting from the personalized competency-based learning methodology (Sullivan & Downey, 2015).

One New Hampshire study with a small at-risk population found success with personalized competency-based learning when there was additional support for software, technology, and the technology infrastructure (Freeland, 2014). In a study by Prain et al. (2012) researchers found a decrease in the mathematics achievement gap of the average raw score by 6.3 points on the Australian National Assessment Program - Literacy and Numeracy (NAPLAN) between 2009 and 2011, for at-risk students in a personalized learning environment compared to the state student average.

A grounded theory study on personalized STEM (Science, Technology, Engineering, and Mathematics) learning courses in Harmon Public Charter Schools with at-risk students found students taking ownership and responsibility for their learning and demonstrating academic gains in conjunction with gains in self-confidence, technology skills, communication skills, collaborations skills, and life and career skills (Sahin & Top, 2015). Additionally, a personalized learning school demonstrated in a mixed method study an increase in attendance rates and provided students with a more positive outlook upon school (Ewen & Topping, 2012). In an intervention setting, those students receiving personalized learning had significantly higher achievement in reading, writing, and spelling than anticipated from the scores of their pretests on standardized tests (Kennedy, 2010).

In a review of research of personalized learning, these studies indicated favorable outcomes to personalized competency-based learning environments, specifically in settings characteristic to the district in which this study was conducted. These research studies were conducted in small groups of at-risk students, intervention classrooms with a small sample size, but not in an entire school, district, or in small rural district (Ewen & Topping, 2012; Freeland, 2014; Prain, et al., 2012; Sahin & Top, 2015; Sturgis, 2012; Sullivan & Downey, 2015). Additional research is needed to specifically look at the void found in published research. Such research is needed in larger groups of at-risk, poverty, and minority populations that reside in small rural school districts.

Background

This study was conducted in Wilson (pseudonym), a small rural town in the Northwest region of the United States, with a population of 1,662 (estimate as of July 1, 2016) within the city limits. The poverty rate was 40%, and only 47.1% of adults had attained a high school diploma or higher. With a median household income of $34,408, the median home value was $75,600 and 53% of these homes were lower-income rental units (United States Census Bureau, 2016). [Seventy-eight] 78% of the population was Hispanic. When compared to the national median household income, Wilson falls 46% below that level. The below average income not only impacts the Wilson community, but contributes to the challenges of its local school district. The median household income for families living in the school district and outside the Wilson city limits, whose children also attend the school district, was not available due to the homes in this county overlapping multiple school district boundaries. It is important to note that 67% of students who attend this community school district live within the city limits.

Nestled in this high poverty community is the small rural Wilson School District (pseudonym). The 20 square mile school district serves 523 students, kindergarten through 12th grade. The demographics of the student population were similar to the demographics of the community. The 366 Hispanic students represent 69% of the student body. The percentage of students who were identified as living below the poverty threshold and qualify for a free or reduced lunch (FRL), was 94%. For a student to qualify for a free or reduced lunch, the family must meet the Income Eligibility Guidelines in the National School Lunch Program (NSLP) guidelines (U. S. Department of Agriculture, 2018). The threshold ranges (Appendix A) from an income $15,301 for a two-person household, to an income of $53,157 for an eight-person household (U. S. Department of Agriculture, 2018). In addition, 34% of the students qualified as English Language learners, 11% as special education learners, and six percent as migrants; the Wilson School District elected to offer a free lunch for all students, which signifies for the district a 100% FRL population.

One additional unique statistic was the large percentage of students that came and left throughout the year and represented in the Student Mobility table. Table 1 gives the year the data was collected, the number of students enrolled who were new to the district, the number of students who exited during that school year, the total district enrollment for that specific year, and the percentage calculation for the student mobility. The largest percentage of students who entered and left the district in a single year, was during the initial year of the study in 2015/2016 school year at 42%.

Table 1.
Wilson School District Student Mobility

School Year	Fall Enrollment	Enrolled	Exited	Mobility
2015/2016	447	100	89	42%
2016/2017	477	83	74	33%
2017/2018	505	97	98	39%

Note. *Enrolled = Enrolled in the fall of that year new to the district;* Exited = Exited during that school year, prior to June *1st*.

In 1965 Congress enacted a great society program titled the Elementary and Secondary Education Act (ESEA) of 1965 (P.L. 89-10; 79 Stat. 27), which allocated federal funding for primary and secondary schools with children of low-income families to provide equal access to education, close the achievement gaps, and establish higher standards and learning expectations

(P.L. 89-10; 79 Stat. 27). In addition, ESEA provided funds for teacher professional development, instructional materials, and a pathway for increased parental involvement. ESEA provisions of funding were a way to provide long-term support to improve schools and their available resources for rural, Native American, neglected, migrant, homeless, and children from English language limited families (P.L. 89-10; 79 Stat. 27).

When ESEA became law, there was a large achievement gap: “The differences in scores on state or national achievement tests among various student demographic groups and the gap that has been a long-standing source of the greatest concern is that between white students and minority students” (Anderson, Medrich, & Fowler, 2007, p. 547). The provisions of ESEA aimed to close this gap by setting standards and goals to measure the progress of students. Additional funding through Title I of the ESEA was directed to schools with more than 40% of their students classified as low-income based on the federal NSLP qualifying guidelines (P.L. 89-10; 79 Stat. 27).

The No Child Left Behind (NCLB) Act of 2001 (P.L. 107−110, 115 Stat. 1425, H.R. 1) was the reauthorization of ESEA Act of 1965. Subsequently, in 2015, NCLB was replaced by the Every Student Succeeds Act (ESSA) (P.L. 114–95). No matter the reauthorization title, the fundamental standards remained the same: to provide funding to support disadvantaged students and close the achievement gap for at-risk students. The rural, high-poverty district where this study was conducted embodies the challenges identified more than 50 years ago when the ESEA was first put into law.

The Wilson School District is comprised of two main buildings, an elementary building which serves 298 kindergarten through sixth-grade students, and a combined middle/high school building which serves 97, students in Grades 7 and 8 and 130 high school students. There are 12 elementary teachers, 13 mid/high teachers, six district-wide paraprofessionals, and 13 classified support staff. There are two administrators, one elementary principal, and one middle/high school principal who also serves as the district superintendent. All staff were appropriately assigned based upon their individual certification or endorsements. In addition, the district belongs to a five-district consortium which shares special education resources. Each member of the consortium hosts special education programs. This district hosts the Developmental Preschool program of 15 students, the elementary Emotionally Disturbed program of eight students, and the high school Severe and/or Profound program of nine students.

Specifically, the high poverty rate in the district has generated challenges for the teaching and learning environment directly impacting the district's ability to close the educational achievement gap for its at-risk population from 2001 to 2015 under the NCLB achievement and identification guidelines (P.L. 107−110, 115 Stat. 1425, H.R. 1) and the ESSA of 2015 (P.L. 114–95). For example, the reader will note in Table 2 that in 2008 the district's third- through eighth-grade students' state Idaho Standards Achievements Tests (ISAT) proficiency scores for students who achieved a score identifying them as proficient were as follows: 50% Language Usage, 65% Mathematics, and 70% Reading. More specifically, the lowest score was the third-grade Language Usage proficiency at 27% and the highest score came from the same third-grade class in Mathematics at 77% proficient.

In comparison, identified for the reader in Table 3 are the not economically disadvantaged student state proficiency scores for the same grade-level students were Language Usage at 80%, Mathematics 87%, and Reading 89%. Additionally, the third grade score for Language Usage proficiency was at 79% and Mathematics at 93% (Idaho State Department of Education [SDE], 2008). In 2010, the elementary school in the district faced sanctions from the

State Department of Education for not meeting Adequate Yearly Progress (AYP) for the sixth consecutive year (Appendix B). AYP required districts to demonstrate the ability to meet all state and academic standards while working toward the goal of narrowing the achievement gaps for at-risk student populations (DoED, 2001). This AYP identification intensified the need and requirement to create a plan of improvement (DoED, 2001). During this period, the district took steps to fill gaps in the instructional practices with weekly professional development, by increasing instructional differentiation, and implementing assessment driven lesson planning. Curriculum was adapted to better meet the needs of the learner and building leadership changed. Each of the efforts were written into the districts' improvement plan and demonstrated a desire to close the gap of proficiency in the missed targeted areas including math, reading, and language for all students.

Table 2.

2008 Wilson School District ISAT Assessment Proficiencies

	Grade Level						
Assessment	3rd	4th	5th	6th	7th	8th	Overall
Language Usage	27%	57%	31%	46%	49%	56%	50%
Mathematics	77%	49%	48%	44%	46%	64%	65%
Reading	42%	51%	55%	50%	52%	80%	70%

Note: Proficiency = advanced and proficiency percentages. No scale scores were available for this ISAT, only percent proficient.

Table 3.

2008 State ISAT Assessment Proficiencies-Not Economically Disadvantaged

	Grade Level						
Assessment	3rd	4th	5th	6th	7th	8th	Overall
Language	79%	86%	82%	80%	78%	75%	80%
Mathematics	93%	90%	83%	85%	82%	86%	87%
Reading	89%	89%	90%	88%	87%	93%	89%

Note: Proficiency = advanced and proficiency percentages. No scale scores were available for this ISAT, only percent proficient

The Idaho legislature (2014) approved the use of the Smarter Balanced Assessment Consortium (SBAC) standardized assessment as the statewide achievement indictor. The state made some minor modifications to the SBAC to call it their own and renamed the assessment as the Idaho Standards Achievement Test (ISAT) replacing the earlier version of the ISAT. In 2016, the assessment data for this small rural school, combined advanced percentages with proficient percentages to arrive at total proficiency, Table 4, showing 27% of the district at-risk students taking the ISAT were proficient in the English Language Arts/Literacy (ELA), and eight percent were proficient in mathematics. Both the reading and mathematics district's at-risk proficiency scores were well below the state not-at-risk students, scoring a 70% proficiency on the ELA and 57% proficiency on mathematics (SDE, 2016). Looking back to 2008 through 2016, the data continued to demonstrate a proficiency gap in the achievement between Wilson district's at-risk and the state not-economically disadvantaged in 2008, and not-at-risk in 2016, student populations. In 2016 the percent proficient for the state's not-at-risk students was 43.2% greater than the percent proficient for district's at-risk students on the ISAT ELA, and the percent proficient for the state's not-at-risk students was 49% greater than the percent proficient for district's at-risk students in mathematics (SDE, 2016).

Table 4.

2016 ISAT Proficiency Report Card / English Language Arts - All Grades.

Agency	State (All Students)	State (not-at-risk)	District (at-risk)
Percentage proficient	52.9%	70.1%	26.9%

Table 5.

2016 ISAT Proficiency Report Card / Mathematics - All Grades.

Agency	State (All Students)	State (not-at-risk)	District (at-risk)
Percentage proficient	41.7%	57.2%	8.2%

This transition to the current ISAT assessment, with new standards, identifies significant achievement gaps for the at-risk student population. The purpose of this study was not to hypothesize why the achievement gap increased with this 2014 adopted ISAT assessment, but to determine if the achievement gap could be reduced if a personalized competency-based learning model was introduced in the Wilson district. Prior to the introduction of a personalized competency-based learning model, traditional teaching and learning structures were utilized. The traditional method included whole class instruction, students working on the same material at the same time, seat time for credit, bells to move students from class to class, and grade level identification. Based on the existing achievement gap, the traditional instructional methodology approach had not aided in closing the achievement gap to the extent expected for students at-risk. The district began to move away from the traditional instructional model by separating multiple aspects of teaching and learning into individualized components and reorganized them into a student-centered system encapsulated with a teacher-facilitated partnership with students, supported by the integration of technology. For example, each school turned off the bells that typically indicated when students moved from classroom to classroom. Student grade level identifications were removed. Students were required to demonstrate competency of standards before they could progress. Teachers were provided weekly professional development to assist in the shift away from the traditional to personalized competency-based teaching and learning.

Technology was improved to meet the challenges of the shift from a teacher-centered traditional learning environment to a student-centered model. The district was a recipient of the White House ConnectED Initiative (The White House, United States Government, 2013) to prepare “America’s students with the skills they need to get good jobs and compete with other countries relies increasingly on interactive, personalized learning experiences driven by new technology” (para. 1). The Apple Corporation partnered with President Obama’s White House ConnectED Initiative and provided technology upgrades, devices, and professional development to 114 high-poverty schools across the United States. The Wilson district had two of the 114 schools chosen (Apple and ConnectED, 2019). In 2014 the Wilson School District received an invitation to apply for the Apple grant. Each of the two schools in the district applied for the Apple ConnectED Grant and in October of 2014 each school received notification that they would be awarded the ConnectED grant.

Research Questions and Hypotheses

Considering the historical perspective of ESEA, NCLB and now ESSA, a foundational pillar evident in each reauthorization is to close the achievement gap for at-risk students (DoED 2001, 2015, 2017). The Wilson district trustees and administration desired to learn if the shift from a traditional learning environment to a personalized competency-based learning environment would be successful in closing the at-risk achievement gap. Specifically, would personalized competency-based learning provide at-risk students the skills and knowledge needed to close the achievement gap as measured by the state ISAT Mathematics and English Language Arts/Literacy assessment for students in third through eighth grades and tenth grade after a two-year treatment? The following two sub-questions and four hypotheses guided the data collection and statistical analyses to answer the research question.

Sub-question # 1: Will ISAT scores improve for at-risk students taught by personalized competency-based learning techniques when compared to at-risk students taught by traditional methods?

- Hypothesis # 1: There is no significant difference on the ISAT Mathematics ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grade taught by traditional methods and at-risk students taught by personalized competency-based learning methods.
- Hypothesis # 2: There is no significant difference on the ISAT English Language Arts/Literacy ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grade taught by traditional methods and at-risk students taught by personalized competency-based learning methods.

Sub-question # 2: Will the difference in ISAT mean scores for at-risk students and not-at-risk students be reduced if at-risk students are taught by personalized competency-based learning methods?

- Hypothesis # 3: The difference in the mean scores on the ISAT Mathematics exam, between statewide not at-risk students and the district at-risk students, will be reduced when at-risk students are taught using the personalized competency-based learning methods.

- Hypothesis # 4: The difference in the mean scores on the ISAT English Language Arts/Literacy exam, between statewide not at-risk students and the district at-risk students, will be reduced when at-risk students are taught using the personalized competency-based learning methods.

Description of Terms

21st Century Skills are proficiencies for college and career readiness. These skills include adaptability, complex problem solving, and highly developed interactive skills (Sullivan & Downey, 2015).

Achievement Gap is the difference in the performance between each Elementary Secondary Education Act (ESEA) subgroup (students at risk of educational failure, needing of special assistance and support, who are living in poverty, who are minority, fall below grade level, at risk of not graduating with a diploma on time, who are homeless, who are in foster care, who have been incarcerated, who have disabilities, or who are English learners) within a district or school and the statewide average performance of the district's or state's highest achieving subgroups in reading/language arts and mathematics as measured by the assessments required under the ESEA (DoED, 2009a).

Adaptive Learning is a system that refers to three main components: a content model is a structure of the content to be learned by the learner, a learner model that adapts to the abilities of the learner, and an instructional model that matches the content and the way it will be delivered to the learner in a personalized manner (Oxman & Wong, 2014).

Adequate Yearly Progress (AYP) Adequate yearly progress is defined by each state and describes the amount of yearly improvement each Title I school and district are expected to make in order to enable low-achieving, disadvantaged, and at-risk children to meet high performance levels expected of all children (DoED, 2009a) .

At-Risk includes many factors identified by DoED (1992) that can contribute to a student being considered at-risk. They include coming from a low-socioeconomic household, backgrounds from minority groups, uninvolved parents, special needs, retention, failure to pass classes that leads to a high probability of dropping out of school, and discipline issues. For this research, the term at-risk is synonymous with low-socioeconomic status.

ISAT At-Risk A student who at the point of analysis was/is any of the following: A student with a disability, English learner, Hispanic, Native American, Black/African-American, and/or economically disadvantaged (State Department of Education, 2018).

Bandwidth is the capacity for data transfer of electronic communications. The value is communicated as megabits per second (Mbps) (Comer, 2015).

Blended Learning is an educational approach where students learn content in part through an online portal and students have some control over time, pace, and path. This learning takes place at home, and in a supervised brick-and-mortar location allowing students some control over the location of learning (Horn & Staker, 2015).

Carnegie Unit is defined as 120 hours of contact time with a teacher and is also referred to as credit hours. This system of calculating credits based on the hours in front of a teacher is used by most high schools in The United States. The defined time for high school credits allows for a typical high school student earning 6 or 7 credits a year, over a 4-year program (Silva, White, & Toch, 2015).

Co-Construction of Knowledge happens when the teacher and student trade off leading discussions about a shared text or content and collaboratively learn (John-Steiner & Mahn, 1996).

Competency-Based education, the student advances upon demonstration of mastering competencies that are explicit, measurable, transferable learning objectives that empower students (Malan, 2000; Sturgis, 2014). This education is characterized as a system where "Learning is the constant and time is the variable" (Delorenzo, Battino, Schreiber, & Carrio, 2009, p. 19).

Differentiated Instruction is a type of instruction aligned with the learner preferences and is similar to that of personalized learning. Students are on the same content with a different modality of learning and engagement. The teacher remains the constant in the room and provides the whole class with the goals and outcome standards (De Jesus, 2014; Watts-Taffe et al., 2012).

e-Learning: All course activity is done online; there are no required face-to-face sessions within the course and no requirements for on-campus activity. The online courses totally eliminate geography as a factor in the relationship between the student and the institution. They consist entirely of online elements that facilitate the three critical student interactions: with content, the instructor, and other students (Miller, 2015).

Formative Assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes (CCSSO, 2018).

Guided Reading is a teaching approach designed to help individual students learn how to process a variety of increasingly challenging texts with understanding and fluency (Fountas & Pinnell, 1996).

Individualized Learning refers to instruction that has assessed the students' individual needs or challenges, and an individualized approach developed to best meets the students' abilities to follow the established curriculum. The curriculum most often used is the one taught in the mainstream standard class (Domenech et al., 2016).

Idaho Standards Achievement Test (ISAT) is a computer adaptive standardized test based on scale scores ranging from 2000 to 3000 across all grade levels. The ISAT is a product of the SBAC (SDE, 2018c).

Low Socioeconomic Status (SES) is a broadly defined as the ability of someone to access capital resources, such as education, financial, social, and cultural. A student's SES is indicated by their parents' household income, level of education attainment, and occupation (National Center for Education Statistics [NCES], 2012).

Mastery-Based Education Act (2015) approach to education means an education system where student progress is based on a student's demonstration of proficiency in competencies and content, not seat time or the age or grade level of the student.

Paraprofessional is a not-certificated school employee that supports educational programming under the direct supervision of a properly certificated staff. They can provide direct instruction under the direct supervision of a teacher (SDE, 2017b).

Personalized Learning is learning tailored to each student's strengths, needs, and interests. It includes embedding student voice and choice in what, how, when, and where they learn. It provides flexibility and supports to ensure mastery of the highest content standards possible (Patrick, Kennedy, & Powell, 2013).

Reading A-Z is a research based on-line reading library with developmentally appropriate levels for every K-5 learning environment. The library includes reading materials to address foundational reading skills, teacher lessons, and benchmark assessments given by the teacher to determine the proficiency level of the reader (Reading A-Z, 2018).

Scaffolding is often referred to as educational or instructional scaffolding, students are supported and stepped along their learning journey, where ongoing diagnosis, shared understanding and a gradual fading of support occurs as the learner becomes more independent (Benko, 2012).

Schools in Need of Improvement are those schools that do not meet state targets for two consecutive years. Schools identified as in need of improvement are required to institute changes so that all students receive adequate and appropriate instruction to enable them to reach proficiency on the state standardized assessment (McClure, 2005).

Socio-demographic characteristics are those relating to, or involving, a combination of social and demographic factors. Some socio-demographic factors include: gender, age, level of education, employment status, profession, marital status, total number of persons living in the house and living arrangements (Koukouli, Vlachonikolis, & Philalithis, 2002, p. 3).

Student Mobility is determined by comparing the enrolled students in the fall of a school year to the enrolled students from the prior fall. All students who exited the district are counted and all new students enrolled are counted. Additional counts are those students who enrolled and exited within the school year (Wilson School District, 2018).

Traditional Learning is a behaviorist's approach in which the teacher is the dominant source of the knowledge and imparts that knowledge to the learner. The learner responds when the teacher requests a task to be completed or asks an answer a question. It produces both active and inactive leaners but does not favor the active engagement of the learner (Khalaf & Zin, 2018).

Traditional Teacher talks more than students do in a whole class participation approach. They are the authority and know the students' needs in the classroom and adhere to a strict time and place of learning. In this face-to-face environment the instructor prepares lessons for whole-class instruction, lectures, models with examples, assigns practice, collects the assignments, grades assignments, and determines the competency of individual student (Khalaf & Zin, 2018).

Zone of Proximal Development (ZPD) theory refers to when an individual is taking part in an activity or learning where the learner is developing mastery. In addition, as the individual is actively and ready to learn or take part in an event and there is guidance from another individual who is more advanced, this provides direct or indirect positive influence on the learner (Chaiklin, 2003).

Significance of the Study

The significance of the study was to contribute to the existing body of knowledge regarding closing the achievement gap between the academic performance of students designated as at-risk and those who were not considered at-risk. Across the county there is evidence that closing the achievement gap has not yet been achieved based upon the review of state test data and the NAEP assessment data (Sousa & Armor, 2016). It is imperative that a solution to closing the achievement gap be accomplished and documented to provide a model for dealing with at-risk students in other schools and districts. The method proposed to support this effort allows for alignment with the individual student's ZPD by implementing personalized competency-based learning. Attention to the elements of personalized competency-based education enables educators to close the achievement gap and helps students achieve excellence (Guskey, 2010).

Overview of Research Methods

This study was a quasi-experimental study examining the treatment of a personalized competency-based learning environment (independent variable) for at-risk students and how that treatment affects their performance on the state-wide ISAT assessment (dependent variable). Student data were selected from students who have been in the district for at least two years and have received the personalized competency-based learning treatment, for which there is ISAT data. Student data from those who have not received two years of the treatment were not included. Throughout the state, the ISAT is given to all third through eighth grade students and to those in the tenth grade. The comparative data were the scores students received on the ELA and Mathematics ISAT assessments prior to the personalized competency-based learning treatment; and the post-data were the scores students received after two years of personalized competency-based learning.

To determine if an at-risk student achievement was significantly improving, the researcher conducted an SPSS paired t-test for data addressing sub-question 1 on the students' third- through eighth-grade and tenth-grade ISAT Mathematics and English Language Arts/Literacy exams for the two data collection periods of 2016 and 2018. For Sub-question 2 a descriptive statistics method was used for analyzing the ISAT data for 2016-2018 in English Language Arts/Literacy and Mathematics comparing the mean scores of the district at-risk students to the mean scores of the state not at-risk students. Descriptive statistics and figures were used to demonstrate changes in the performance gap between the state’s not-at-risk students and the district at-risk students using the mean and standard deviation of each group.

Chapter II

Literature Review

The literature review blends information on personalized learning with competency-based education as it relates to students of poverty. In 1965 Congress enacted a great society program titled the Elementary and Secondary Education Act of 1965 (ESEA), which allocated federal funding for primary and secondary schools with children of low-income families to provide equal access to education, close the achievement gaps, and establish higher standards and learning expectations. ESEA provisions of funding was a way to provide long-term support to improve schools and their available resources for rural, Native American, neglected, migrant, homeless, and children from English language limited families (P.L. 89-10; 79 Stat. 27). When ESEA became law, there was a large achievement gap (Anderson et al., 2007).

The provisions of ESEA aimed to close this gap by setting standards and goals to measure the progress of students. Additional funding through Title I of the ESEA was directed to schools with more than 40% of its students classified as low-income based on the federal NSLP qualifying guidelines (P.L. 89-10; 79 Stat. 27). The NCLB Act of 2001 was the reauthorization of ESEA Act of 1965; in 2015 Every Student Succeeds Act (ESSA) (P.L. 114–95) replaced NCLB Act of 2001 (P.L. 107−110, 115 Stat. 1425, H.R. 1).

To close the achievement gap, the method of personalized learning provides on-demand content acquisition opportunities modeled on Vygotsky's *Sociocultural Theory of the Zone of Proximal Development* (ZPD). A close look at personalized competency-based learning took place through the following lenses: a) students-at-risk, student achievement, and the attempt of closing the existing achievement gap for students-at-risk in the United States, b) competency-based education, c) personalized learning, d) differentiated instruction and learning, e) adaptive learning software with the use of 1:1 devices, and f) project-based learning.

Zone of Proximal Development

The ZPD theory emerged from Vygotsky's work in the 1920s and 1930s to develop a simple understanding and explanation of human behavior. A Russian psychologist, Vygotsky's research ranged from psychology of art, language and thought, learning and development, and students with special needs (John-Steiner & Mahn, 1996). After a 20-year suppression of Vygotsky's work after his early death, his work became accessible and developed diverse attention from country to country with the most influence taking place in western countries. Vygotsky's work from the 1920s and 1930s was collected and translated by the President and Fellows of Harvard College and published in 1978 as *Mind in Society: The Development of Higher Psychological Processes*. Chapter six of this work describes what we know now as the Zone of Proximal Development theory (John-Steiner & Mahn, 1996).

Vygotsky explained how social and participatory learning happened in children. In this explanation, Vygotsky's concept of the ZPD was defined as "the distance between the actual developmental level as determined through independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotskiĭ, Cole, Stein, & Sekula, 1978, p.86).

The ZPD theory is one of the most well-known of Vygotsky's works and permeates educational research today (John-Steiner & Mahn, 1996; Kozulin, Gindis, Ageyev, & Miller, 2003). One of the most notable influences came as education transformed the ZPD social context theory into an educational context theory. The theory was developed into a teaching strategy to support struggling learners in the classroom and is known in the education system today as *scaffolding*. This strategy is designed to help the learner by providing hints and prompts at the ZPD level of the learner (John-Steiner & Mahn, 1996). The approach provides graduated interventions by the teacher but does not simplify the task for the learner. One approach is grouping students in such a way that the higher performing students in the group, who have mastered the concept, can provide supports for the students at lower levels, who have not yet mastered the concept, but could with some support from those who have mastered the concept (Slavin, 2018).

Brown, Ash, Rutherford, Nakagawa, and Campione (1993) expanded the definition to include "problem solving" through the guidance of children with a higher level of expertise than the learner to include, books, wall displays, and "a computer environment intended to support intentional learning" (1993, p. 191). This expanded the view of the interaction between the learner and the environment, such as the classroom, and provided a wider view of the impact on the learners. In a classroom, each participant makes significant contributions to the tasks being learned despite the unequal understanding or knowledge of the subject (Palincsar, Brown, & Campione, 1989). As Palinscar et al. (1989) examined the role of reciprocal teaching, when the teacher and student trade off leading discussions about a shared text, a theme emerged in both theory and practice for collaboration. Collaborative learning contributes to a classroom when educational programs encourage the co-construction of knowledge.

According to John-Steiner and Mahn (1996), the movement in the sociocultural theory is toward co-participation, cooperative learning, and partnership discovery. This provides students with existing knowledge and co-constructs it with them (Brown et al., 1993). A broader development of the sociocultural ZPD theory was published by Moll and Whitmore (1993). This research of a sociocultural approach in a bilingual classroom integrated reading and writing into a project-based learning task. The researchers examined the collaborative and contextual character of cognitive change. They found, when examination of student interaction and participation demonstrated a family pattern, there was flexibility of roles between student and teacher. This also facilitated use of student experts in the room, and co-construction of knowledge. Students were able to take the lead role in, for example, text-based discussions, while the teacher's role shifted to that of a mediator and facilitator.

"As guide and supporter, the teacher is crucial for helping children take risks, focus their questions and ideas, and translate them into manageable activities, ensuring that each child finds academic success" (Moll & Whitmore, 1993, p. 38). During facilitation, the teacher's role becomes one of conscious planner, understanding the environment in order to provide the appropriate curriculum and materials to create "purposeful uses for language, literacy and learning processes" (Moll & Whitmore, 1993, p. 38). As a broader view of Vygotsky's ZPD theory, this research by Moll and Whitmore (1993) shed light on a classroom that exceeds the initial formulation of the theory, but it might also show how "narrowly we may have been interpreting and applying his ideas" (p. 39).

Chaiklin (2003) also expanded the understanding of the ZPD to include any learning task, the process of developing proficiency in a skill, or knowledge of a given topic by directly or indirectly influencing the child in a positive manner. The expansion also included properties of the learner, or the desire and willingness for the learner to participate in the learning. When engagement is present, it accelerates learning within student's ZPD and should result in "the easiest or most effortless form of learning for the child" (Chaiklin, 2003, p.3).

The expansion of the ZPD definition creates a utopia for educating children, where the teacher can aid the student to joyfully and effortlessly master content, with a little added knowledge here and there, to open the doorway of understanding in all content throughout the day. There are three assumptions regarding ZPD for educators to consider regarding this utopia of education. The first is the assumption that ZPD is for all kinds of learning. It is not about the development of a skill, but about how strongly associated the skill is to the development. The second assumption is concerning the learning associated with help from a more competent individual. This assumption is more about how the learner makes meaning of the help as much as it does to the learning and development. The third assumption is that the learning is joyful for the learner, although Chaiklin (2003) also stated that in the theory of ZPD, the zone could include challenges and learning that are not enjoyable but are still attainable.

Student Achievement and Closing the Achievement Gap

The Elementary and Secondary Education Act of 1965 (ESEA), Title 1 chapter is a U.S. compensatory education program specifically designed to provide federal financial assistance to K-12 schools with a high proportion of students from low-income families (P.L. 89-10; 79 Stat. 27). The goal of Title 1 was to improve educational attainment for children of poverty (Sousa & Armor, 2016; Every Student Succeeds Act, 2015). Following the initial ESEA Act of 1965, was Improving America's School's Act of 1994, and then came NCLB Act of 2001 (P.L. 107−110, 115 Stat. 1425, H.R. 1; United States 107th Congress, 2001). A landmark revision mandated that 100% of the students be proficient on state standardized measures by the 2013-14 school year via the NCLB Act (P.L. 107−110, 115 Stat. 1425, H.R. 1; United States 107th Congress, 2001). According to Sousa and Armor (2016), the purpose was to raise the academic achievement of disadvantaged students to match not-disadvantaged students, therefore closing the achievement gap in the same period. The 2015 congress, with President Obama's signature, reauthorized NCLB with Every Student Succeeds Act of 2015 (DoED, 2017). Using the synthesis research approach, they used five peer-reviewed studies from the DoED. These studies are: a) Borman and D'Agostino meta-analysis conducted from 1966-1993; b) the Prospects study conducted from 1991-1994, c) the 1999 National Assessment of Title 1 covering data from the 1980s and 1990s, d) the 2007 National Assessment of Title 1 covering data from 1992-2007, and e) the study from Dee and Jacob (2011).

In addition, supplemental trend analysis of longitudinal national-level data from the National Assessment of Educational Progress (NAEP) was included to add the years from 2007-2013. In total, the research covers student achievement from 1966 to 2013. No matter the reauthorization, research spanning from 1966-2013, according to Sousa and Armor's (2016) review of multiple national-level evaluations, there is little evidence that ESEA, in all its forms, has improved the academic achievement of disadvantaged students nationwide. It is important to note that the earlier study by Borman and D'Agostino did show modest effect size improvement of a .2 standard deviation in math for elementary grades, but that same improvement did not happen for higher grades, which showed an effect size improvement of only a .1 standard deviation. Sousa and Armor (2016) found in the Prospect study there was no significant change in the achievement gap between Title 1 participants and not Title 1 participants. In the same study Sousa and Armor (2016) reviewed the Department of Education study carried out between 1988 and 1999 which compared fourth-grade math and reading scores for highest poverty schools and lowest poverty schools and determined that the achievement gap widened before 2000; the study by Dee and Jacob (2011) showed a modest effect on fourth-grade math test scores showing gains for disadvantaged students.

Within the summary, Sousa and Armor (2016) concluded that the 2013 NAEP data for fourth- and eighth-grade students were disappointing for closing the achievement gap of those students of poverty. The gap of achievement between students receiving free/reduced lunch and those who are not eligible have remained constant in both reading and math. A highlight from the data span from 1966-2013 is that there has been an increase in the scale scores for all students. The authors asserted that this is mostly attributed to the NCLB accountability efforts across all 50 states. The original intent of Title I was to provide compensatory support in the form of additional remediation for disadvantaged students to help them catch up with non-disadvantaged peers. The funding to support Title 1 students has remained level, at about $1,500 per student (in 2012 dollars). One can argue that the same dollar for dollar funding provided the same scale score improvements for the past 47 years for this student population and kept the achievement gap unchanged. One could also argue that if the funding were not provided, the gap might be much worse. Nonetheless, the gap persists, and it is clear that closing the achievement gap is exceedingly difficult.

The capstone for NCLB was a significant reauthorization that promised by 2013-2014 all students would be proficient in reading and math before receiving their high school diploma. As states implemented a punitive statewide accountability system to identify Adequate Yearly Progress (AYP), it required schools to receive sanctions if they failed to meet AYP. The sanctions were thought to provide incentives to improve focus and accountability to public school that were in school improvement status. This status process varied from state to state on identifying schools which needed improvement (Dee & Jacob, 2011; Forte, 2010; NCLB, 2001). The lack of success with closing the achievement gap is based on the assumptions that NCLB would force schools and school systems to meet the proficiency targets or deal with the consequences (NCLB, 2001; Sousa & Armor, 2016). Nonetheless, analysis of data collected over the course of 10 years provides a clear case for the ineffectiveness of NCLB (Forte, 2010; Sousa & Armor, 2016).

There were three main misconceptions by the drafters of NCLB which were not addressed in the creation of the policy. The first misconception was that schools are appropriately identified for school improvement status by means of an algorithm for calculating Adequate Yearly Progress (AYP). The key element of this section of the policy was to identify school improvement around achievement rather than effectiveness (Forte, 2010). It did not matter if a school was making improvements over time, culturally or academically. It fell directly upon the targeted proficiency achievement data, regardless of effectiveness of progress in making other gains.

NCLB's second misconception relates to the consequences surrounding the school improvement status (Forte, 2010). Sanctions were based on missed target areas for proficiency; for example, two of the 40 target areas were English Language Learner (ELL) and At-Risk proficiencies. If a school missed just one of the 40 targets for growth, or a 90% graduation rate, for two consecutive years, the school was placed into school improvement identification (SDE, 2006). Once that school was placed in the improvement status, the consequences began. Parents were given school choice options, and outside agencies could intervene with supplemental services for that school. Each year the district failed to meet the targets, the sanctions became more severe. The final consequence for a low performing school was the process of restructuring the school. This restructuring required new leadership and teachers to be hired for schools designated as *schools in need of improvement*. In addition, if the assessment data for the following year showed growth in the targeted area and met AYP, but missed a different AYP target, the school would remain in school improvement status. In this circumstance, the school would move down to year two of school improvement instead of remaining at year one, even though it met the missed target from the previous year (NCLB, 2001; SDE, 2006).

The third misconception within NCLB was that school improvement efforts lead to increases in student learning. States were good at showing gains in student learning. These gains were based on individual state data generated from measures that in some cases had little reliability or validity nationwide in part because the definition of proficiency varied, as well as the standardized assessment instruments and scores utilized from one state to the next. In addition, when individual state data were compared to the National Assessment of Educational Progress (NAEP) data, the NAEP data did not show the similar gains, in contrast to the statistical data from the individual state's assessment data (Forte, 2010; Sousa & Armor, 2016).

An example of how NCLB was ineffective comes from Oklahoma's attempt to close the achievement gap by creating a letter grading system for schools that met, or failed to meet, the assessment standard. Identifying schools' achievement on the state assessment with a letter grade provided the public a much easier way to identify how well their schools were doing because everyone was familiar with the traditional letter grading system. These letter grades were intended as quality indicators for closing the achievement gap, improved achievement, and improved equity.

In the Oklahoma formula, the student test scores were converted into a continuous index, which produced a summative letter grade. To calculate the overall letter grade for the school the following factors were included: student scores, student growth, and overall school performance (Adams et al., 2016). There were no data that demonstrated D/F schools improved or closed the achievement gap from 2011 to 2012 compared to A/B letter graded schools. This casts doubt on the use and effectiveness of a single letter grading system to identify high to low performing schools. In fact, more questions were raised as a result from the findings. For example, does a letter grade of an A or B mean that all students are proficient in all subjects? In addition, the researchers found more disparity between students of poverty than those not of poverty, in schools with A, B or C letter grades than they did with schools with letter grades of D or F (Adams et al., 2016).

On a national scale, in 2013-2014 as the deadline approached to have all schools close the achievement gap, there appeared to be discrepancy between state assessment results and the NAEP results. Data analysis indicated some minor correlations between states implementing accountability systems and improved test scores on the NAEP in fourth-grade math nation-wide, but the data were not as consistent for reading. The NCLB Act of 2001 required states to implement school improvement guidelines to increase academic achievement but failed to directly correlate with closing the achievement gap for at-risk students (Dee & Jacob, 2011; Madrid, 2011).

This is a complex problem and solutions have not come through the federal mandates, state accountability requirements, or adjustments in curriculum or intervention efforts. Increasing academic achievement of at-risk students to close the achievement gap requires schools, school administration, and school boards to identify and resolve core issues of the inequality of education for students (Madrid, 2011).

Measuring Student Achievement in Idaho

Before 2014, Idaho utilized a standardized achievement assessment known as the Idaho Standards Achievement Test (ISAT), a non-adaptive computer-based assessment. This assessment tested student knowledge in mathematics, reading and language usage. The data produced for the districts were percentages proficient and placed each student into one of four categories: Advanced, Proficient, Basic, and Below Basic. The data were not reported just by scores for proficiency, which identified the students' categories. The state also calculated the total percentage of students Proficient for state and district data, by the total number of students who were identified as Advanced, Proficient, and half of those who were Basic (SDE, 2018a).

In 2014 the Idaho State legislature approved the adoption of a new ISAT. This ISAT was a product of the SBAC. The new ISAT was a computer adaptive standardized assessment, which tested mathematics and English Language Arts/Literacy (ELA) skills and knowledge. The assessment provides two results for demonstrating student growth over time. The first is the students' achievement level categories. Students performing at the upper levels, Advanced and Proficient, are considered on track to demonstrate the skills and knowledge necessary for college and career readiness. The Basic performance indicates at or near on track for college and career readiness. The Below-Basic identification is just that, below expected level of performance to demonstrate college and career readiness. The second results provided are students' scale scores ranging from 2000 to 3000. These increase for each grade levels (SDE, 2018c; SBAC, 2018).

Success in Closing the Achievement Gap

Unlike the national attempt to close the achievement gap with little to no success, on a much smaller scale there are some schools and systems that have been successful in closing the gap for at-risk students (Sousa & Armor, 2016). The question that needs to be asked is: How are they accomplishing this task? According to Anderson et al. (2007), researchers and practitioners need to understand what systematic reforms were directed at closing the achievement gap and were there common effective strategies being used in these schools. In addition: Was this a whole school or targeted reform? Were curriculum changes incorporated? What instructional changes were made? How has professional development changed? These questions can give guidance to scaling of the successes and to revisions of local or state policy.

In research about micro-ecosystems of education, there are schools and teachers within school systems which have the ability to accomplish significant growth in achievement scores of at-risk students and closing the achievement gap. Kennedy (2010) provided an example of a case study which explored the potential to close the achievement gap and increase student achievement with isolated efforts for Title 1 students by enhancing the ability of teachers to increase their content knowledge of essential literacy skills through professional development. Teachers needed the development to incorporate the pedagogical content into literacy strategies providing on-going student achievement and an inquiry-based, problem-solving approach. At the end of the professional development intervention, students had significantly higher achievement in reading, writing, and spelling than anticipated from their pretest scores. There were higher teacher expectations of students' learning and confidence was found in their ability to meet the needs of literacy difficulties. Kennedy (2010) concluded that the challenge to closing the achievement gap was complex and not easily accomplished. It occurred as a complicated result of the interaction between home, school, and the classroom.

The following sections outline some examples of types of instructional methodologies which showed promise or have shown success in closing the achievement gap for at-risk students. These methodologies closely align with Vygotsky's ZPD theory where teaching and learning are intentional to needs of the student and the student's ability to access the knowledge needed to be gained.

Differentiated Instruction and Learning

In 1997, the Individuals with Disabilities Education Act outlined the efforts to provide the least restrictive environment for students with disabilities by including these students more regularly into the general education classrooms and schools (Individuals With Disabilities Education Act, [IDEA] (20 U.S.C. § 1400 1997, 2004). This legal act moved the pendulum from specialized instruction to individualized instruction within the classroom and school. To assure individualized instruction, special education teachers and general education teachers worked cooperatively to support the differentiated needs of special education students. This collaboration offered benefits for students with and without disabilities and is often needed to facilitate differentiated instruction (De Jesus, 2014).

Differentiated instructional methods utilize a wide variety of instructional strategies and flexible learning styles allowing students to access curriculum by tailoring instruction to the individual learning needs, such as providing students with the appropriate reading instruction and working with students in small groups (De Jesus, 2014; Watts-Taffe et al., 2012). While increasing engagement and attention paid to the different approaches to learning, the result produces more engaged students with less off-task behaviors (Morgan, 2014). In the differentiated model, the teacher creates the plans and prepares each class and each student for appropriate differentiated learning levels with close monitoring of each student's progress (De Jesus, 2014; Mills et al., 2014).

Little, McCoach, and Reis (2014) found in a middle school setting that teachers were able to replace whole-and small-group instruction with differentiated individual conferences and increased independent student reading time without detriment to achievement scores. Students demonstrating self-efficacy needed less time with the teacher and low performing students received more intense time with teachers and aides. At times, the teacher grouped students by trial and error before they found the appropriate groupings (Mills et al., 2014).

In 2009, in the Wilson School District, where this current study was conducted, a three-year effort was made to differentiate learning for all elementary students. Students were placed into instructional groups based on their Reading A-Z benchmark reading level and their district created assessment math levels instead of direct grade level instruction. Lesson plans were created for each group in reading and math daily. In most classes, there were five reading groups and five math groups, requiring 10 different lesson plans for two subjects. This created an intense workload for the teachers, yet at the end of this three-year effort the percentage of students proficient on the state test increased 60% in math and 57% in reading for the at-risk student population (Dillon, 2013; SDE, 2013).

Mastery Learning

Mastery learning stems from the seminal work of Benjamin S. Bloom (1968). Bloom observed classrooms and documented no true deviation in teachers' instructional practices. Most teachers instructed all students in the same way and provided all students with the same duration of time to learn. Students for whom these instructional methods and time allotted were exactly right learned well. Many students found these methods and time allocated only somewhat appropriate and those students learned less. Moreover, students for whom the instruction methods and time assigned for learning were inappropriate due to differences in their learning styles or other factors were not inclined to learn at all (Bloom, 1968).

Thus, Bloom noted that in teaching the same method to a whole classroom resulted in wide variations in student learning (1968). To accomplish better results and decrease variations in student achievement, Bloom suggested that teachers would have to increase differentiation in their teaching methods. Because students differ in their learning styles and aptitudes, Bloom proposed that educators must differentiate instruction to better meet students' individual learning needs in order for all students to learn well (1968).

Teachers might adapt the successful aspects of individualized instruction and tutoring to improve student learning in general education classrooms. In doing this, they could provide the appropriate time and learning conditions for students with a variety of learning needs. Maintaining quality instruction, providing for a variety of learning opportunities, and providing instruction students can understand and encapsulating it in perseverance and motivation may help nearly all students reach a high level of achievement (Bloom, 1968). Core elements of mastery-based learning are as follows:

1). pre-assessment with pre-teaching,
2). high quality, initial instruction,
3). progress monitoring,
4). high quality corrective instruction,
5). formative assessment, and
6). enrichment or extension activities.

Mastery learning teachers prepare for success before instruction begins. Assessments are not single, summative experiences and re-teaching is different from a simple restatement of the original material, just paced more slowly. Each student must then progress toward a clearly defined goal, be continually assessed, and earn credit as they demonstrate mastery instead of acquiring traditional Carnegie Units (Bill & Melinda Gates Foundation, 2016; Guskey, 2010; SDE, 2018b; Sullivan & Downey, 2015).

There are two distinct components of mastery-based education. The first is mastery learning, which is an instructional method based on the idea that students learn best if they fully understand, or master, one concept before moving on to the next (Diegelman-Parente, 2011;

Morgan, 2014). The second is a competency-based grading evaluative tool which allows the teacher to determine the level of mastery students must achieve before a passing grade is achieved (Diegelman-Parente, 2011).

According to Singer and Willett (2003), growth models assume that the outcome must grow. These assumptions look for singular directional growth, yet the researchers state that complex trajectories need to include multiple directional change as well as growth plateaus. Educators and pediatricians differ as to the outcome growth that should be expected in children. One belief is that all children will become proficient over time, and if enough time is allowed, they will reach mastery. The other belief is that no matter how long they are followed, they will never reach mastery because they simply lack the skill to do so (Singer & Willett, 2003).

Competency Based Education

To support the learning continuum for Title 1 students, attention to the elements of competency-based education may enable educators to close achievement gaps and help all students achieve excellence (Guskey, 2010). In competency based education, learning is driven by standards developed around the uniqueness of the needs of the learner, where credits are earned by demonstrating academic proficiency instead of the traditional grading and seat time framed from within the Carnegie Units, which is a time-based standard of learning progression (Malan, 2000; Silva et al., 2015; Sullivan & Downey, 2015). According to Wells (1999) the ZPD can be applied to any situation, in which those participating in an activity are in the process of developing competency of a practice or an understanding of a topic. Assessing in a competency-based progression is done on-demand when the learner is ready to demonstrate a specific competency in a variety of ways, which could include projects, presentations, or more traditional tests and quizzes (Pane, Steiner, Baird, & Hamilton, 2015). Academic proficiencies are meaningful and provide positive learning experiences for the learners, with rapid differentiated support along the learning continuum of application and creation of knowledge (Sturgis, 2014).

In New Hampshire, an educational paradigm shifted from a traditional classroom to a competency-based learning environment for diverse learners driven by NCLB and state mandates (Freeland, 2014). This top down paradigm shift produced varied levels of success based on software, training, and technology working or partially working (Freeland, 2014). NCLB and state mandates were the leading factor for the change. Successful transitions happened when the leadership created synergy around mastery-based education, curriculum, and assessment with stakeholders giving energy to the paradigm shift (Sullivan & Downey, 2015). The successes were teacher engagement, student engagement, and increased academic rigor. Not only did the success outweigh the challenges, Sullivan and Downey (2015) reported that there was a waiting list for admissions in this competency-based school for students at-risk.

The New Hampshire Department of Education 2005 legislative change created student mastery of select competencies rather than the traditional seat-time method of determining course credit (Freeland, 2014). New Hampshire regulated removal of Carnegie Unit seat-time and opened opportunities for students to advance sooner than in a traditional school setting. For educators, it gave the opportunity to measure authentic student learning instead of measuring hours and minutes (Freeland, 2014; Silva et al., 2015).

Competency Works is a collaborative initiative dedicated to advancing personalized, competency-based education in K-12 and higher education, and they provide a working definition for this specific model of learning, which comes from their five tenets for a high-quality competency-based model: a) students advance upon demonstrated mastery of content, b) learning objectives that will empower students, c) meaningful assessments, d) differentiated personalized support based on individual student learning needs, and e) applied learning competencies (Freeland, 2014; Lopez et al., 2017).

Personalized Learning

Personalized learning has three principles. The first is student-driven learning environments that are flexible to the needs of each student; staffing, plans, and time supports the individual goals of each student. Secondly, customized personal learning paths are created for all students with high expectations. Finally, students have the control and adapt their personal profile providing a clear path for reaching their established goals (Bill & Melinda Gates Foundation, 2016; Pane et al., 2015).

An example of a personalized learning model is Blended Learning. This learning method incorporates two approaches, the traditional teacher interface, and the web-based or on-line learning (Mehmet, Muzaffer, & Cumali, 2013). The web-based, on-line approach offers a learner a portion of the lesson, such as a video lecture, to be viewed at home in preparation of the face-to-face time with the teacher the following day (Kazu & Demirkol, 2014). In the formal educational environment, the student has little control over the time, path, pace, or place (Christensen, Horn, & Staker, 2013). Blended Learning instruction is structured to allow the learner to complete the topic at various times based on the individual learner's needs, instead of at a teacher's timetable. The learners can progress at different speeds, skip information already mastered, or repeat information not understood.

The goal for personalized learning is to provide more relevant content and information to students (Dorça, Araújo, de Carvalho, Resende, & Cattelan, 2016). Students can make choices about the structure of the learning, curriculum, or materials to complete the assignment, based on the learning needs of the individual students. They can engage in learning outside the school, can determine learning progression based upon competency of standards, and can create flexible learning time and space (Pane et al., 2015; Penuel & Johnson, 2016). The environment additionally creates time during the day for additional individualized support for all learners, from intervention to enrichment (Pane et al., 2015). In 2015, Charlotte-Mecklenburg School District in North Carolina embraced Personalized Learning and aimed to develop the whole child while empowering them to take ownership of their learning. The district anticipated implementation by providing students with multiple pathways to demonstrate mastery learning to be successful and productive 21st century citizens in an ever-changing world (AASA, 2019).

In an Australian school, students were given autonomy to work in a variety of physical and virtual contexts. Curriculum was personalized; learning opportunities were more individualized, along with group-negotiated learning. The data supported that there was student agency in investment and autonomous problem solving and the teacher was the key influence in effectively facilitating the use of learning spaces and personalized learning (Deed et al., 2014).

A longitudinal study of a personalized performance-based system in a rural school in Alaska demonstrated across the board that a school could be successful implementing this system of education (Sturgis, 2014). This particular school found improvements in language arts and math proficiency scores on the state assessment. The language arts scores increased from < 25% in 1992 to 80% in 2014, and math increased from < 25% to 58% during that same period. In 2006 the graduation rate was 45% and over the next 8 years it increased to 76%. Additional support and contact time for students occurred when attendance rates increased from 90% to a high of 97% over the course of the study.

Harmony Public Schools, in Texas, implemented a new STEM teaching approach. This model combined the ready-to-teach materials, with student choice and voice for classroom and out of classroom projects (Sahin & Top, 2015). This personalized learning approach revealed that students gained and benefited from the new model approach to STEM instruction based on the post project interview with students and teachers (Sahin & Top, 2015). In addition, students frequently perceived project completion as a fun privilege. They developed ownership of the projects, took responsibility for their learning, and demonstrated resilience and independence with academic tasks (Kennedy, 2010; Sahin & Top, 2015).

In 2009 the DoED offered Race To The Top (RTT) grant opportunities for state education agencies "that are leading the way with ambitious yet achievable plans for implementing coherent, compelling, and comprehensive education reform" (DoED, 2009b, para. 1). The American Institute for Research looked at 16 RTT grantees and analyzed four main activities that emerged as central components of successful personalized learning programs through the lens of opportunities, promises, and potential challenges (Tanenbaum, Le Floch, & Boyle, 2013). The four main activities included:

1). Creating and implementing blended learning environments to include online, digital, and face-to-face, through effective connectivity to the internet.; to "improve and facilitate the process by which teachers are able to deliver common instruction in essential core content and meaningfully differentiate instruction to meet diverse student learning styles, preferences, and needs" (p. 4).

2). Developing and using individualized college and career readiness learning plans. The personalized pathways were created beginning as early as middle school and progressed through high school. Collaboration among the student, parents, school counselors, and teachers was key to the success of the personalized leaning plans.

3). Implementing competency-based models to support and accelerate students' progress through their learning plans. In this system, "Seat time is not the determinant of whether a student has mastered content. Rather, student progression is based on the pace at which the student is able to move through the activities and learning tasks and gain competency" (p. 10).

4). Engaging and empowering key stakeholder groups to ensure student success by including the broader community. This includes, but is not limited to, partnership development of job embedded learning opportunities, and building capacity of parents to be leaders for their child's learning.

Personalized Competency-Based Learning

The personalized competency-based approach provides the option to eliminate daily bells, the traditional semesters, and fixed timelines for grades. Students set weekly completion goals and worked independently with their teacher to accomplish their goals. This flexible learning environment optimizes the learning time for students and opens the pathway for more advanced students to progress more quickly. Those students who needed extra assistance are given additional support at the most appropriate time (Malan, 2000; State Department of Education, 2015; Sturgis, 2014).

In this learning environment students are empowered to become owners of their learning. It is tailoring learning for each student's strengths, needs and interests. It enables student voice and choice. Students determine what, how, when, and where they learn, and high standards for mastery are ensured by providing flexibility and supports at the appropriate time for the student (Patrick et al., 2013).

Adaptive Personalized Learning

Adaptive personalized learning is a data-driven process that adjusts to learners' interactions and demonstrated performance levels and anticipates the content and resources the learner needs to make progress. This constant formative assessment process attempts to provide the right next steps in the learner's progress (Newman, 2013). A key factor to enhance personalized learning is the learning system and its adaptive properties. The key is to offer the most appropriate learning path for students with the appropriate learning material based on their profiles (Mehmet et al., 2013).

The fundamental component is the degree of understanding by the student. Adaptive learning can support the learning process by tailoring learning materials to individual needs (Mehmet et al., 2013; Thalmann, 2014). As the focus on the individual learning increases, the learning and cognitive approaches need to be more diverse. This diversity comes by way of e-Learning and adaptive delivery. The research presented by Thalmann (2014) was designed to develop some guidance and criteria for adaptation needs for learning materials. The data Thalmann (2014) collected determined there was a set of thirteen adaptation criteria representing adaptation needs (see Table 6) to which the contents can be prepared. The set of thirteen criteria presented in Table 6 is critical to the success of e-Learning adaptation material.

Table 6.

Adaptation Criteria

Criterion	Description
Bandwidth	Data transfer rate that is available during a session with the system.
Content Preferences	Preferences, trust, and aversions for presented contents or content sources.
Device Requirements	Technical characteristics of hardware and basic software that are relevant for accessing the system.
Knowledge Structure	A list of terms or taxonomy of concepts, sub-concepts, and their relations in a knowledge domain.
Location	Physical coordinates which can be related to pieces of content.
Language	Ability or preference of a user for the language that is used for content delivery.
Preferences for Media Types	Preferences for the technical format of contents.
Presentation Preferences	Preferences for the style in which contents are delivered.
Previous Knowledge	Knowledge of the user, acquired in the past and relevant for using the system, which must be considered for the information provision.
User History	A collection of data describing previous interactions with an adaptive system on an individual or a group level.
User Status	User-related or environmental characteristics describing the user's current activities, cognitive load or stress level and their related impact on the user's ability to absorb knowledge.

Note: *Adapted from (Thalmann, 2014, p.54).*

Project-Based Learning

Project-based learning is an alternative to the traditional classroom where passive learning and rote memorization takes place. The teacher presents problems that students must solve in groups with the appropriate resources (Hosler, 2013). The following can be found in classrooms that are designed for project-based learning; Learning spaces to support collaborative work, student access to a variety of information and manipulatives, and available technology used for a purpose. The projects are student-guided, and the teacher plays a supportive and engaged role (Hosler, 2013).

In a science classroom, personalized learning can include joining multiple disciplines together with elements of project-based activities for students and changing the role of the teacher to a facilitator of learning and mentor (Munakata & Vaidya, 2015). The researcher restructured the traditional science class by creating a learning environment, stimulating creativity, and emulating what scientists would do. Students were given an open-ended approach to a science question with no step-by-step instructions to follow, and the freedom to explore without a known process to solve the problem.

This approach brought a playful side of science to the forefront of student consciousness, and in the end the project was a success. Students were able to complete the open-ended, project-based learning without the heroic efforts of the instructor to the rescue with all the answers (Munakata & Vaidya, 2015).

Conclusion

According to Sousa and Armor (2016), research determined there was little evidence for improving the academic achievement and closing the achievement gap of disadvantaged at-risk students nation-wide. Regarding the shift from traditional classroom instruction to differentiated classroom instruction, De Jesus (2014) found there are advantages and disadvantages to differentiated instructional methods. In the differentiated model, the teacher creates the plans and prepares each class and each student for differentiated learning, creating a large workload for the teacher and little effort on behalf of the students.

Personalized learning shifts the focus and work from the teacher to the student by creating, flexible-learning environments, and student needs drive the design of the learning environment. Personalized learning paths for all students are held to clear, high expectations, and each student follows a customized path that responds and adapts based on his/her individual learning (Bill & Melinda Gates Foundation, 2016). In addition, personalized learning in the Charlotte-Mecklenburg Schools (2015) aims to develop the whole child and empower them to take ownership of their learning, which are key elements of personalized learning. Ownership of learning is accomplished when the students have voice in the topics they are learning, choice in the method they are learning through, and the place where this learning happens (Fletcher, 2008).

The personalized competency-based education approach is an educational instructional method that is based on the belief that students learn best if they fully understand, or master, one concept before moving on to the next (Diegelman-Parente, 2011). Thalmann (2014) found that the method to personalize student learning requires access to an adaptive personalized learning system which meets the adaptive criteria noted in Table 5.

The need is great for research, as describe in chapter three of this document, to be conducted to give guidance on how the personalized approach can best meet the achievement needs of at-risk students. The research presented by Vygotskiĭ et al. (1978) provides evidence that learners learn more effectively when they learn within their ZPD. The personalized competency-based model aligns closely with the ZPD theory by identifying and allowing struggling leaners more time to access texts and other instructional programs. “It reinforces the content and skills under study to ensure they have the necessary time to become proficient and be prepared for the next level of instruction” (Tanenbaum et al., 2013, p.10). The advanced student can take higher-grade level classes and explore topics of study more in-depth.

Chapter III

Design and Methodology

The purpose of the study was to examine if personalized competency-based learning had an impact on the achievement of at-risk students, specifically in reducing the achievement gap on standardized tests. Specifically the study was designed to apply the theory of Vygosky's Zone of Proximal Development (ZPD) that was introduced in the district through the integration of personalized learning for all students, kindergarten through 12th Grade, and measuring student progress upon mastery of content, with support of the mentoring of teachers (John-Steiner & Mahn, 1996; Vygotskiĭ et al., 1978).

This chapter is divided into several sections to address the research questions, research design, participants, data collection, analysis methods, and limitations.

Research Questions

Can personalized competence-based learning provide at-risk students the skills and knowledge needed to close the achievement gap on the state ISAT Mathematics and English Language Arts/Literacy assessment for students in third through eighth grades and tenth grade after a two-year treatment of personalized competency-based learning? The following two sub-questions guided the data collection and statistical analysis to answer the research question:

Sub-question # 1 Will ISAT scores improve for at-risk students taught by personalized competency-based learning techniques when compared to at-risk students taught by traditional methods?

- Hypothesis # 1 - There is no significant difference on the ISAT Mathematics ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grade taught with traditional methods and at-risk students taught with personalized competency-based learning methods.

- Hypothesis # 2 - There is no significant difference on the ISAT English Language Arts/Literacy ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grade taught by traditional methods and at-risk students taught by personalized competency-based learning methods.

Sub-question #2 - Will the difference in ISAT mean scores for at-risk students and not-at-risk students be reduced if at-risk students are taught by personalized competency-based learning methods?

- Hypothesis # 3: The difference in the mean scores on the ISAT Mathematics exam, between statewide not at-risk students and the district at-risk students, will be reduced when at-risk students are taught using the personalized competency-based learning methods.
- Hypothesis # 4: The difference in the mean scores on the ISAT English Language Arts/Literacy exam, between statewide not at-risk students and the district at-risk students, will be reduced when at-risk students are taught using the personalized competency-based learning methods.

Research Design

The Board of Trustees for the school district approved the researcher's request to conduct the study (see Appendix C). The guidelines of the Family Educational Rights and Privacy Act of 1974 (FERPA) were followed to protect the rights and privacy of the students. The researcher holds a Certification of Completion from the National Institutes of Health (NIH) Office of Extramural Research (see Appendix D) and received approval for the study from the Institutional

Review Board (IRB) through Northwest Nazarene University. In addition, the researcher was employed at the research site and the data was collected by way of a secure state website.

Prior to the implementation of personalized competency-based learning, the district applied for and received the Apple ConnectED grant which included a four-phase implementation and deployment; the first phase established a communication expectation between the team from the district and the team from Apple. During this phase, the district was required to join Apple on a conference call to review the progress of each phase of the project. It was during this time that the district created its mission and vision for the utilization of the forthcoming technology (Appendix E). Included was also how staff would interact with students, develop integrated technology lessons, create a pathway for student digital citizenship, communicate with stakeholders, and begin to transform students from consumers of information into creators of information with the use of the iPad.

The second phase was a survey of the district's infrastructure. Technicians from Apple visited the schools and surveyed the technology infrastructure to determine its capacity. The results indicated that an upgrade was needed to support the coming individual student iPad deployment and connectivity internally and externally. The upgrade included Cat 6 Ethernet cables which connected to 50 wireless access points, to accommodate every location on the district's property, where students are accessing learning. In addition, a fiber optic cable was added between the mid/high school and elementary school buildings to increase internet speed for the whole campus. Once the infrastructure was installed it was turned on and checked for stability of the connection.

The third phase was the deployment of a MacBook Air and iPad for each staff member, in conjunction with 16 days of professional development. The first day that teachers received devices, the expected technology training began. This training was provided by two Apple trainers in a workshop setting allowing teachers to become familiar with the devices and their unique platform of operation. The initial training lasted two days and the following 14 days of professional development were spread out throughout the next 12 months. After the initial training, teachers were to begin to use the devices to gain familiarity and prepare for when students would be using iPads.

The fourth and most visual phase was the deployment of iPads to all kindergarten-12th grade students in March of 2016. To support this deployment, the area Apple retail store employees drove 40 miles to the district and donated their time and helped students turn on the iPads and work through the initial set up. This hands-on support for every student allowed for quick set up and activities to familiarize students with multiple device tools.

The district redesigned many of the traditional teaching approaches, changed their education mission and vision to provide the personalized competency-base student-centered system of teaching and learning (Appendix E). Changes included turning off all bells that typically indicated when students moved from classroom to classroom. Grade-level identifications were removed to open opportunities for student movement through the curriculum based solely on competency of content and standards, instead of the changing of school year based primarily on age of the student. Teachers were provided weekly professional development to increase their skill in mentoring students to own their learning through goal-setting and developing 21st century skills, and to teach/mentor multi-grade levels in one classroom of the same aged students.

Prior to students being introduced to personalized-competency-based instruction, assessments were given to place the students at their appropriate ZPD level in reading. For the kindergarten level, a district pre-assessment was given to students that included letter, number, color and shape identification. The results of that assessment allowed the teacher to level the students at their mastery level of reading and provided the initial learning place for every individual student. For example, in 2016 there were approximately 32 of the 48 kindergarten students who entered Kindergarten at the start of the year unable to identify a letter or numbers and two students who were able to read Reading A-Z level A books, with the balance of students who knew several letters or numbers. Each student was taught and instructed in reading at their independent mastery level (Learning A-Z, 2016).

First grade through fifth grade readers were placed at their reading ZPD level according to Reading A-Z benchmark assessments. These were administered by the teacher at the beginning of the year or upon enrollment to the class. If the comprehension assessment accuracy score was at 85% or higher the student was placed at that level benchmark which was that student's independent mastery level ZPD level. If the student scored lower than 85%, then a lower level benchmark assessment was given to determine mastery. This process will continue until an appropriate ZPD level was established as instructional (Learning A-Z, 2016).

Once the mastery reading level was established, the teacher utilized the guided reading protocols to support the independent reading process for balanced literacy (Fountas & Pinnell, 1996). The protocols included the teacher selecting the appropriate text, and meeting with an individual student or a small group of students. The teacher began by introducing the book with visuals, structure, and meaning. Next the teacher asked some clarifying questions about the introduction of the book. New vocabulary was introduced from the text, usually unknown or recently learned vocabulary. Finally, students were given the autonomy to read the text as many times as they preferred before answering comprehension questions. Comprehension questions could be oral questions given by the teacher based upon the level of the reader or aligned worksheets assigned either electronically or traditional hardcopy, as per the preference of the student. During the independent time, where the student was reading and or working on comprehension questions, the teacher circulated around the room to check-in and listen to student reading or spot checking for comprehension. During this check-in the teacher attended to the reading behaviors and watched for evidence of various strategies being utilized by the reader. It was during the check-in time that the teacher determined difficulties with understanding or comprehension and implemented the ZPD methodology of assisting and scaffolding the student from the known skill to the unknown skill.

As the teacher determined the success or lack of the independent reading by the student, the teacher adjusted the next steps needed to support the reader. The teacher used this knowledge to implement reading strategies that fit the level of the reader to support his/her ability to access the needed knowledge at the particular reading level. For example, the student may have been assigned a reading partner at the same reading level for a partner read. This is where each student reads their book to their partner and the other student listens to the story and asks comprehension questions of the reader.

As the student concluded the reading episode, the teacher revisited the text with the student(s) and elicited personal response tied to the outcomes of the text level. These included the state reading standards that were required to be mastered prior to progressing on to a more complex text. In addition, the students were given the opportunity to explore the whole story, check for predictions, react personally to the story, or create a written summary of the author's purpose (Fountas & Pinnell, 1996; Learning A-Z, 2016).

Kindergarten through 5th grade writing was addressed with the utilization and implementation of the Lucy Calkins writing curriculum and aligned with the state writing standards (Calkins, 2013). Each performance level followed the assessments and learning progression that included mastery level appropriate opinion writing, information writing, narrative writing, and persuasive writing. For each developmental writing section, students were given a pre-writing assessment. Upon grading the assessment, the teacher developed an individual pathway based upon what the student had or had not mastered in the pre-assessment writing sample. The teacher provided lessons from the curriculum for developing a thorough writing progression, and at the conclusion of the writing section an on-demand performance assessment prompt was given. The assessment was graded using the program created rubric, and reteaching occurred accordingly to allow the student to reach mastery.

As is typical in a balanced literacy approach, the teachers provided phonics lessons based upon the individual student's needs from assessments provided by Pinnell & Fountas, (2003). In addition, teacher-created lessons were provided to students that included word sorts, picture cards, language games and activities as well as cross curricular material from science. Teachers modeled the activities in a whole class or small group setting. After students became familiar with the activities, students then practiced independently, with a partner or in a small group. The teachers provided new material every few days in order for students to grow academically and to keep engagement high. In mentoring sessions, with the teacher or other students throughout the activities, attention was paid to ensure that the student had successfully mastered the concept.

Sixth through eighth grade reading was taught utilizing the Spark e-Learning curriculum, for the 2016-2017 school year and the Edgenuity e-Learning curriculum for the 2017-2018 school year. The Spark curriculum content was implemented to focus on individualization, differentiation, and personalization, aligned with state standards, customized by teachers, adapted to the level of student leaning, and accessed when needed by students (Onfire Learning, 2016). The Edgenuity curriculum was accessed by the students on and off campus. In addition, the online courses and curriculum were grounded in research and aligned to state standards. It combined direct-instruction videos featuring expert, on-screen teachers with rigorous assignments, performance tasks, and assessments to engage students and ensure subject-area mastery (Edgenuity, 2018). After the first year with Spark, teachers and the principal reported that the curriculum was limited on content needed for middle school students. The district took measures to find an e-Learning curriculum that was personalized for the student, academically rigorous, and customizable by the teacher. The district chose the Edgenuity curriculum to replace Spark.

Each of the programs provided a pre-assessment and provided the teacher and student with data outlining the appropriate skill level in order for the student to be placed appropriately. After the student was placed at this ZPD level, the curriculum provided the lessons and daily work for the student. For a student who was behind the desired grade level mastery, the pace was increased by supporting the student with additional time to advance and achieve expected traditional grade level mastery. The teacher monitored all online progress and had daily face-to-face check-ins with students on their progress. To accommodate student choice, another option for accessing reading content were one-on-one meetings with the teacher and a print out of the online work was provided to the student. In addition, students had the choice to complete a project to demonstrate mastery of the reading standards they were working on. This project was developed in cooperation with the teacher, in order to assure that the standards were addressed appropriately in the project. A limited number of students choose this option.

Tenth grade reading and writing was included in the 10th grade English class. The content for 10th grade English course was comprised of Spark and Edgenuity as described in the sixth through eighth grade reading programs. This was a credit bearing course and all students were required to complete the content with an 80% passing rate on all assignments and tests before they could proceed.

Prior to students being introduced to personalized-competency-based instruction, assessments were given to place the students at their appropriate ZPD level in math. For mathematics, students in Kindergarten through fifth grade were placed on the Dreambox e-Learning curriculum. The DreamBox math curriculum adapted to each student's learning needs at their ZPD mastery level with personalized instruction that promoted student decision-making and strategy development (Dreambox, 2016). In addition to the Dreambox curriculum, teachers supported mathematics learning with diverse mathematics strategies that were individualized and included use of math manipulatives, one-on-one instruction, teacher created supplemental games and activities, or small group instruction as prescribed by their personalized plan.

Mathematics instruction for tenth grade was introduced through a variety of online programs or teacher created lessons. Choices for e-Learning content included Flipped Math which allowed students to demonstrate mastery of all concepts and standards while progressing at their individual pace, Spark, and Edgenuity. This extensive variety was driven by the unique learning needs of the students. All of the content provided aligned with the state math standards, and allowed for diversity of mastery options for students. Some students preferred the video lessons of one program and other students preferred the printable versions of the online program with the instruction provided by the mathematics teacher. The teacher monitored all online progress and met with students daily to review their progress. There was no seat time requirements for course credit attainment, and in some cases, students completed a year's worth of reading or mathematics in as little as eight weeks.

The district required that all teachers meet weekly with all students to establish learning goals for the week. Each goal setting session required a deep knowledge of each student's learning levels and subject progression. In this meeting the teacher and student looked closely at the progress made the prior week to determine which goals needed to be adjusted moving forward and which goals had been reached. In the coming week, the new goals provided the students with a clear set of expected outcomes to strive for. During the week, these goals allowed the teacher to determine how best to mentor the student toward mastery.

The district provided an early release day for students once a week, allowing for professional development time for all staff. The professional development was delivered by experts from Apple, trainers from Edgenuity, Spark, Learning A-Z, in-district content experts, and district administrators. During the first year of implementation of personalized competency-based learning, time was designated to support teachers in several areas. First, to provide training on the utilization and implementation of iPads as a tool for student learning. Teachers were trained on classroom apps, iPad accessibility tools, iMove, Garage Band, Keynote, and Classroom Manager. Next, teachers were trained to use the online learning platforms, which were personalized to the appropriate grade level and content on instruction. Following this, teachers and administrators addressed the challenges that arose from the paradigm shift from traditional teaching to personalized competency-based teaching. Support and opportunities for growth came from the administrators or from expert staff in personalized competency-based learning. Finally, teachers reflected weekly on successes of the prior week, often sharing the success of a specific student who turned the corner from falling to succeeding. Occasionally, teachers shared situations where they were successful in understanding the new learning methodology and the tools that supported the effort.

The professional development time was also used to address some of the challenges in the second year of implementation. These challenges included training new teachers and teachers changing teaching levels to provide additional supports to get the needed training to match what had already been provided. This training was provided by in-district staff with an expert understanding of the new learning platforms, personalized competency-based instruction, and use of iPads. There were no professional development meeting agendas collected during this research.

The state assessment data came from the ISAT, a computer adaptive standardized test. This assessment is a required standardized assessment for students in third through eighth grades and tenth grade level students based upon the Idaho's Consolidated Sate Plan for the ESSA requirement (Idaho State Board of Education, 2018). On the ISAT, academic achievement is determined by the continuously enrolled (greater than 56 days) student who demonstrates mastery of content standards and reaches a proficient or advanced level of performance on the mathematics and English Language Arts/Literacy (ELA) exams. The performance level of student achievement is reported as:

1). below basic,

2). basic,

3). proficient, or

4). advanced.

These proficiencies or advanced scores are calculated for each school to determine the academic achievement percentage and used for one of several measures for accountability. On the school report card, the ISAT targets the percentage of proficient students (PPS) and percentage of the gap closure on the mathematics and ELA assessment for Grades 3 through Grade 8 and Grade 10 (SDE, 2018a).

Nationally, the PPS has become the primary indicator of student and school performances. These percentages are monitored over time and compared across groups to determine trends in achievement gaps in student populations at all levels. It is important to note that relying upon a single indicator like PPS, to identify a student or school's achievement, can limit the ability of educators and policymakers to understand the complexities of the test scores, trends, and gaps. The limitations PPS as a primary indicator of achievement are the heavy reliance on cut scores which can mislead inferences about student performance gaps and trends, and the often not-normal student distributions (Gossin-Wilson, 2009). In addition, Gossin-Wilson "strongly recommends the use of multiple measures and discourages the reliance on any single measure" (2009, p. 1).

This quantitative study was a quasi-experimental one which examined the treatment of a personalized competency-based learning environment (independent variable) for at-risk students and how that treatment affected those students' performance on the state-wide ISAT assessment (dependent variable). Student data were selected from students who had been in the district for at least two years and had received the personalized competency-based learning treatment. Student data from those who have not received two years of the treatment were excluded from the research. The ISAT is given to all students in Grades 3 through 8 and Grade 10 throughout the state. In response to needed research beyond a single grade level of study, these grade levels were chosen to seek a more comprehensive understanding of the treatment. The comparative data represent scores students received on the ELA and Mathematics ISAT assessments prior to the personalized competency-based learning treatment; the post-data are the scores students received after two years of personalized competency-based learning. Based on the findings of Gossin-Wilson (2009), it is best to use multiple measures to indicate performance changes. To determine the performance gap changes in this study, the mean and the effect-size were utilized from the SPSS output.

The first and second hypotheses addressed the differences in performance on the ISAT assessments in relation to the change in the type of instruction students were provided. The independent variable for both hypotheses was personalized competency-based learning and the learning methodology factor manipulated to determine the outcome in the dependent ISAT test. The not-manipulated instruction methodology was the traditional instructional approach. The traditional methodology placed students at grade-levels based on age, and students were taught with curriculum based on that grade-level. An independent sample t-test was utilized to compare the differences between the means of the groups with two different experimental conditions (Field, 2015).

The first two hypotheses required collection of students' 2016 ISAT assessment scores for English Language Arts/Literacy and Mathematics of all district third- through eighth- and tenth-grade students prior to the treatment of personalized competency-based learning. The 2016 means scores of each grade level were compared to mean scores of students at the same grade level two years after students had been taught using the treatment (see Figure 1). For example, all fifth-grade students (Cohort 1) took the fifth-grade 2016 ISAT Mathematics assessment. Their scores were compared with the fifth-grade student scores (Cohort 2) from 2018 ISAT Mathematics assessment after Cohort 2 had been taught using the personalized competency-based learning. The individual assessment scores from Cohort 1 were compared to the assessment scores of Cohort 2 to determine if there was a significant change in the scores after the treatment.

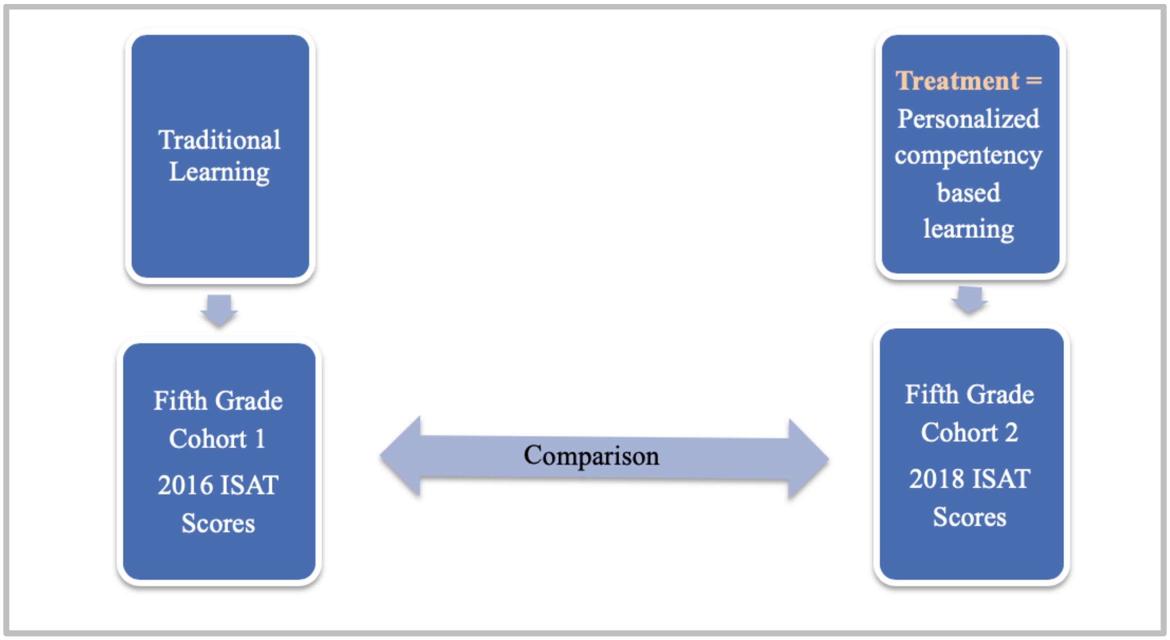

Figure 1. Example of How Sub-question 1 Data Was Compared

The third and fourth hypotheses required collection of grade-level 2016 ISAT assessment data for all third- through eighth-grade and tenth-grade students for both English Language Arts/Literacy and Mathematics. Prior to the spring 2016 ISAT data collection, students were taught in a traditional manner with grade-level appropriate content regardless of their competency level or ZPD. The scale score mean achievement gap, between district at-risk and the state not-at-risk in Table 7 indicates the ELA baseline achievement gap, while Table 8 indicates the mathematics baseline achievement gap. The differences in ISAT mean scores for ELA and mathematics assessment from 2016 were compared to the differences in ISAT mean scores for ELA and mathematics assessment to determine the impact of the changes in instruction.

Table 7.

2016 ISAT English Language Arts/Literacy - District At-Risk Compared to State Not At-Risk

	District at-risk			Statewide not at-risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	28	2399.75	65.70	8,333	2460.89	72.70	61.14
4th	44	2400.14	78.8	8,442	2506.23	75.05	106.09
5th	40	2446.88	70.09	8,758	2544.72	76.34	97.84
6th	37	2467.95	80.62	9,143	2564.51	73.21	96.56
7th	34	2478.00	79.17	9,603	2587.61	78.85	109.61
8th	21	2529.19	61.10	9,624	2605.06	79.36	75.87
10th	26	2547.88	78.99	10,076	2637.10	88.87	89.22

Table 8.

2016 ISAT Mathematics - District At-Risk Compared to State Not-at-Risk

	District at-risk			Statewide not at-risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	28	2403.04	75.73	8,328	2467.27	64.05	64.23
4th	44	2406.57	54.46	8,434	2511.52	67.57	104.95
5th	40	2438.98	53.04	8,749	2539.99	71.90	101.01
6th	37	2437.86	74.55	9,123	2564.65	79.18	126.79
7th	34	2460.29	78.23	9,581	2582.33	81.61	122.04
8th	21	2486.43	54.71	9,606	2595.39	95.43	108.96
10th	26	2483.04	58.68	10,066	2595.39	100.89	112.35

Beginning in March 2015, the district deployed individual iPads to all students and staff. For the remainder of the 2015 school year, the district, with Apple professional development support, provided weekly teacher personalized competency-based learning and iPad classroom utilization professional development, to support the personalized competency-based learning environment for staff and students in the district. In the beginning of the 2016 school year all instruction and curriculum were delivered at each student's ZPD level based on adaptive testing, instead of their age-grade level, for student in kindergarten through 12th grade. The ZPD instructional delivery eliminated the traditional grade-level identification for all students.

In keeping with the personalized competency-based learning theory, this model provided the opportunity for students to be included in the decision-making process deciding the amount of time spent on subjects and the sequencing of when subjects were delivered. In addition, students were often given the choice of an on-line curriculum, worksheets from the online curriculum, or the opportunity to demonstrate competency through a project-based activity built upon the on-line curriculum standards. Once the student demonstrated competency of the content standards, they would then progress onto more challenging content. This effort was incorporated to support the closing of the achievement gap for a-risk student population in the district.

Following two years of treatment (personalized competency-based learning where students progressed based on a demonstration of standards aligned competency), student ISAT assessment data were collected for previously identified at-risk students in both English Language Arts/Literacy and Mathematics enrolled in the district. The 2016 mean score data for students in each grade level (third through eighth grades and tenth grade) in Idaho as identified as not-at-risk, to students in each grade level (third through eighth grades and tenth grade) as identified as at-risk in the district to determine the performance gap. The same mean score data comparison was conducted on the 2018 ISAT in each grade level to determine if the gap had been decreased.

For example (see Figure 2), all seventh-grade-level at-risk students in the district of study took the seventh-grade ISAT Mathematics assessment prior to the treatment. Utilizing the descriptive statistics methodology, the 2016 ISAT mean scores from the at-risk group were compared to the same grade-level, not-at-risk student mean scores from the state. After the at-risk students from this district received the personalized competency-based learning treatment for two years, the 2018 ISAT data were collected using the same descriptive statistics method and the mean scores analyzed. The difference in the means of 2018 district at-risk and state not at-risk students from 2016 was compared with the difference in means of the district at-risk and the state not at-risk students to determine if those differences changed. This comparison showed the achievement gap either widening or decreased.

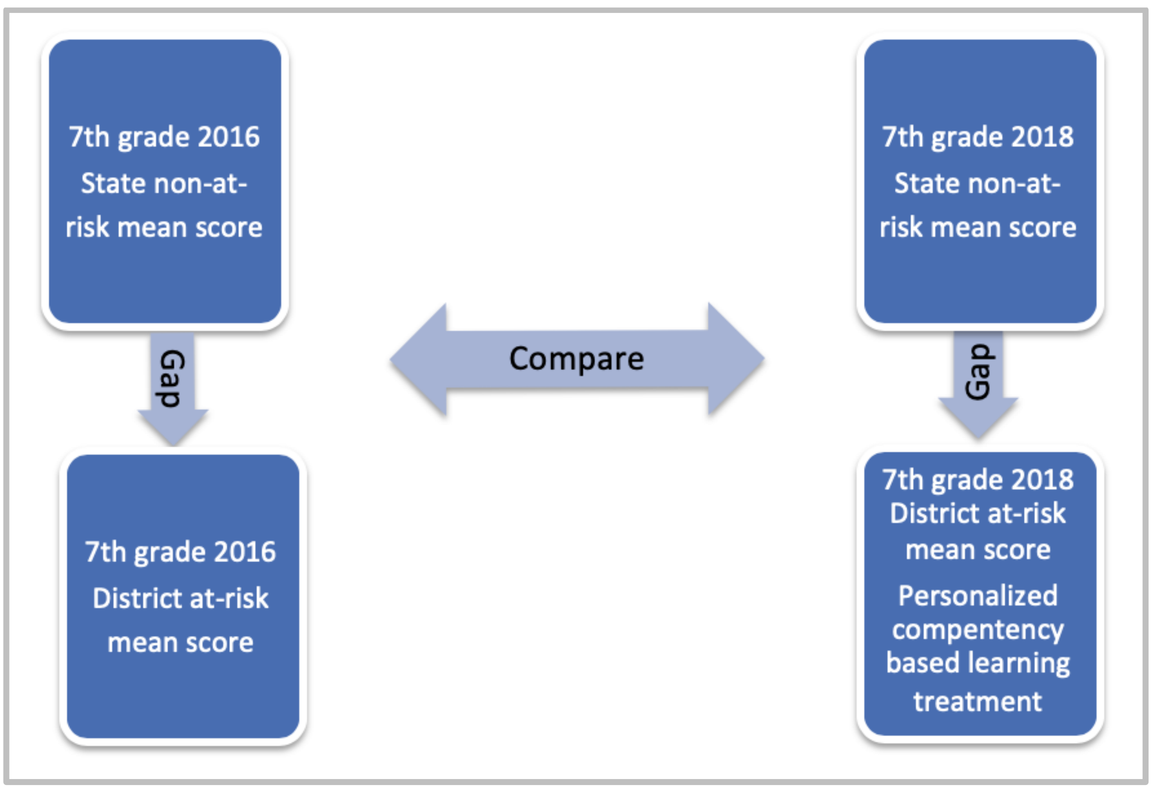

Figure 2. Example of How Sub-question 2 Data Was Compared

Participants

Participants in this study attended a rural public-school district located 45 miles from the state capital. This primarily agricultural area is home to several labor-intensive crops. This intensity provides many jobs for families living in the area. A large cross-section of employment in this area was agriculture-related. The primary type of work was manual labor and paid at the lower end of the pay scale. There is only one manufacturing facility in the area of this study, with an approximate employment of 200 individuals, and it too pays at or near the state's minimum wage. The community housing within the city limits is divided into four major areas; the farmworkers camp of 90 rental apartments, middle of town with 80 plus year old homes, many of which are in poor condition, 30 track houses built in the late 1960's, and a newly added section of 30 starter style homes. It is important to note that 67% of the study participants come from within the city limits. The other 32% come from outside the city limits and live in homes as diverse as those within the city limits. As noted in Table 8 all participants are identified on the state student informational data system and state assessment report as at-risk due to the multiple at-risk designations, including poverty, and minority.

There were two school buildings, one was a kindergarten through fifth grade with 255 students and the other was a sixth through twelfth grade with 261 students at the October 30th, 2018 reporting period. These two schools were located on the same campus within the city limits. The demographics and the percentage of students that received a free breakfast and lunch, are summarized in Table 8. One additional unique statistic was the large percentage of students who came and left throughout the year and are represented in the Student Mobility Table 9. This table provides the year the data was collected, the number of students enrolled who were new to the district, the number of students who exited prior to the end of the school year, the total district enrollment for that specific year, and the percentage calculation for the student mobility. The largest percentage of students, who entered and left the district in a single year, was during the initial year of the study in 2015/2016 school year at 42%.

Table 9.

Wilson School District Demographics Summary by Grade - 2018

	K	1	2	3	4	5	6	7	8	9	10	11	12	Totals
Female	20	8	22	20	20	25	16	30	20	24	21	5	14	245
Male	29	26	20	21	30	22	19	19	26	16	19	14	17	278
White	19	9	15	16	14	9	12	16	7	7	8	5	8	145
Hispanic	26	24	27	24	35	37	22	32	37	33	32	14	23	366
Other	4	1	0	1	1	1	1	1	2	0	0	0	0	12
LEP	21	21	21	18	18	21	8	9	16	8	9	3	4	177
SpEd	3	1	3	2	3	5	6	9	4	8	5	1	3	54
Migrant	2	2	3	4	2	3	2	4	2	1	5	1	0	31
At-Risk	49	34	42	41	50	47	35	49	46	40	40	19	31	523
FRL	49	34	42	41	50	47	35	50	46	40	40	19	31	523

Note: LEP = Limited English Proficient; SpEd = Special Education; FRL = Free Lunch

Table 10.

Wilson School District Student Mobility - 2018

School Year	Fall Enrollment	Enrolled	Exited	Mobility
2015/2016	447	100	89	42%
2016/2017	477	83	74	33%
2017/2018	505	97	98	39%

Note: Enrolled = Enrolled in the fall of that year new to the district or newly enrolled during the school year; Exited = Exited during that school year, prior to June 1st.

Instrument

The SBAC was responsible for creating and validating the standardized assessment also known as the Idaho Standards Achievement Test (ISAT) assessment. "The five sources of validity evidence consist of:

1). test content,

2). response processes,

3). internal structure,

4). relations to other variables, and

5). consequences of testing (SBAC, 2016, p. 14).

The reliability is the essential measure of consistency of an assessment. The National Center for Research on Evaluation, Standards & Testing (CRESST) conducted the test reliability study for the SBAC. Test reliability was estimated by simulations using operational summative item pools. This methodology was used because the Smarter Balanced tests are adaptive. The CRESST-presented data for bias and overall estimated reliability coefficients are high, between .90 to .99 for all grades, which was determined to be acceptable for a high stakes test (SBAC, 2016).

The adaptive test generates scale scores that fall on a continuous scale from approximately 2000 to 3000. Scale scores are more precise than achievement categories in representing student growth or changes in achievement gaps between groups. The scale scores increase across grade levels and can be used to illustrate students' current achievement level and growth over time. The scale scores, when combined across various populations and subpopulations, can describe changes in performance and reveal gaps in achievement (SBAC, 2018).

Data Collection

Data were collected from the 2016 and 2018 ISAT Mathematics and ELA assessments. All data for state-wide pass rates and state-wide mean scale scores were collected by the State Department of Education, stored in a secured server, and only accessible to state and district officials for their specific district student data. All state individual student data is kept confidential and displayed only as aggregate percentages. The state-wide data collected by the researcher were summary mean scale scores and the PPS data in proficiency levels fell into the following categories: Below Basic, Basic, Proficient and Advanced. The categories considered proficient included only the proficient and advanced scores. The district data collected were the individual student mean scale scores and included the PPS proficiency levels.

In this study, the researcher collected demographic information for participants in the researcher's district, such as grade level, inclusion in any special programs (Special Education, Gifted & Talented, Migrant, and English as a Second Language), and the length of enrollment in order to compare the difference between two means and generally explore data with descriptive statistics. Student achievement data were collected from the 2016 and 2018 spring ISAT scores for Mathematics and ELA exams. In addition, students were filtered out of the study if they had not received the full two-year treatment of personalized competency-based instruction.

Analysis Methods

The research study conducted was a quantitative study which examined the effectiveness of a personalized competency-based learning to close the achievement gap between an at-risk student population as measured by the ISAT Mathematics and English Language Arts/Literacy assessments verses not-at-risk students state-wide.

To test the first two hypotheses, an independent sample t-test was conducted using IBM's SPSS version 24. The district at-risk students experienced the personalized competency-based learning treatment for two years prior to the 2018 spring ISAT assessment. The independent variable (personalized competency-based treatment) was manipulated by changing the traditional teaching methodology to the personalized competency-based methodology for all students in the district. The t-test was used to compare mean test scores for students at each grade level tested from 2016 prior to implementing the treatment with the scores of the same grade level from 2018 after two years of treatment. The output of this hypothesis included the difference between the mean score in each condition, the standard deviation of the scores of the two sets of data, the standard error of the difference between the participants score in each condition, the statistic test, and a two-tailed probability significance (Field, 2015).

Hypothesis three and four utilized a descriptive statistics methodology to describe the data set ran in IBM's SPSS version 24. Descriptive statistics were used to compare the difference between the mean scores for the state not at-risk and the district at-risk students at each grade level in 2016 and 2018. The dependent variable in this study was the district at-risk student ISAT assessment scale scores, which were then compared to the gap before and after the treatment to the state not-at-risk student on the ISAT assessments for Mathematics and ELA exams. The independent variable was the treatment or personalized competency-based teaching and learning methodology. The sample size for the state not-at-risk students was larger than the sample size of the district; the sample size for each grade level was relatively small, 50 students, but large enough to provide a normal distribution (Field, 2015). The gap between the mean scores for the district at-risk students and the state not at-risk students in each grade level in 2016 on the ISAT assessments where compared to the gap between the district at-risk students and the state not at-risk students in 2018 on the ISAT assessments. The descriptive data comparison determined if the gap was widening or closing.

Limitations

Limitations identified by the researcher are "potential weaknesses or problems with the study" (Creswell, 2015, p. 197). The researcher made use of student data from the school district he works for as a district administrator. This may indicate researchers' bias to be addressed in this study. The researcher did ensure that all necessary measures were taken to maintain student privacy per FERPA regulations and has carefully selected the most appropriate statistical analysis and methods to maintain integrity of the research and meet ethical expectations for quantitative research.

Teachers' buy-in to the level of personalized competency-based learning implementation was variable, though not formally measured. Two teachers moved from the elementary building to the middle/high school between year one and year two. Three new teachers were hired between the years 2017 and 2018, one to teach fourth grade, one at the middle school to teach writing, and one at the high school to teach English. There was no way to assess the impact these changes had on the results.

The district provided extensive professional development to the teachers on how to use and implement technology and the iPad in the classroom, but due to turn over in staff, those who were new did not receive the same professional development. For students, there was no uniform way in which student were trained to use the iPads in order to provide evidence or their knowledge or ability to use the iPads.

Another limitation was the at-risk student identification by the district. The district allows all students to receive a free breakfast and lunch (FRL) which classifies all of them as at-risk. The assumption was that even though the district is classified 100% at-risk due to poverty, there would be a few participants in the study who would not technically meet at-risk designation.

The length of time for treatment of the personalized competency-based instruction was two years. The time allowed was short for such a significant change in teaching and learning. This two-year treatment could be too short for the study to show expected changes in the gap of achievement between at-risk and not at-risk students. Additionally, teacher piloted the instructional approach in the spring of 2015 after the deployment of the individual iPads and weekly training began. Scaling up the personalized competency-based instructional approach was rapid at the start of year in September 2016 for teachers and students. Within a month, the initiative was operational throughout the district.

After students were placed at their ZPD, and growth was based upon the competency of standards, grade levels were removed. This shift provided students the opportunity to learn at their mastery level and not grade-level based upon age, causing many students to be taught with lower “grade-level” content. The ZPD instruction supported the personal learning needs of the student but when it came to taking the ISAT assessments, the student was required to take the assessment at the age appropriated grade level. For example, a fifth-grade age student mastering mathematics content at a fourth-grade level was required to take the Mathematics ISAT at the fifth-grade level. This also was the case for students mastering above their grade level age.

Finally, the ISAT is a high stakes assessment, and was implemented in the state in 2015, one-year prior to the beginning of this research. The newness of the assessment could have caused some anxiety, or there could have been a lack of understanding of how to take the assessment for the student. The new assessment with a new online format could have been unfamiliar to students, or they may not have known how to utilized the assessment tools. Did the student understand how to answer the questions in the correct manner? If the district did not put the appropriate time and effort into preparing students to take the assessment prior to or during the treatment years, then the data could be skewed and not appropriately represent the gap or closing of the gap.

Summary of Design and Methodology

Chapter 3 highlighted the study's design and treatment. A quantitative study was selected to investigate the closing of the achievement gap for at-risk students in a K-12 rural public school when personalized competency-based instruction and learning was implemented. To determine if the achievement gap was closing, ISAT data was collected for the spring assessments for ELA/Literacy and Mathematics in 2016 and 2018. The 2016 data, in the district, was compared to the 2018 district data. Grade level student test data was compared to district at-risk students before and after implementation of the treatment. This informational data was analyzed through an independent sample t-test and IBM's SPSS version 24. In addition, the difference in district at-risk student mean scores before and after treatment was compared with the difference in the state not at-risk student mean scores for the same years. Limitations of the study included that the researcher was the administrator in the district, the small sample size, and the short treatment period (Creswell, 2015). Some additional district limitations included teacher buy-in, at-risk identification in the district, student skill level with technology, teacher skill level with technology, and the change in teacher assignments within the treatment period.

Chapter IV

Results

Chapter 4 provides a summary of the results of this study including the analysis of the data by a combination of inferential and descriptive statistics. Considering the historical perspective of ESEA, NCLB and now ESSA, one of the foundational pillars that was evident in each reauthorization was to close the achievement gap for at-risk students (DoED, 2001, 2015). The Wilson District administration desired to learn if the shift from a traditional learning environment to a personalized competency-based learning environment would be successful in closing the at-risk achievement gap. Specifically, would personalized competence-based learning provide at-risk students the skills and knowledge needed to close the achievement gap as measured by the state ISAT Mathematics and English Language Arts/Literacy assessments for students in third through eighth grades and tenth grade after a two-year treatment? The following two sub-questions and four hypotheses guided the data collection and statistical analysis to answer the research question:

> Sub-question # 1: Will ISAT scores improve for at-risk students taught by personalized competency-based learning techniques when compared to at-risk students taught by traditional methods? Hypothesis 1 and 2 will be provided at the beginning of the results section for each hypothesis.
>
> Sub-question # 2: Will the difference in ISAT mean scores for at-risk students and not-at-risk students be reduced if at-risk students are taught by personalized competency-based learning methods? Hypothesis 3 and 4 will be provided at the beginning of the results section for each hypothesis.

Sub-question 1 Results

Sub-question 1: Will ISAT scores improve for at-risk students taught by personalized competency-based learning techniques when compared to at-risk students taught by traditional methods? The results of the study will be reported for each hypothesis in the section including the results for the t-test used for analyzing the data. The complete SPSS printout of the analysis for hypothesis 1 and 2 can be found in Appendix F.

Hypothesis # 1. There is no significant difference on the ISAT Mathematics ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grade taught by traditional methods and at-risk students taught by personalized competency-based learning methods. To analyze hypothesis 1, independent samples t-tests were conducted to examine if there was a significant difference on the ISAT Mathematics ($p \leq .05$) scores of at-risk students at each grade studied when taught by traditional methods and at-risk students at the same grade level taught by personalized competency-based learning methods.

Third grade. Levene's Test for Equality of variance showed no violations, $p = .20$. Results in Table 11 indicate that students in 2018 ($M = 2370.03$, $SD = 84.30$) scored numerically lower on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students ($M = 2403.04$, $SD = 75.73$) who were taught traditionally, $t(58) = 1.59$, $p = .12$. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the third-grade participants. Cohen's d was calculated at $d = .41$, which is a medium negative effect based on Cohen's (1992) guidelines.

Fourth grade. Levene's Test for Equality of variance showed a violation and equal variance was not assumed, p = .002. Results in Table 11 indicate with the output option of a violation of variance was used in determining significance. Students in 2018 (*M* = 2427.59, *SD* = 78.37) scored numerically higher on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2406.57, *SD* = 54.46) who were taught traditionally, *t*(46) = 1.26, p = .22. Thus, the students taught with personalized competency-based methods scored numerically higher, though not significantly higher, than students taught by traditional methods. Thus, the null hypothesis was accepted for the fourth-grade participants. Cohen's d was calculated at d = .31, which is a small positive effect based on Cohen's (1992) guidelines.

Fifth grade. Levene's Test for Equality of variance showed no violations, p = .12. Results in Table 11 indicate that students in 2018 (*M* = 2465.20, *SD* = 74.23) scored numerically higher on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2438.98, *SD* = 53.04) who were taught traditionally, *t*(58) = 1.58, p = .12. Thus, the students taught with personalized competency-based methods scored numerically higher, though not significantly higher, than students taught by traditional methods. Thus, the null hypothesis was accepted for the fifth-grade participants. Cohen's d was calculated at d = .41, which is a medium positive effect based on Cohen's (1992) guidelines.

Sixth grade. Levene's Test for Equality of variance showed no violations, p = .76. Results in Table 11 indicate that students in 2018 (*M* = 2410.19, *SD* = 79.50) scored numerically lower on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2437.86, *SD* = 74.55) who were taught traditionally, *t*(72) = 1.55, p = .13. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the sixth-grade participants. Cohen's d was calculated at d = .36, which is a small to medium negative effect based on Cohen's (1992) guidelines.

Seventh grade. Levene's Test for Equality of variance showed no violations, p = .23. Results in Table 11indicate that students in 2018 (*M* = 2426.03, *SD* = 90.76) scored numerically lower on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2460.29, *SD* = 78.23) who were taught traditionally, *t*(64) = 1.65, p = .11. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the seventh-grade participants. Cohen's d was calculated at d = .40, which is a medium negative effect based on Cohen's (1992) guidelines.

Eighth grade. Levene's Test for Equality of variance showed a violation and equal variance was not assumed, p = .03. Results in Table 11 indicate with the output option of a violation of variance was used in determining significance. Students in 2018 (*M* = 2459.73, *SD* = 93.71) scored numerically lower on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2486.43, *SD* = 54.71) who were taught traditionally, *t*(41) = 1.22, p = .23. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the eighth-grade participants. Cohen's d was calculated at d = .35, which is a small to medium negative effect based on Cohen's (1992) guidelines.

Tenth grade. Levene's Test for Equality of variance showed no violations, $p = .78$. Results in Table 11 indicate that students in 2018 (*M* = 2514.25, *SD* = 67.98) scored numerically higher on the Mathematics ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2483.04, *SD* = 58.68) who were taught traditionally, $t(40) = 1.58$, $p = .12$. Thus, the students taught with personalized competency-based methods scored numerically higher, though not significantly higher, than students taught by traditional methods. Thus, the null hypothesis was accepted for the tenth-grade participants. Cohen's d was calculated at $d = .49$, which is a medium positive effect based on Cohen's (1992) guidelines.

Table 11.

Mathematics ISAT Scale Scores

Grade/Year		n	M	SD	Sig. (2-tailed)	Difference in Means
3rd	2016	28	2403.04	75.73	.12	- 33.00
	2018	32	2370.03	84.30		
4th	2016	44	2406.57	54.46	.22	21.02
	2018	29	2427.59	78.37		
5th	2016	40	2438.98	53.04	.12	26.23
	2018	20	2465.20	74.23		
6th	2016	37	2437.86	74.55	.13	-27.68
	2018	37	2410.19	79.50		
7th	2016	34	2460.29	78.23	.11	-34.26
	2018	32	2426.03	90.76		
8th	2016	21	2486.43	54.71	.23	-26.70
	2018	26	2459.73	93.71		
10th	2016	26	2483.04	58.68	.12	31.21
	2018	16	2514.25	67.98		

Hypothesis # 2. There is no significant difference on the ISAT English Language Arts/Literacy ($p \leq .05$) scores of at-risk students in third through eighth grades and tenth grades taught by traditional methods and at-risk students taught by personalized competency-based learning methods. To analyze hypothesis 2, independent samples t-tests were conducted to examine if there was a significant difference on the ISAT English Language Arts/Literacy ($p \leq .05$) scores of at-risk students at each grade studied when taught by traditional methods and at-risk students at the same grade level taught by personalized competency-based learning methods.

Third grade. Levene's Test for Equality of variance showed no violations, p = .22. Results in Table 12 indicate that student in 2018 students (*M* = 2368, *SD* = 79.34) scored numerically lower on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2399.75, *SD* = 65.70) who were taught traditionally, $t(58) = 1.67$, p = .10. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the third-grade participants. Cohen's d was calculated at d = .44, which is a medium negative effect based on Cohen's (1992) guidelines.

Fourth grade. Levene's Test for Equality of variance showed no violations, p = .06. Results in Table 12 indicate that students in 2018 (*M* = 2430.1, *SD* = 105.60) scored numerically higher on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2400.14, *SD* = 78.86) who were taught traditionally, $t(71) = 1.39$, p = .17. Thus, the students taught with personalized competency-based methods scored numerically higher, though not significantly higher, than students taught by traditional methods. Thus, the null hypothesis was accepted for the fourth-grade participants. Cohen's d was calculated at d = .32, which is a positive medium effect based on Cohen's (1992) guidelines.

Fifth grade. Levene's Test for Equality of variance showed no violations, p = .98. Results in Table 12 indicate that students in 2018 (*M* = 2478.2, *SD* = 75.98) scored numerically higher on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2446.88, *SD* = 70.09) who were taught traditionally, *t*(58) = 1.59, p = .19. Thus, the students taught with personalized competency-based methods scored numerically higher, though not significantly higher, than students taught by traditional methods. Thus, the null hypothesis was accepted for the fifth-grade participants. Cohen's d was calculated at d = .43, which is a medium positive effect based on Cohen's (1992) guidelines.

Sixth grade. Levene's Test for Equality of variance showed no violations, p = .07. Results in Table 12 indicate that students in 2018 (*M* = 2435.97, *SD* = 103.48) scored numerically lower on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2467.95, *SD* = 80.62) who were taught traditionally, *t*(72) = 1.48, p = .14. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the sixth-grade participants. Cohen's d was calculated at d = .35, which is a medium negative effect based on Cohen's (1992) guidelines.

Seventh grade. Levene's Test for Equality of variance showed no violations, p = .80. Results in Table 12 indicate that students in 2018 (*M* = 2465.5, *SD* = 79.44) scored numerically lower on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2478, *SD* = 79.17) who were taught traditionally, *t*(64) = .64, p = .52. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the seventh-grade participants. Cohen's d was calculated at d = .16, which is a small negative effect based on Cohen's (1992) guidelines.

Eighth grade. Levene's Test for Equality of variance showed a violations and equal variance was not assumed, p = .04. Results in Table 12 the output option of a violation of variance was used in determining significance. Students in 2018 (*M* = 2516.62, *SD* = 89.60) scored numerically lower on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2529.19, *SD* = 61.1) who were taught traditionally, *t*(44) = .57, p = .57. Thus, the students taught with personalized competency-based methods scored numerically lower, though not significantly lower, than students taught by traditional methods. Thus, the null hypothesis was accepted for the eighth-grade participants. Cohen's d was calculated at d = .16, which is a small negative effect based on Cohen's (1992) guidelines.

Tenth grade. Levene's Test for Equality of variance showed no violations, p = .45. Results in Table 12 indicate that students in 2018 (*M* = 2519.38, *SD* = 87.1) scored numerically lower on the English Language Arts/Literacy ISAT after being taught in a personalized competency-based learning method than the 2016 students (*M* = 2547.88, *SD* = 78.99) who were taught traditionally, *t*(40) = 1.09, p = .28. Thus, the students taught with personalized competency-based were not associated with a statistically significant score difference. Thus, the null hypothesis was accepted for the tenth-grade participants. Cohen’s d was calculated at d = .34, which is a medium negative effect based on Cohen’s (1992) guidelines.

Table 12 .

English Language Arts/Literacy ISAT Scale Scores

Grade/Year		n	M	SD	Sig. (2-tailed)	Difference in Means
3rd	2016	32	2399.75	65.70	.1	- 31.75
	2018	29	2368	79.34		
4th	2016	44	2400.14	78.86	.17	29.97
	2018	29	2430.1	105.60		
5th	2016	40	2446.88	70.09	.12	31.33
	2018	20	2478.2	75.98		
6th	2016	37	2467.95	80.62	.14	-31.97
	2018	37	2435.97	103.48		
7th	2016	34	2478	79.17	.52	-19.53
	2018	32	2465.5	79.44		
8th	2016	21	2529.19	61.1	.59	-12.58
	2018	26	2516.62	89.60		
10th	2016	26	2547.88	78.99	.28	-28.51
	2018	16	2519.38	87.1		

Sub-question 2 Results

Sub-question 2 - Will the difference in ISAT mean scores for the district at-risk students and the state not-at-risk students be reduced if at-risk students are taught by personalized competency-based learning methods? Prior to analyze hypothesis 3 & 4, descriptive statistics were conducted. The difference in mean scores for the state not at-risk and the district at-risk students were established using the 2016 ISAT Mathematics data before the district implemented personalized competency-based. The difference served as a baseline and determine the numerical gap between the state not at-risk and the district at-risk student scores. The results of the study will be reported for each hypothesis in the section following and the SPSS results for the descriptive statistics used for analyzing the data for hypothesis 3 and 4 can be found in Appendix G.

Hypothesis # 3. The difference in the mean scores on the ISAT Mathematics exam between statewide not at-risk students and the district at-risk students will be reduced when at-risk students are taught using the personalized competency-based learning methods. The mean scores for the 2016 ISAT Mathematics were analyzed to determine the numerical gap between the state not at-risk and the district at-risk student scores. The results in Table 13 indicate the baseline difference between the district at-risk student mean score with the state not at-risk mean score. The difference in the gap of the mean scores ranged from a third-grade score of 64.23 to a 126.79 in the sixth-grade score.

Table 13.

2016 ISAT Mathematics - District At-Risk compared to State not-At-Risk

	District At-Risk			Statewide not At-Risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	28	2403.04	75.73	8,328	2467.27	64.05	64.23
4th	44	2406.57	54.46	8,434	2511.52	67.57	104.95
5th	40	2438.98	53.04	8,749	2539.99	71.90	101.01
6th	37	2437.86	74.55	9,123	2564.65	79.18	126.79
7th	34	2460.29	78.23	9,581	2582.33	81.61	122.04
8th	21	2486.43	54.71	9,606	2595.39	95.43	108.96
10th	26	2483.04	58.68	10,066	2595.39	100.89	112.35

The mean scores for the 2018 ISAT Mathematics were analyzed to determine the numerical gap between the state not at-risk and the district at-risk student scores when taught using the personalized competency-based method. The results in Table 14 indicate the difference between the district at-risk student mean scores with the state not at-risk mean scores. The difference in the gap of the mean scores ranged from a fifth-grade score of 80.97, to 165.16 in the sixth grade.

Table 14.

2018 ISAT Mathematics - District At-Risk Compared to State Not-At-Risk

	District At-Risk			Statewide not At-Risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	32	2370.03	84.29	8,655	2471.30	69.39	101.27
4th	29	2427.59	78.37	9,280	2513.31	70.27	85.72
5th	20	2465.2	74.23	9,340	2546.17	76.55	80.97
6th	37	2410.19	79.50	9,814	2575.35	80.50	165.16
7th	32	2426.03	90.76	10,349	2588.15	86.18	162.12
8th	26	2459.73	93.71	10,461	2602.24	101.38	142.51
10th	16	2514.25	67.98	10,808	2606.83	110.45	92.58

To analyze the data for hypothesis 3, the results in Table 15 indicate that the third-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (64.23), and 2018 (101.27), produced a numerical increase of (37.04) in the mean score gap, after being taught in a personalized competency-based learning method. The fourth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (104.95), and 2018 (85.72), produced a numerical decrease of (-19.23) in the mean score gap, after being taught in a personalized competency-based learning method. The fifth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (101.01), and 2018 (80.97), produced a numerical decrease of (-20.04) in the mean score gap, after being taught in a personalized competency-based learning method. The sixth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (126.79), and 2018 (165.16), produced a numerical increase of (38.37) in the mean score gap, after being taught in a personalized competency-based learning method. The seventh-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (122.04), and 2018 (162.12), produced a numerical increase of (40.08) in the mean score gap, after being taught in a personalized competency-based learning method. The eighth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (108.96), and 2018 (142.51), produced a numerical increase of (33.55) in the mean score gap, after being taught in a personalized competency-based learning method. Lastly, the tenth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (112.35), and 2018 (92.58), produced a numerical decrease of (-19.77) in the mean score gap, after being taught in a personalized competency-based learning method.

Table 15.

Changes in the Performance Gaps from 2016 -2018 ISAT Mathematics

Grade	2016	2018	Increase/Decrease
3rd	64.23	101.27	37.04
4th	104.95	85.72	-19.23
5th	101.01	80.97	-20.04
6th	126.79	165.16	38.37
7th	122.04	162.12	40.08
8th	108.96	142.51	33.55
10th	112.35	92.58	-19.77

A graphic comparison of the performance gap in Figure 3, are the differences in mean scores from 2016 to 2018 of the numerical increases and decreases between the district at-risk students and the state not at-risk students showed potential trends, by grade level. The larger gaps can be seen in Grades 6, 8, and 10 in 2016 with the smaller gaps in third through fifth grades. The larger gaps in 2018 were in Grades 6 through 8, and smaller gaps found in third through fifth grades and tenth grade. It was concluded that the fourth, fifth, and tenth grade gaps narrowed, and the third, sixth, seventh, and eighth grade gaps widened between the district at-risk students and the state not at-risk students.

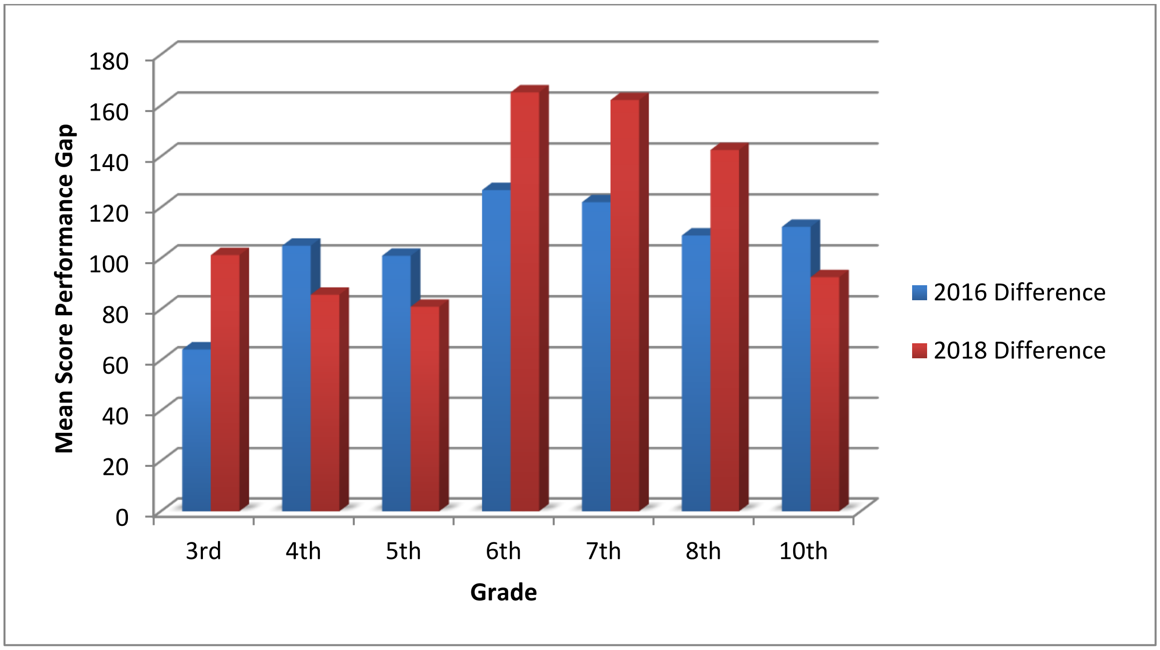

Figure 3. Comparison of Performance Gap in 2016 and 2018 ISAT Mathematics

Hypothesis # 4. The difference in the mean scores on the ISAT English Language Arts/Literacy exam, between statewide not at-risk students and the district at-risk students will be reduced when at-risk students are taught using the personalized competency-based learning methods. The mean scores for the 2016 ISAT ELA were analyzed to determine the numerical gap between the state not at-risk and the district at-risk student scores. The results in Table 16 indicate the baseline difference between the district at-risk student mean score with the state not at-risk mean score. The gap in mean score ranged from the third grade of a 61.14 difference, to a 109.61 difference in the seventh grade.

Table 16.

2016 ISAT English Language Arts/Literacy - District At-Risk Compared to State Not-At-Risk

	District At-Risk			Statewide Not At-Risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	28	2399.75	65.70	8,333	2460.89	72.70	61.14
4th	44	2400.14	78.8	8,442	2506.23	75.05	106.09
5th	40	2446.88	70.09	8,758	2544.72	76.34	97.84
6th	37	2467.95	80.62	9,143	2564.51	73.21	96.56
7th	34	2478.00	79.17	9,603	2587.61	78.85	109.61
8th	21	2529.19	61.10	9,624	2605.06	79.36	75.87
10th	26	2547.88	78.99	10,076	2637.10	88.87	89.22

The mean scores for the 2018 ISAT English Language Arts/Literacy were analyzed to determine the numerical gap between the state not at-risk and the district at-risk student scores. The results in Table 17 indicate the difference between the district at-risk student mean score with the state not at-risk mean score. The gap in mean score ranged from the fifth-grade score of 69.47 difference, to the 136.24 difference in sixth-grade.

Table 17.

2018 ISAT English Language Arts/Literacy - District At-Risk compared to State not-At-Risk

	District At-Risk			Statewide Not At-Risk			
Grade	N	Mean	Std. Deviation	N	Mean	Std. Deviation	Difference
3rd	32	2,368.0	79.33	8,660	2463.06	76.14	95.06
4th	29	2430.1	105.60	9,287	2505.82	79.56	75.72
5th	20	2478.2	75.98	9,342	2547.67	80.37	69.47
6th	37	2435.97	103.48	9,820	2572.21	76.03	136.24
7th	32	2465.5	79.44	10,374	2591.17	79.22	125.67
8th	26	2516.62	89.60	10,479	2605.28	81.30	88.66
10th	16	2519.38	87.08	10,827	2633.55	91.69	114.16

To analyze hypothesis 4, the results in Table 18 indicate that the third-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (61.14), and 2018 (95.06), produced a numerical increase in the mean score (33.92) gap, after being taught in a personalized competency-based learning method. Fourth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (106.09), and 2018 (75.72), produced a numerical decrease in the mean score (-30.37) gap, after being taught in a personalized competency-based learning method. Fifth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (97.84), and 2018 (69.47), produced a numerical decrease in the mean score (-28.37) gap, after being taught in a personalized competency-based learning method. Sixth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (96.56), and 2018 (136.24), produced a numerical increase in the mean score (39.68) gap, after being taught in a personalized competency-based learning method. Seventh-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (109.61), and 2018 (125.67), produced a numerical increase in the mean score (16.06) gap, after being taught in a personalized competency-based learning method. Eighth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (75.87), and 2018 (88.66), produced a numerical increase in the mean score (12.79) gap, after being taught in a personalized competency-based learning method. Tenth-grade mean score difference for not at-risk statewide and district at-risk students in 2016 (89.22), and 2018 (114.16), produced a numerical increase in the mean score (24.94) gap, after being taught in a personalized competency-based learning method.

Table 18.

Changes in the Performance Gaps from 2016 -2018 ISAT English Language Arts/Literacy

Grade	2016	2018	Increase/Decrease
3rd	61.14	95.06	33.92
4th	106.09	75.72	-30.37
5th	97.84	69.47	-28.37
6th	96.56	136.24	39.68
7th	109.61	125.67	16.06
8th	75.87	88.66	12.79
10th	89.22	114.16	24.94

A comparison in Figure 4 provides a visual comparison of the increases and decreases in the gaps between the mean scores of district at-risk students and state not at-risk students from 2016 to 2018. The larger gaps can be seen in Grades 4, 7, and 10 in 2016, with the smaller gaps in Grades 3 and 8. The larger gaps in 2018 were in Grades 3, 6, 7, and 10, and smaller gaps found in Grades 4, 5, and 8. The fourth and fifth grade gaps narrowed, and the third, sixth, seventh, eighth, and tenth grade gaps widened between the district at-risk student and the state not at-risk students.

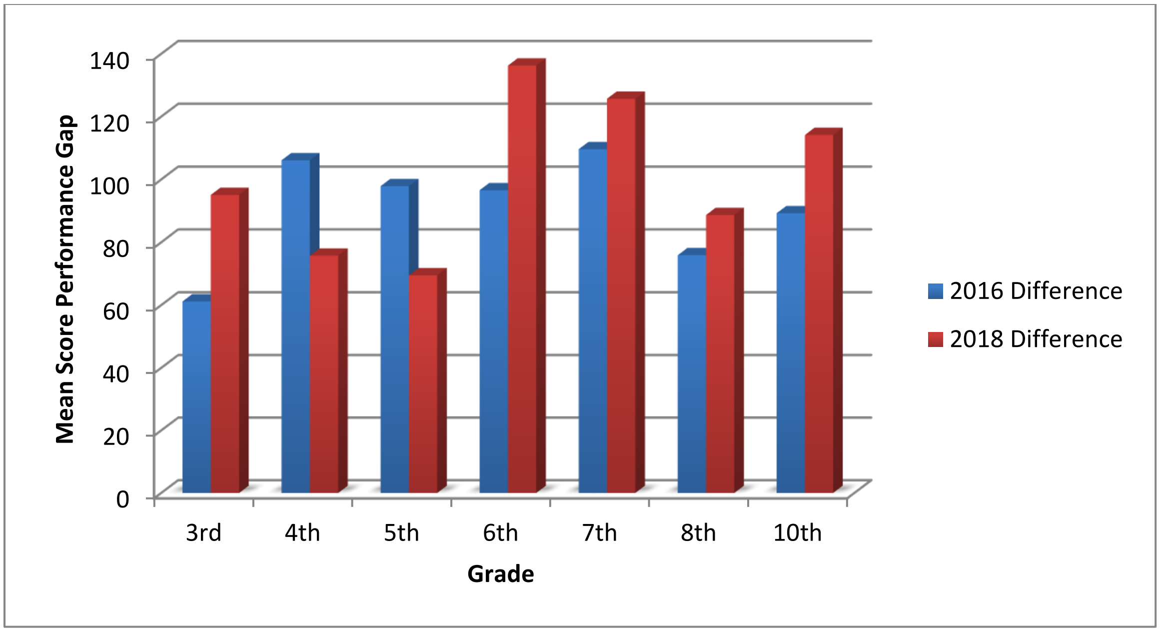

Figure 4. Comparison of Performance Gap in 2016 and 2018 ISAT English Language Arts/Literacy

Summary of Findings

Chapter 4 presents the student data for the 2016 and 2018 Mathematics and ELA ISAT assessments for district students taught in a traditional setting and district students taught in a personalized competency-based. In addition, there was a comparison of the gap in achievement between the state not at-risk students and the district at-risk students prior to the personalized competency-based treatment on the 2016 ISAT Mathematics and ELA assessments. The same gap comparison was made for 2018 (Figures 3 and 4) after the two-year treatment of the personalized competency-based method for the district at-risk students, in effort to determine if students taught with this method would close the achievement gap between the district at-risk and the state not at-risk students.

The quasi-experimental study examined the treatment of a personalized competency-based learning environment (independent variable) for at-risk students and how that treatment affects their performance on the state-wide ISAT assessment (dependent variable) utilizing an independent samples t-test to identify the statistical significance between 2016 and 2018 after a two-year treatment. In Sub-question 1, the data showed there was no significant difference in scores on the Mathematics or English Language Arts/Literacy ISAT after the treatment for the nine classes scale scores that went down and five that went up. In Sub-question 2 a descriptive statistics analysis was conducted to compare changes in the difference in mean scores between district at-risk and state not at-risk students from before the treatment to after the treatment. The data suggests that there were more grade levels in which the achievement gap increased than decreased after the two-year treatment, which aligns with research that the challenge to closing the achievement gap was complex and not easily accomplished (Kennedy, 2010; Madrid, 2011). Therefore personalized competency-based method may not be a means of closing the performance gap for at risk students within two years of implementation.

Chapter V

Discussion

Chapter 5 includes the summary and discussion of the findings of the study. This chapter begins with a brief introduction to add perspective to the overall study, the summary synthesizes the data from chapter 4, the conclusion provides answers to the questions, the recommendations infers what valuable information can be drawn from the data of the study, and a concluding section for educators considers options and professional practices in progressing forward with personalized competency-based learning for at-risk students, and recommendations for future research.

Poverty has been identified as a barrier for at-risk student achievement across the United States in traditional classroom settings. School leaders continue to look for ways to close this achievement gap for this student population (Barron et al., 2012; Brooks-Gunn & Duncan, 1997; Cuthrell et al., 2010; Freeland, 2014; Rothstein & Jacobsen, 2006).

This study looked at the Wilson School District's promising approach in closing the achievement gap by adopting a personalized, competency-based system of teaching and learning. To accomplish personalization and provide mastery of competencies, students were placed at a level of content based upon their ZPD. The appropriate ZPD is present when an individual student is participating in an activity or learning where the learner in the process of developing mastery. In addition, as the individual is actively and ready to learn or participate in an event and there is guidance from another individual, that is more advanced, which provides direct or indirect positive influence on the learner (Chaiklin, 2003). This system builds and creates opportunities to move at a flexible, personalized pace, by providing supplemental content for students who have fallen behind or want to move ahead (Domenech et al., 2016; Freeland, 2014).

The competency-based system additionally increases formative assessments when the focus is to demonstrate mastery in real-world examples and settings (Freeland, 2014; Sturgis, 2012). To support the shift to this methodology, an infusion of technology took place that included infrastructure to handle the demand of the individual iPads and iPad professional development training for staff and students.

In a review of current research of personalized learning, these studies indicated favorable outcomes for personalized competency-based learning environments, specifically in settings characteristic to the Wilson School District, in which this study was conducted. These characteristics similar to the Wilson School District were poverty, rural setting, minority population, small group size, access to functioning technology, and consistent professional development (Ewen & Topping, 2012; Freeland, 2014; Prain, et al., 2012; Sahin & Top, 2015; Sturgis, 2012; Sullivan & Downey, 2015).

Summary of the Results

This quasi-experimental study sought to examine the treatment of a personalized competency-based learning environment for at-risk students and how that treatment affected their performance on the statewide ISAT exam. Student ISAT data were selected from students who have been in the Wilson School District for at least two years and have received the personalized competency-based learning treatment, for whom there was ISAT data. Student ISAT assessment data from those who have not received two years of the treatment were removed from the research. The ISAT is given to all third- through eighth- and tenth-grade students throughout the state. The comparative data that addressed the first research Sub-question 1 represented the scores students received on the ELA and Mathematics ISAT exams prior to the personalized competency-based learning treatment and the post-data were the scores students received after two years of personalized competency-based learning. The finding suggests there were no significant differences between the pretreatment and the posttreatment scores for ELA or Mathematics. For Grades 3, 6, 7, and 8 the scores went down on the Mathematics ISAT and for Grades 4, 5, and 10 the scores went up. On the ELA ISAT the third, sixth, seventh, eighth, and tenth grade scores went down, while the fourth and fifth grade scores went up.

Can personalized competence-based learning provide at-risk students the skills and knowledge needed to close the achievement gap on the state ISAT Mathematics and English Language Arts/Literacy exams for students in third through eighth grades and tenth grade after a two-year treatment of personalized competency-based learning? The following two sub-questions guided the data collection and statistical analysis to answer the research question:

Sub-question 1

Will personalized competency-based techniques improve for at-risk students? The answer to Sub-question 1 can be determined from the results in hypotheses 1 and 2 which, specifically looked at the significant difference on the Mathematics and English Language Arts/Literacy ISAT after the two year treatment The data indicated for the Mathematics exam that there were three grade levels that had a numerical increase in the mean from 2016 to 2018 and four grade levels that had numerical decreases in the mean, but there were no grade levels that experience a significant difference ($p \leq .05$) change in scores in either direction. On the English Language Arts/Literacy exam, there were two grade levels that had a numerical increase in the mean from 2016 to 2018 and five grade levels that had numerical decreases in the mean, but there were no grade levels that experience a significant difference ($p \leq .05$) change in scores in either direction.

After all the data were analyzed for both Mathematics and English Language Arts/Literacy exams, it was determined that the ISAT scores did not significantly increase or decrease for at-risk students taught by personalized competency-based learning techniques when compared to at-risk students taught by traditional methods.

Sub-question 2

Will personalized competency-based techniques decrease the performance gap for at-risk students in the district and the state not at-risk students? The answer to Sub-question 2 can be determined from the results in hypotheses 3 and 4 which specifically looked at the difference in mean scores on the ISAT Mathematics and the English Language Arts/Literacy exams after the two-year treatment.

The data on the ISAT Mathematics exam indicated that there were four grade levels in which the difference in mean score between 2016 and 2018 for statewide not at-risk students and district at-risk students increased (third grade + 37.04, sixth grade + 38.37, seventh grade + 40.08, and eighth grade + 33.55). In addition, there were three grade levels in which the differences in mean scores decreased 2016 and 2018 (fourth grade -19.23, fifth grade -20.04, and tenth grade -19.77). The data on the ISAT English Language Arts/Literacy exam indicated that there were five grade levels in which the differences in mean scores increase between 2016 and 2018 for statewide not at-risk students and district at-risk students (third grade + 33.92, sixth grade + 39.68, seventh grade + 16.06, 8th grade + 12.79, and 10th grade + 24.94). In addition, there were two grade levels in which decreases were shown in the differences in mean scores (fourth grade, -30.37 and fifth grade, -28.37).

The results for Sub-question 2 were inconclusive in determining if the difference in mean scores reduced between not at-risk students and at-risk students that were taught by personalized competency-based learning methods. There were grade levels in which the performance gap increase and there were other grade levels that decreased in both Mathematics and ELA. The increases and decreases were relatively small, with a range in the difference from a decrease of -30.37 to an increase of 40.08.

Conclusion

The purpose of ESSA Act of 2015 (P.L. 114–95) was to raise the academic achievement of disadvantaged students to match not-disadvantaged students therefore closing the achievement gap. No matter the reauthorization, research spanning from 1966-2013, a review of multiple national-level evaluations reveals little evidence that ESEA, in all its forms, have improved the academic achievement of disadvantaged students nationwide. Despite numerous efforts by school districts across the United States, little progress has been made in closing the achievement gap for students of poverty (Sousa & Armor, 2016). In addition, Sousa and Armor concluded that in 2013 the NAEP data for fourth and eighth grade students were disappointing for closing the achievement gap of those students of poverty.

The Wilson School District took steps to address the achievement gap for at-risk students by providing a personalized competency-based learning method that was consistent with the personalized learning principles of multiple sources (Bill & Melinda Gates Foundation, 2016; Pane et al., 2015). First, in a technically rich environment, providing student-driven learning with a flexible environment meets the unique needs of each student. Secondly, customized personal learning paths were created for all students with high expectations. Finally, students had the control and adapted their personal profile providing a clear path for reaching their established goals.

This study looked at a district-wide approach to the personalized competency-based method, specifically at the at-risk population in this small high poverty rural school district. This study suggests that though at-risk students were taught with a personalized competency-based method, data did not support there were consistent improvements in state test scores. Though there were changes in student scale scores by grade level, they were not significant and there was not conclusive evidence that the changes in scale score closed the achievement gap.

Specifically, there were no significant changes in ISAT Mathematics and ELA assessment scores in the first two years for at-risk students taught by personalized competency-based learning techniques than those who were taught by traditional approaches two years earlier. Those results as stated previously, that in Sub-question 1, there were three grade levels where the scores increased from 2016 to 2018 and four grade levels where they decreased on the Mathematics ISAT. For ELA, there were two grade levels where the scores increased from 2016 to 2018 and five grade levels where the scores decreased. These finding are similar to Sousa and Armor (2016) in which they found in the Prospect study that there was no significant change in the achievement gap between Title 1 participants and non-Title 1 participants. On Sub-question 2 the gap between 2016 and 2018 for the district at-risk students and the state not at-risk students was inconclusive. The data for the Mathematics ISAT indicated there were four grade levels where the gap increased and three grade levels the gap decreased. For ELA ISAT there were five grade levels where the gap increased and two grade levels saw decreases.

The data indicated that there was no significant change in exam scores, in either direction. More directly, after Wilson School District abruptly shifted from a traditional approach to teaching and learning to a personalized competence-based there was no statistically significant decrease or increase in exam scores after just two-years of treatment. According to

Briethaupt (2019), longitudinal studies assume the time given will balance out the random fluctuations in the data sets and provide a more accurate trend. Psychometrics look for these fluctuations to begin diminishing starting at three, five and up to seven years after a treatment is introduced. More specifically, the length of the longitudinal study, one year to many years has a vast impact on the conclusion of the study. This supports the possibility that a change in student performance as measured by state tests may not occur quickly as found by the Sturgis (2014) longitudinal study where it took 22 years to see significant increases in state test scores.

It is important to address some of the issues the Wilson School District had to address during the two-year treatment that could have limited the ability to demonstrate significant score increases and the closing of the achievement gap. In the elementary building with two teachers per grade level, there were three teacher turnovers in third grade, fourth grade and fifth grade, one was a new hire and two changed grade levels. In the middle school, with four teachers, there were six different teacher changes and two different English teachers at the high school within the two-year treatment. Next, there was a change in the administration at the middle/high school, and the middle/high school changed curriculum platforms to better support the content rigor needed for demonstration and mastery of course competencies. Finally, were the multiple conditions that qualified the students of the district of study as at-risk. Those conditions included minority status, second language learners, mobility, and poverty. According to Singer and Willett (2003), growth models assume that the outcome must grow and look for singular directional growth. Growth measures are complex and can be multidirectional, and it might take more time for mastery, or time might run out before mastery is met.

Based on the challenges the Wilson School District faced over the two-year, with data that indicated no significant decrease in the ISAT exam in Sub-question 1 and inconclusive changes for Sub-question 2, indicating that this model may not be the means to close the achievement gap for at-risk students.

Recommendations for Further Research

This study was conducted to explore the capability of a small rural district's ability to close the achievement gap for at-risk students who were introduced and being taught with a personalized competency-based method over a two-year period. To better understand the challenge of closing the achievement gap for at-risk students there are several recommendations for future research to be considered.

First, a larger student sample size would strengthen the findings and would minimize the potential errors that take place in relatively small sample sizes. According to Field (2015), a larger sample size would more closely fit the larger population of an entire school district. Second, this study was limited in scope to a quantitative research methodology. To investigate if a large reform shift in teaching and learning toward a personalized competency-based method would close the achievement gap, it should include a qualitative research methodology. This would aid in providing a broader understanding of the efficacy of staff, students, parents, and community throughout the implementation through surveys and interviews (Creswell, 2015). Third, a look into the fidelity of implementation of the method could support the rational of why the treatment demonstrated limited success in closing the achievement gap for the at-risk population. Finally, there should be a longitudinal study of the implementation of personalized competency-based learning that would extend beyond two years. This two-year study did not provide enough time to appropriately show a decrease in the achievement gap.

Some additional suggested research would be to look specifically how the release of seat time for credit impacted students' access to courses and/or Career Technical Education. Did students complete more courses for credit at the high school level, or did students gain more than one year's growth based upon standards in the elementary and middle school? Did the overall student grade point average change? Did student behaviors change with the implementation of this student-centered approach in some capacity? Did student voice and choice impact access to improve equity, and are students graduating with a greater number of college credits or career certifications with the personalized competency-based method? Does implementing a more student-centered approach increase the graduation rate?

And finally, technology was a vital factor in student access to curriculum in the Wilson School District. Hence, it is suggested that research be conducted to determine how technology impacts student achievement with this method of teaching and learning. Does the increased access to technology better prepare students to go on to post high-school education programs and the workplace? Further research should also look for other measures of learning (dependent variable) in addition to state mandated tests. State mandated tests are important and on some level are excellent measures, but they are good at measuring what they measure. They do not measure everything which is important to learn, and supports Singer and Willett (2003) findings.

Implications for Professional Practice

Do not fear taking on the challenge to implement a student-centered approach. With new initiatives and/or innovative approaches in education, there are those who lead and those who follow those who lead. This study of a district that stepped forward to lead an innovative approach for at-risk students to close the achievement gap may provide other schools with similar demographics some confidence to attempt the same or similar approaches. For school leaders looking to make similar changes, it is evident from the study, that there would be a commitment for more than a two year treatment to determined successfully closing the achievement gap, technology infrastructure aligned to meet the demands of an individual learning environment, professional development on a constant basis for staff, and assessments and curriculum to establish the ZPD of the students participating it the personalized competency-based method of teaching and learning.

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Appendix A: Poverty Thresholds

Poverty Thresholds for 2017 by Size of Family and Number of Related Children Under 18 Years

Size of family unit	Related children under 18 years								
	None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual):									
Under age 65................................	12,752								
Aged 65 and older..........................	11,756								
Two people:									
Householder under age 65.............	16,414	16,895							
Householder aged 65 and older.......	14,816	16,831							
Three people..	19,173	19,730	19,749						
Four people..	25,283	25,696	24,858	24,944					
Five people...	30,490	30,933	29,986	29,253	28,805				
Six people...	35,069	35,208	34,482	33,787	32,753	32,140			
Seven people...	40,351	40,603	39,734	39,129	38,001	36,685	35,242		
Eight people..	45,129	45,528	44,708	43,990	42,971	41,678	40,332	39,990	
Nine people or more..............................	54,287	54,550	53,825	53,216	52,216	50,840	49,595	49,287	47,389

Source: U.S. Census Bureau.

Appendix B: Adequate Yearly Progress

State of Idaho

Consolidated State Application Accountability Workbook

for State Grants under Title IX, Part C, Section 9302 of the Elementary and Secondary Education Act (Public Law 107-110)

U. S. Department of Education
Office of Elementary and Secondary Education
Washington, D.C. 20202

Idaho State Board of Education
650 West State Street
Boise, Idaho 83720-0037
June 2006

PART I: Summary of Required Elements for the State Accountability Systems

Summary of Implementation Status for Required Elements of State Accountability Systems

Status		Idaho Statewide Assessment and Accountability Plan Element	Page
Principle 1: All Schools			
F	1.1	Accountability system includes *all schools and districts in the state.*	1
F	1.2	Accountability system holds *all schools to the same criteria.*	2
F	1.3	Accountability system incorporates the *academic achievement standards.*	4
F	1.4	Accountability system provides *information in a timely manner.*	5
F	1.5	Accountability system includes *report cards.*	6
F	1.6	Accountability system includes *rewards and sanctions.*	11
Principle 2: All Students			
F	2.1	The accountability system includes *all students.*	13
F	2.2	The accountability system has a consistent definition of full academic year.	15
F	2.3	The accountability system properly includes *mobile students.*	16
Principle 3: Method of AYP Determinations			
F	3.1	Accountability system expects *all student subgroups, public schools, and LEAs to reach proficiency by 2013-14.*	17
F	3.2	Accountability system has a method for determining whether *student subgroups, public schools, and LEAs made Adequate Yearly Progress.*	19
F	3.2a	Accountability system establishes a *starting point.*	22
F	3.2b	Accountability system establishes *statewide annual measurable objectives.*	24
F	3.2c	Accountability system establishes *intermediate goals.*	25
Principle 4: Annual Decisions			
F	4.1	The accountability system *determines annually the progress* of schools and districts.	26

STATUS Legend
F – Final state policy
P – Proposed policy, awaiting Idaho State Board of Education approval
W – Working to formulate policy

Status		State Accountability System Element	Page
Principle 5: Subgroup Accountability			
F	5.1	The accountability system *includes all the required student subgroups.*	28
F	5.2	The accountability system *holds schools and LEAs accountable for the progress of student subgroups.*	30
F	5.3	The accountability system includes *students with disabilities.*	31
F	5.4	The accountability system includes *limited English proficient students.*	32
F	5.5	The State has determined the minimum number of students sufficient to yield statistically reliable information for each purpose for which disaggregated data are used.	34
F	5.6	The State has strategies to protect the privacy of individual students in reporting achievement results and in determining whether schools and LEAs are making adequate yearly progress on the basis of disaggregated subgroups.	36
Principle 6: Based on Academic Assessments			
F	6.1	Accountability Plan is based primarily on academic assessments.	37
Principle 7: Additional Indicators			
F	7.1	Accountability system includes *graduation rate for high schools.*	39
F	7.2	Accountability system includes an *additional academic indicator for elementary and middle schools.*	41
F	7.3	Additional indicators are valid and reliable.	43
Principle 8: Separate Decisions for Reading and Mathematics			
F	8.1	Accountability system holds students, schools and districts separately accountable for *reading and mathematics.*	44
Principle 9 Plan Validity and Reliability			
F	9.1	Accountability system produces *reliable decisions.*	45
F	9.2	Accountability system produces *valid decisions.*	46
F	9.3	State has a plan for addressing changes in assessment and student population.	47
Principle 10: Participation Rate			
F	10.1	Accountability system has a means for calculating the *rate of participation* in the statewide assessment.	48
F	10.2	Accountability system has a means for *applying the 95% assessment criteria to student subgroups and small schools.*	49

STATUS Legend

F – Final policy

P – Proposed Policy, awaiting Idaho State Board of Education approval

W – Working to formulate policy

Appendix C: Researcher's District Site Approval

Our Vision

Students will graduate confident and prepared for post-secondary pursuits and responsible citizenship.

Our Mission

We are a District that expects student and adult success and we provide the motivation and tools to accomplish this.

Our Goals

Our students are college and career ready for their post-secondary choice.

Students will exit each grade level prepared for the next.

Each school has systems in place for instructional support for students.

Student learning excels through rigor, relevance and relationships.

Students demonstrate trust for their teachers as an essential foundation for their learning success.

Our schools are child-centered communities that promote healthy behaviors and responsible citizenship.

Schools, parents and the community work together to enrich educational experiences for our children.

[redacted]

November 5, 2017

Northwest Nazarene University
Attention: HRRC Committee
Helstrom Business Center 1st Floor 623 S.
University Boulevard Nampa, ID 83686
RE: Research Proposal Site Access for Mrs. Jeff Dillon

Dear HRRC Members:

This letter is to inform the HRRC that the [redacted] School District has reviewed the proposed dissertation research plan including subjects, assessment procedures, proposed data and collection procedures, data analysis, and purpose of the study. Mr. Dillon has permission to conduct her research study at the [redacted] School District. The authorization dates for this research study are July 1st – December 1st, 2018.

Respectfully,

Patricia Clagg

Board Chair

Appendix D: NIH Certificate of Completion

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Jeff Dillon** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 03/19/2016.

Certification Number: 2035545.

Appendix E: Wilson School District Vision and Mission

VISION

The vision is what we intend to create, realize and demonstrate.

Provide a rigorous mastery-based personalized environment where 100% of our students graduate, have the skills to be leaders, and creatively design their own future.

MISSION

The mission defines who we are and what we do.

We are an educational community of mentors who empower students to positively impact the world as responsible citizens.

GUIDING PRINCIPLES

Guiding principles are what we model and promote through our practices, programs and expectations.

- We expect professionalism, respect, responsibility and honesty.
- We embrace innovation in technology tools, resources and instructional practices.
- We hold accountable the ownership of teaching and learning.
- We incorporate the necessary skills (16 Habits of Mind) and a growth mindset to effectively demonstrate 21st century skills to thrive in society and promote strategic reasoning, insightfulness, perseverance, creativity and craftsmanship.
- We make decisions based on a student-centered data driven educational practices
- We achieve rigor and relevance through relationships of trust, developed as a result of effective and inclusive mentoring.

2

Appendix F: Sub-question 1 SPSS Data

```
GET DATA
  /TYPE=XLSX
  /FILE='/Users/jdillon/Desktop/NNU/Dissertation/Data/2018 Data/2016-2018 Data
 set.xlsx'
  /SHEET=name 'Sheet1'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0
  /HIDDEN IGNORE=YES.
EXECUTE.
DATASET NAME DataSet1 WINDOW=FRONT.
T-TEST GROUPS=Grade3(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=@3ELA @3Math
  /CRITERIA=CI(.95).
```

T-Test

[DataSet1]

Group Statistics

	Grade3	N	Mean	Std. Deviation	Std. Error Mean
3ELA	1	28	2399.75	65.702	12.417
	2	32	2368.00	79.336	14.025
3Math	1	28	2403.04	75.725	14.311
	2	32	2370.03	84.293	14.901

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
3ELA	Equal variances assumed	1.530	.221	1.674	58
	Equal variances not assumed			1.695	57.841
3Math	Equal variances assumed	1.654	.204	1.586	58
	Equal variances not assumed			1.598	57.953

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence ... Lower
3ELA	Equal variances assumed	.100	31.750	18.970	-6.222
	Equal variances not assumed	.095	31.750	18.731	-5.747
3Math	Equal variances assumed	.118	33.004	20.810	-8.652
	Equal variances not assumed	.116	33.004	20.660	-8.352

Independent Samples Test

		t-test for Equality of ... 95% Confidence Interval of the ... Upper
3ELA	Equal variances assumed	69.722
	Equal variances not assumed	69.247
3Math	Equal variances assumed	74.661
	Equal variances not assumed	74.361

```
T-TEST GROUPS=Grade4(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=@4ELA @4Math
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade4	N	Mean	Std. Deviation	Std. Error Mean
4ELA	1	44	2400.14	78.855	11.888
	2	29	2430.10	105.604	19.610
4Math	1	44	2406.57	54.459	8.210
	2	29	2427.59	78.374	14.554

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
4ELA	Equal variances assumed	3.531	.064	-1.387	71
	Equal variances not assumed			-1.307	48.128
4Math	Equal variances assumed	10.883	.002	-1.353	71
	Equal variances not assumed			-1.258	45.646

Independent Samples Test

		t-test for Equality of Means			
					95% Confidence ...
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower
4ELA	Equal variances assumed	.170	-29.967	21.612	-73.059
	Equal variances not assumed	.198	-29.967	22.932	-76.072
4Math	Equal variances assumed	.180	-21.018	15.535	-51.994
	Equal variances not assumed	.215	-21.018	16.710	-54.660

Independent Samples Test

		t-test for Equality of ...
		95% Confidence Interval of the ...
		Upper
4ELA	Equal variances assumed	13.125
	Equal variances not assumed	16.138
4Math	Equal variances assumed	9.958
	Equal variances not assumed	12.624

```
T-TEST GROUPS=Grade5(1 2)
  /MISSING=ANALYSIS
```

```
/VARIABLES=@5ELA @5Math
/CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade5	N	Mean	Std. Deviation	Std. Error Mean
5ELA	1	40	2446.88	70.092	11.083
	2	20	2478.20	75.984	16.990
5Math	1	40	2438.98	53.044	8.387
	2	20	2465.20	74.226	16.597

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
5ELA	Equal variances assumed	.001	.976	-1.587	58
	Equal variances not assumed			-1.544	35.478
5Math	Equal variances assumed	2.384	.128	-1.575	58
	Equal variances not assumed			-1.410	29.020

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence ... Lower
5ELA	Equal variances assumed	.118	-31.325	19.739	-70.836
	Equal variances not assumed	.131	-31.325	20.285	-72.487
5Math	Equal variances assumed	.121	-26.225	16.651	-59.556
	Equal variances not assumed	.169	-26.225	18.596	-64.257

Independent Samples Test

		t-test for Equality of ... 95% Confidence Interval of the ... Upper
5ELA	Equal variances assumed	8.186
	Equal variances not assumed	9.837
5Math	Equal variances assumed	7.106
	Equal variances not assumed	11.807

```
T-TEST GROUPS=Grade6(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=@6ELA @6Math
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade6	N	Mean	Std. Deviation	Std. Error Mean
6ELA	1	37	2467.95	80.620	13.254
	2	37	2435.97	103.482	17.012
6Math	1	37	2437.86	74.548	12.256
	2	37	2410.19	79.504	13.070

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
6ELA	Equal variances assumed	3.432	.068	1.483	72
	Equal variances not assumed			1.483	67.936
6Math	Equal variances assumed	.094	.761	1.545	72
	Equal variances not assumed			1.545	71.704

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence ... Lower
6ELA	Equal variances assumed	.143	31.973	21.566	-11.018
	Equal variances not assumed	.143	31.973	21.566	-11.062
6Math	Equal variances assumed	.127	27.676	17.917	-8.042
	Equal variances not assumed	.127	27.676	17.917	-8.045

Independent Samples Test

		t-test for Equality of ... 95% Confidence Interval of the ... Upper
6ELA	Equal variances assumed	74.964
	Equal variances not assumed	75.008
6Math	Equal variances assumed	63.393
	Equal variances not assumed	63.396

```
T-TEST GROUPS=Grade7(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=@7ELA @7Math
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade7	N	Mean	Std. Deviation	Std. Error Mean
7ELA	1	34	2478.00	79.168	13.577
	2	32	2465.50	79.436	14.042
7Math	1	34	2460.29	78.230	13.416
	2	32	2426.03	90.759	16.044

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
7ELA	Equal variances assumed	.068	.795	.640	64
	Equal variances not assumed			.640	63.731
7Math	Equal variances assumed	1.501	.225	1.646	64
	Equal variances not assumed			1.638	61.338

Independent Samples Test

		t-test for Equality of Means			
					95% Confidence ...
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower
7ELA	Equal variances assumed	.524	12.500	19.531	-26.517
	Equal variances not assumed	.524	12.500	19.533	-26.524
7Math	Equal variances assumed	.105	34.263	20.820	-7.329
	Equal variances not assumed	.106	34.263	20.914	-7.553

Independent Samples Test

		t-test for Equality of ...
		95% Confidence Interval of the ...
		Upper
7ELA	Equal variances assumed	51.517
	Equal variances not assumed	51.524
7Math	Equal variances assumed	75.855
	Equal variances not assumed	76.079

```
T-TEST GROUPS=Grade8(1 2)
  /MISSING=ANALYSIS
```

```
/VARIABLES=@8ELA @8Math
/CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade8	N	Mean	Std. Deviation	Std. Error Mean
8ELA	1	21	2529.19	61.099	13.333
	2	26	2516.62	89.602	17.572
8Math	1	21	2486.43	54.714	11.940
	2	26	2459.73	93.713	18.379

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
8ELA	Equal variances assumed	4.218	.046	.548	45
	Equal variances not assumed			.570	43.888
8Math	Equal variances assumed	4.729	.035	1.155	45
	Equal variances not assumed			1.218	41.349

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence ... Lower
8ELA	Equal variances assumed	.586	12.575	22.951	-33.651
	Equal variances not assumed	.572	12.575	22.058	-31.883
8Math	Equal variances assumed	.254	26.698	23.120	-19.867
	Equal variances not assumed	.230	26.698	21.916	-17.552

Independent Samples Test

		t-test for Equality of ...
		95% Confidence Interval of the ...
		Upper
8ELA	Equal variances assumed	58.802
	Equal variances not assumed	57.033
8Math	Equal variances assumed	73.263
	Equal variances not assumed	70.948

```
T-TEST GROUPS=Grade10(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=@10ELA @10Math
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Grade10	N	Mean	Std. Deviation	Std. Error Mean
10ELA	1	26	2547.88	78.987	15.491
	2	16	2519.38	87.077	21.769
10Math	1	26	2483.04	58.683	11.509
	2	16	2514.25	67.976	16.994

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
10ELA	Equal variances assumed	.586	.448	1.093	40
	Equal variances not assumed			1.067	29.498
10Math	Equal variances assumed	.078	.781	-1.576	40
	Equal variances not assumed			-1.521	28.337

Independent Samples Test

		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence ... Lower
10ELA	Equal variances assumed	.281	28.510	26.091	-24.223
	Equal variances not assumed	.295	28.510	26.718	-26.095
10Math	Equal variances assumed	.123	-31.212	19.805	-71.239
	Equal variances not assumed	.139	-31.212	20.524	-73.231

Independent Samples Test

		t-test for Equality of ... 95% Confidence Interval of the ... Upper
10ELA	Equal variances assumed	81.242
	Equal variances not assumed	83.114
10Math	Equal variances assumed	8.816
	Equal variances not assumed	10.808

Appendix G: Sub-question 2 SPSS Data

2016 ISAT Mathematics - SPSS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
3Math	28	2168	2536	2403.04	75.725
4Math	44	2262	2560	2406.57	54.459
5Math	40	2334	2538	2438.98	53.044
6Math	37	2241	2601	2437.86	74.548
7Math	34	2282	2583	2460.29	78.230
8Math	21	2395	2576	2486.43	54.714
10Math	26	2365	2626	2483.04	58.683
Valid N (listwise)	21				

2016 ISAT ELA - SPSS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
3ELA	28	2257	2538	2399.75	65.702
4ELA	44	2275	2570	2400.14	78.855
5ELA	40	2298	2543	2446.88	70.092
6ELA	37	2306	2626	2467.95	80.620
7ELA	34	2277	2628	2478.00	79.168
8ELA	21	2355	2609	2529.19	61.099
10ELA	26	2401	2723	2547.88	78.987
Valid N (listwise)	21				

2018 ISAT Mathematics - SPSS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
3Math	32	2223	2542	2370.03	84.293
4Math	29	2301	2552	2427.59	78.374
5Math	20	2363	2646	2465.20	74.226
6Math	37	2190	2582	2410.19	79.504
7Math	32	2245	2601	2426.03	90.759
8Math	26	2364	2689	2459.73	93.713
10Math	16	2413	2697	2514.25	67.976
Valid N (listwise)	16				

2018 ISAT ELA - SPSS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
3ELA	32	2222	2533	2368.00	79.336
4ELA	29	2223	2609	2430.10	105.604
5ELA	20	2352	2622	2478.20	75.984
6ELA	37	2253	2630	2435.97	103.482
7ELA	32	2315	2636	2465.50	79.436
8ELA	26	2326	2670	2516.62	89.602
10ELA	16	2377	2662	2519.38	87.077
Valid N (listwise)	16				