2020

Blended Learning Success in the Classroom

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This is to certify that the doctoral study by

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2020

Abstract

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by

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MA, Marygrove College, 2010

MA, Marygrove College, 2005

BS, Marygrove College, 1999

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

December 2020

Abstract

An early elementary school in the Midwest, some economically disadvantaged students perform below grade level in math achievement. The blended learning model (BLM) is utilized within the district, however, there is a lack of data to support its effectiveness with underachieving, economically disadvantaged students. The purpose of this sequential mixed methods study was to investigate if there was a difference between the implementation of (BLM) and student achievement for economically disadvantaged students who are performing below grade level in math. The study was grounded in the technological, pedagogical, and content knowledge (TPCK) theoretical framework. Three quantitative research questions examined if there was a difference in math achievement between students who received BLM and students who received traditional instruction as measured by Northwest Evaluation Association (NWEA) math assessment. A qualitative question examined teachers' perceptions of BLM. A mixed method design was employed to first collect and analyze the NWEA data, followed by the collection and analysis of qualitative semi-structured interview data for a convenience sample of students from selected Grades K-2 (N = 133) and their teachers (N = 6). A t-test for independent means was employed to analyze the research questions and Atlas.ti software was used to analyze teacher interview data. The t-test results revealed a statistically significant difference between students that received BLM and those who did not. Qualitative teacher responses indicated a positive perception of BLM. Project recommendation is a 3-year BLM professional development. This study promotes positive social change by providing a BLM professional development model to support increased student math achievement.

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Dedication

I dedicate this work to my loving husband Wesley and my daughter Faith who supported me on this journey. I am thankful for his encouragement and sacrifice that supported me in finishing my work. I would not have been able to complete my work without a strong support team. In addition, I am thankful for my parents, siblings and extended family for encouragement and support as well. Thank you for supporting me on this journey. I could not have done this without you.

Acknowledgments

I want to acknowledge my friend Ms. Chapman who supported me in my academic career. Ms. Chapman proofread my papers and encouraged me throughout the journey. There were many days I felt like giving up, but my friend encouraged me that I could get it finished. As I moved through each phase of my writing, Ms. Chapman would provide feedback on my writing. I would not have been able to complete this work without the help of a great friend. God will connect you with individuals to get you through different seasons in your life. Thank you for being a wonderful friend.

I want to thank Dr. Koyzis and Dr. Todd my committee chairs for the support on this journey. Dr. Koyzis and Dr. Todd kept me on task and encouraged me as I completed each task. The feedback provided by the committees' chairs supported me in moving through the different phases of my work.

Table of Contents

List of Tables

List of Figures

Section 1: The Problem

The Local Problem

The challenge that exists in the large urban midwestern school involved educators implementing the Blended Learning Model (BLM) in elementary mathematics classrooms. The problem was that the BLM is being implemented with the lack of data to support its effectiveness in schools for use with underachieving students. Yet, the overall effect the BLM had on student learning in the classroom had not been fully evaluated with economically disadvantaged students who perform below grade level in mathematics (Anthony, 2019). According to Anthony (2019), teacher feedback on this model had not been collected and analyzed to determine whether connections exist between the implementation of BLM and student achievement. As such, it was important to understand teachers' perceptions of the BLM and how it affects student outcomes in mathematics.

Specific groups of students in the large urban midwestern city have experienced economic deprivation and as a result are performing two or three grade levels below in math achievement as compared with their more affluent peers (Mason & Reckhow, 2017). The Michigan Educational Assessment Program (MEAP), the locally used assessment tool, shows economically disadvantaged elementary school students have weak math skills and score lower on math concepts such as number line ordering and magnitude comparison (Koon, Petscher, & Foorman, 2014). The local data reflected the national data (K-12 School Quality, 2018) and indicated that after the completion of

kindergarten, economically disadvantaged students fall far behind their more affluent peers in mathematics outcomes (Koon et al., 2014).

Researchers found that traditional teaching methods do not always give teachers the type of information needed to accurately support the students they serve (Capaldi, 2015). Traditional teaching methods are teacher oriented with a lecture style and have not helped students make any progress in mathematics (McLaren & Kinney, 2015). Lectures can fall short in providing instructors with feedback about student learning and rest on the notion that all students learn at the same pace (Kalchman, 2015). Furthermore, students are not able to retain as much information when they learn passively (Capaldi, 2015).

Despite a body of research indicating that research-based instructional models such as the BLM can increase student outcomes in mathematics, many school districts allow teachers autonomy when developing their individual classroom instructional models (Carlson et al., 2017). Doing so allows math teachers to teach using lectures and other traditional teaching methods that diminish the math experience and cause low performers not to make sufficient gains (Moody & DuCloux, 2015), thus creating a gap in practice between the research-based recommendations and classroom practice.

To increase gains in mathematics for economically disadvantaged students, the local school district provided various means of instructional support. One specific model, the BLM, has become increasingly popular within the local district of interest to this study. The BLM is an educational approach where students learn through online instruction and instruction that supports students deciding the path, pace, and/or place of their learning (Saltan, 2017). In the local school district, the mathematics-focused BLM

consists of two distinct components. First, students experienced individualized computer-based mathematics instruction utilizing a program that presents students with increasingly complex problems. Students were rewarded for correct answers and they progress through increasingly difficult concepts when they are successful. The second component involves students working in small learning groups. Teachers were trained in the BLM components to support students in mastering course content while working in small learning groups. The teachers act as the facilitator of the small learning groups through development of materials and activities to support students with content connections in different groups at different times (Farrell & Jacobs, 2016). The facilitator designs the environment, activities, and routines to support students in understanding and demonstrating specific skills through collaboration (Farrell & Jacobs, 2016). Collaboration provided students with an opportunity to work in small learning groups with their peers to support their understanding content. This project study includes a professional development training for to guide educational leaders to effectively implement the BLM model.

Rationale

The purpose of the mixed methods study was to investigate the connections between the implementation of BLM and student achievement for economically disadvantaged students who were performing 2 or three 3 below grade level in mathematics. If an instructional model is identified that supports struggling students in mathematics, then economically disadvantaged and low-performing students can

persevere and overcome the obstacles of being economically disadvantaged in the future, and potentially perform as well as their economically advantaged peers (Huang, 2015).

A math disparity between groups of students has been long documented for some groups of students who are economically disadvantaged (Ratcliff et al., 2016). Other groups of students who experienced such disparity include students receiving specialized services based on their disability and English language learners. Economically disadvantaged students struggle with successful mathematical outcomes more so than their more affluent peers (Ratcliff et al., 2016). For decades, educators and researchers attempted to determine why economically disadvantaged students struggle with successful mathematical outcomes (Moore, MacGregor, & White, 2017). Educators have attempted to improve academic success for economically disadvantaged students through instruction with a focus on differentiating the curriculum; however, challenges remain (Calloway, 2017). To make every effort to improve instruction, educators must identify an instructional model that will support students who are economically disadvantaged and are performing 2 or 3 years below grade level with mathematical outcomes so that all students are given equal opportunities for success and viability in their lives (Moore et al., 2017).

Educators, community members, and local leaders are concerned with low math student outcomes, which negatively affect the economy (Haydarov, Moxley, & Anderson, 2013). The dropout rate tends to increase for students who do not perform on grade level in mathematics thus compounding the problem for economically disadvantaged students (Haydarov et al., 2013). In addition, economically disadvantaged

students who are low performing in mathematics are associated with higher crime rates, poverty, and violence (Bryant et al., 2015)

The purpose of the mixed methods study was to investigate whether connections exist between the implementation of BLM and student achievement for economically disadvantaged students who were performing 2 or 3 years below grade level in mathematics. Additionally, I examined teachers' perceptions of blended learning and its influence on student performance in mathematics. Analysis of teachers' perceptions provides insight as to whether or not the small group learning component of the BLM supported improvement in mathematical instruction for economically disadvantaged students performing 2 or 3 years below grade level.

Definition of Terms

Blended learning model (*BLM*): The blended learning model (BLM) is an educational approach where students learn through online instruction and instruction that support students with deciding the path, pace, and/or place (Saltan, 2017).

Economically disadvantage is defined as a student who meets the income threshold for free and reduced lunch (Hossain & Bloom, 2015).

Highly qualified: Teachers who have a full state license to teach subject knowledge such as reading, writing, mathematics, and other areas of the basic elementary school curriculum as demonstrated by passing a rigorous state test (No Child Left Behind, 2002).

Low performing: Students who scored at the 10th percentile or below on the statewide assessment (What Works Clearinghouse, 2013).

NWEA proficiency: MAP Growth scores are linked to Michigan's summative assessment. This information allows districts and schools to predict performance on state performance. This will allow teachers to target instruction and differentiate to support the needs of the academic goals (NWEA, 2016).

Northwest Evaluation Association (*NWEA*): Northwest Evaluation Association NWEA) is an organization that provides assessments to measure student growth and learning needs educators (NWEA, 2014).

Proficient: Competent or skilled in doing or using something (Achieve, 2015).

Student achievement: Ensuring students are learning common core state standards that are required to be taught by educators (NWEA, 2016). Student achievement was measured by NWEA educational assessments.

Technology: Scientific knowledge that supports our industry in everyday living for practical purposes or applications (Pechenkina & Aeschliman, 2017).

Significance of the Study

In this study, I will provide a contribution to a midwestern urban school district. The purpose of this mixed methods study was to investigate the connections between the implementation of BLM and student achievement for economically disadvantaged students who were performing 2 or 3 years below grade level in mathematics. According to the data, if students are not performing at a proficient level, the dropout rate tends to increase (Jeynes, 2015). Students who drop out do not develop the educational skill set to become productive members of society which will negatively affect the economy (Jeynes, 2015). Seventy-five percent of students who are economically

disadvantaged and performing below proficiency in mathematics are at risk for failing academically or dropping out of school (Mason & Arsen, 2014). Students who are a part of the local district are performing two or three grade levels below in math compared with their more affluent peers (Mason & Reckhow, 2017). The disparity between economically advantaged students and their less economically advantaged peers has been prevalent for well longer than a decade (Callaway, 2017). Investigation of the effects of the BLM might determine if the implementation of the BLM helps to create a positive trajectory for students who are economically disadvantaged and who are performing low in mathematics.

This research could be influential to the education community if an evidence based instructional model, such as BLM, can be implemented in the classroom to support economically disadvantaged who are low performing. Investigating the results of the application of the BLM in mathematics classrooms could provide insight into the effective delivery of instruction to students to support their academic success. If the BLM is shown to positively affect mathematical student outcomes, it may change the status quo for economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics. The results of the study may be generalizable to other school districts with students in Grades K-2 who have experienced economic deprivation and who are performing 2 or 3 years below grade level in mathematics achievement.

Research Question(s) and Hypotheses

The purpose of the mixed methods study was to investigate the connections between the implementation of BLM and student achievement for economically

disadvantaged students who are performing 2 or 3 years below grade level in mathematics.

Quantitative Research Question and Hypothesis

RQ1: What is the difference in math NWEA assessment for economically disadvantaged kindergarten students who experience the BLM compared with students who experience traditional instruction?

Directional hypothesis: Kindergarten students who are economically disadvantaged performing 2 or 3 years below grade level and experiencing BLM will show an increase in student outcomes in mathematic scores compared with those who experience traditional instruction as measured by the NWEA assessment.

Null hypothesis: There will be no difference in kindergarten mathematical student outcomes between economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics who experience BLM compared with economically disadvantaged students who experience traditional instruction as measured by NWEA assessment.

RQ2: What is the difference in math NWEA assessment for economically disadvantaged first-grade students who experience the BLM compared with students who experience traditional instruction?

Directional hypothesis: First-grade students who are economically disadvantaged performing 2 or 3 years below grade level and experiencing BLM will show an increase in student outcomes in mathematic scores compared with those who experience traditional instruction as measured by the NWEA assessment.

Null hypothesis: There will be no difference in first grade mathematical student outcomes between economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics who experience BLM compared with economically disadvantaged students who experience traditional instruction as measured by NWEA assessment.

RQ3: What is the difference in math NWEA assessment for economically disadvantaged second grade students who experience the BLM compared with students who experience traditional instruction?

Directional hypothesis: Second-grade students who are economically disadvantaged performing 2 or 3 years below grade level and experiencing BLM will show an increase in student outcomes in mathematic scores compared with those who experience traditional instruction as measured by the NWEA assessment.

Null hypothesis: There will be no difference in second grade mathematical student outcomes between economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics who experience BLM compared with economically disadvantaged students who experience traditional instruction as measured by NWEA assessment.

Qualitative Research Question

RQ4: What are teachers' perceptions of BLM and its influence on student academic outcomes in mathematics? The overarching research question included: What themes emerge from the qualitative interviews regarding the examination of teacher's

perception of blended learning and its influence on student performance in the acquisition of concepts in the BLM with respect to student outcomes in mathematics?

Review of the Literature

Theoretical Foundation

Mishra and Koehler (2006) developed the technological, pedagogical, and content knowledge (TPCK) framework, which grounded this sequential mixed methods study. TPCK highlights teacher knowledge and implementation of technology and how it can support effective teaching. The TPCK framework proposes that teachers must have a deeper understanding of each component of TPCK to effectively incorporate technology, pedagogy, and content into teaching (Koehler et al., 2014). There are three specific types of knowledge TPCK addresses. These include:

- Content knowledge (CK) standards that teachers are responsible for teaching for a content area (Koehler et al., 2014).
- Pedagogical knowledge (PK) refers to the instructional best practices' teachers use to promote student learning (Koehler et al., 2014).
- Technology knowledge (TK) refers to what teachers know about technology that can be integrated into teaching and learning (Koehler et al., 2014).

The blending of these components connects to support effective teaching (Koehler et al., 2014). TPCK is a theoretical framework that focuses the integration of technology and content as one component instead of two discrete entities (Koehler & Mishra, 2014). TPCK framework directly aligns with BLM. BLM is an educational approach where students learn through online instruction and instruction that support students with

control over the content, pace, and time and location of their learning (Saltan, 2017). First, students experienced individualized computer-based instruction utilizing a program that presented students with increasingly complex problems. Students are rewarded for correct answers and progress through increasingly difficult concepts when they are successful. The TPCK framework was found to be best suited to explore the BLM with the featured components that centered on content, pedagogy, and the use of technology.

Conceptual Framework

The qualitative questions of the study are grounded in the TPCK framework. The pedagogical underpinning of TPCK focus on instructional practices, strategies, and methods that teachers use to support student's construction of knowledge (Mishra & Koehler, 2006). PK focuses on the methods of how students learn standards. It represents how topics are represented and presented to students (Mishra & Koehler, 2006). PK focuses on how students construct knowledge and acquire skills (Mishra & Koehler, 2006). PK includes student-centered environments as an instructional preference supporting students in acquiring skills (Baeten et al., 2016). Student-centered learning environments are used more frequently in a classroom setting with a platform that shifts the focus from the teacher being the keeper of the knowledge but the students having a voice in their learning (Yapici, 2016). Student-centered learning allows for more of a student voice as crucial to the learning experience. Students can become active learners that build coherent and organized knowledge (Baeten et al., 2016). The student-centered environment focuses on small groups of students working together, self-paced instruction to regulate learning, and the development of assignments to support the needs of each

student (Baeten et al., 2016). Small learning groups are utilized to support the learner in mastering learning standards.

PK of the TPCK framework focuses on how teachers present content to students and the instructional methods used to ensure mastery of standards (Koehler et al., 2016). Student-centered learning is an instructional method that allow teachers to target student voice, interest, ability, and learning styles (Slavin, 2015). Student-centered learning promotes the teacher as the facilitator of the learning to steer students in the direction of success (Baeten et al., 2016). One component of the student-centered learning is small groups where students work together to learn academic content (Slavin, 2015). Small learning groups are a widely recognized educational practice that produces learning and social skills among students beginning at preschool (Gillies, 2016). In addition, small learning groups involve students working collaboratively toward a common goal and completing tasks (Gillies, 2016). Researchers suggest that small group learning brings a sense of classroom community within the BLM environment (Yapici, 2016). Students feel confident and connected to other classmates (Yapici, 2016). In fact, when students feel connected to the group, they are more willing to work together with other students and engage in discussion and support other members of the group (Yapici, 2016). Vygotsky believed that more learning takes place when a conversation or collaboration occurs among individuals (Mamam & Rajab, 2016). The goals of small learning group work includes the creation of motivation and stem from three group concepts: academic ability, acceptance of individual differences, and social skill development. Small group learning work allow students the opportunity to enhance their elaborative thinking while

working with their peers in groups, which develops their ability to think critically and potentially retain learned information longer (Gillies, 2016). Small group learning work allows students to interact with each other, which enhances students' self-esteem and improves their performance (Gillies, 2016). The socio-constructivist theory (Eun, 2019) has been applied in other research with a focus on small group learning. Research shows that small group learning has proven to be a successful strategy that supports students learning together toward a common goal (Gilles, 2016).

Review of the Broader Problem

The review and analysis of the literature includes articles and studies that explores instruction online and face-to-face learning as a part of a comprehensive strategy for instructional improvements to support students in the area of mathematics for economically disadvantaged students who are performing below grade level. Following the framework, the review included an extensive literature review, as it relates to the problem and included a discussion of reasons for the lack of instructional support, appropriate curriculum and instruction, and an outline of the BLM. I conducted this search for literature by using the ERIC and SAGE databases by searching key ideas such as economically disadvantaged and low-performing students, BLM, online learning, national data resource center, and background information concerning the lack of instructional support in mathematics. The types of articles that I searched were peer-reviewed articles span from 5 to 7 years. I reviewed and analyzed articles to determine their relevance in the role of BLM in improving mathematics outcomes for economically disadvantaged students who are low performing. The following literature review

illustrated current research regarding the BLM and its relationship with students who are economically disadvantaged and low performing in mathematics.

Math achievement continues to be a significant problem for economically disadvantaged students. According to the National Assessment of Educational Progress, reports compared achievement to the expected levels of performance indicated that 40% of fourth graders and 35% of eighth graders were meeting the expectation or scored above the expectation for levels of performance in 2014 (Jacobsen & Rothstein, 2014). NAEP also indicated that 73% of eighth grade students were at a minimal level for math achievement. The lack of appropriate math instruction within school districts that service economically disadvantaged students remained consistent in 45 states (Jacobsen & Rothstein, 2014). Research shows that after disaggregating the data even further, students who are economically disadvantaged and at or below the poverty level are scoring the lowest in math achievement (Goforth et al., 2014).

According to research the lack of math instructional models is more pronounced due to socioeconomic status as economically disadvantaged students are exposed more to less highly qualified teachers (Bassok et al., 2016). Many economically disadvantaged children who are not proficient readers by third grade are less likely to complete high school (Bassok et al., 2016). Economically disadvantaged students face many challenges. Many times, these students are faced with inexperienced teachers with little or no professional development (Jacobsen & Rothstein 2014). Disadvantaged students are presented with teachers who have lower expectations and an unchallenging curriculum (Mayfield & Wade, 2015).

Low-income students will more than likely struggle with success in elementary and secondary schools and are less likely to attend college (Bellibas, 2016). Being raised in a low-income family sometimes means less resources for students and poor nutrition. Most of the time economically disadvantaged students have less resources and more than likely they are not receiving good nutrition to support brain and body development (Ankrum, 2016; Morsy, 2015). Lower socioeconomically disadvantaged students endure a higher level of stress at home and school and, as a result, their attention to math academic achievement is compromised (Cedeno, Martinez-Arias, Bueno, 2016). Researchers have determined that test scores are based on experiences that occurred before entering school (Morsy, 2015). Parents with a low socioeconomic status are unable to afford resources such as books, computers, or tutors (Morsy, 2015). These major differences emerge early in life. As early as 18 months of age, toddlers from disadvantaged families are behind in language proficiency (Morsy, 2015; Ankrum, 2016). There are large disparities between groups of students who are economically disadvantaged, and their affluent peers are differences such as structure, quality, and processes of how these groups of students live their lives (Morsy, 2015). Risk factors that are associated with mathematics failures for students who are economically disadvantaged include students' grade point average, number of school absences, single parenthood, or three or more kids in the house (Bassok et al., 2016). Additionally, school mobility or changing schools frequently occurs more with economically disadvantaged students and is another risk factor which affects academic achievement (Friedman-Krauss & Raver, 2015).

Several initiatives were put in place to close the mathematics disparity between groups of students. Policies such as the No Child left Behind and Race to the Top initiatives were developed to support students in their educational process and increase student achievement (Goforth et al., 2014). Specifically, a program such as science, technology, engineering, and mathematics (STEM) was designed to specifically support math achievement for students. The goals of these initiatives were to support classroom instruction to support students who are economically disadvantaged and performing below grade level (Goforth et al., 2014).

Quality Math Instruction

There are many factors that affect economically disadvantaged students who are low performing in mathematics such as low rigor in content, a lack of setting high expectations for students, the type of learning strategies used in the classroom, and efficiency of time spent in the classroom (Yamada et al., 2015). Researchers found that economically disadvantaged students are placed in lower academic ability groups and academic courses as early as first grade (Friedman-Krauss & Raver, 2015). Math instruction directly influences student learning (Goforth et al., 2014).

Quality math instruction directly affects math achievement for students (Rahman, Fox, & Ikoma, 2017). Researchers have identified some effective instructional practices that are used by highly qualified teachers. These include putting more of a focus on higher-order thinking strategies and hands on learning to increase math performance (Park, 2013). Researchers have found that other practices such as the time students spend on completing tasks promoted better student performance on the assessments (Park,

2013). Research shows it is critical to respond immediately to students who are economically disadvantaged and low performing by having a program in place such as Response to Intervention (RTI) (Park, 2013). Response to intervention (RTI) is a multitier approach to identify students with learning needs. Struggling math learners are provided with interventions to increase their learning (Park, 2013). Students receiving RTI are sometimes pulled out of the classroom to receive intense intervention. Effective teaching practices in classrooms with struggling math learners include teachers creating small groups to promote one-on-one instruction focusing on different math standards or intervention teachers may pull students in small groups (Yamada et al., 2015). Additionally, group work and hands-on learning can reduce math anxiety for students who struggle in mathematics (Yamada et al., 2015). The use of small groups is a strategy used in math instruction to suit individual needs. This involves placing students into groups within the class for teaching and learning (Garrett & Hong, 2016). There may be homogeneous grouping allowing for opportunities for adaptation of content, individual participation, and serving as a resource for each other (Garrett & Hong, 2016).

Research shows that certain types of learning strategies are being implemented in the classroom to help promote academic achievement in math (Callan et al., 2016). Specifically, metacognitive strategies resulted in higher student performance in math achievement than for those students who did not receive metacognition strategies (Callan et al., 2016). Many practices including memory strategies, control strategies, and elaboration strategies were not connected with high achievement for socioeconomically disadvantaged students (Callan et al., 2016). Strategies used in the classroom that affect

student achievement are conceptual versus procedural instruction, topics covered in classrooms, amount of homework and how much a student is tested.

When a qualified teacher spends more time on an advanced concept, students tend to learn more than when a teacher focuses on basic topics, which negatively affects student achievement. Conceptual instruction is focused on higher-order thinking, which includes estimating, explaining, hypothesizing, and making connections to everyday situations (Minor et al., 2015). Another strategy that supports student learning is the length of time spent during a math block. Researchers have found that a math block should be at least 60 minutes or more to show success in math achievement (Callan et al., 2016).

Teacher Qualifications and Expectations

Research shows that economically disadvantaged students tend to perform better overall when they are taught by highly qualified teachers (Rahman et al., 2017). Researchers have found that students of higher socioeconomic status have more access to highly qualified teachers than students of lower socioeconomic status (Rahman et al., 2017). Teachers who are not certified and highly qualified were found in schools with a high percentage of economically disadvantaged students (Rahman et al., 2017). These unqualified teachers were less experienced and teaching with emergency permits or teaching subjects for which they were not qualified (Krasnoff, 2015). Unqualified teachers continue to provide poor instruction for students, which lead to continuous low academic results (Krasnoff, 2015).

Economically disadvantaged students continue to attend schools where there are high levels of teacher absenteeism, teacher turnover, and large class sizes (Yamada et al., 2015). When a teacher leaves a position in a school and takes another position in a different school, a cost is accrued to the schools, districts, and students. Mobility may lead to inequitable distribution of highly qualified teachers across different types of districts (Podogursky et al., 2016). Teachers may move from low performing schools with a larger population of economically disadvantaged students (Podgursky et al., 2016). According to Isenber et al. (2013), economically disadvantaged students do not have as much access to effective teaching. If economically disadvantaged students have more access to effective teaching, it will likely support students in making more progress in mathematics (Isenberg et al., 2013).

Teacher absence more than 10 days has a major effect on student's math scores substantially and high student absenteeism is associated with lower student achievement (Park, 2013). Some districts surveyed teachers on a regular basis about teacher morale and increased pay slightly to reduce teacher absenteeism (Krasnoff, 2015). Researchers continue to analyze data to determine the factors that affect teacher distribution and support schools with ways to bring more highly qualified teachers to schools where students are economically disadvantaged (Krasnoff, 2015).

A teacher's degree, experience, and certifications determine the quality of instruction students receive (Park, 2013). Qualified teachers offer instruction that is student centered rather than teacher driven. A student-centered environment focuses on "students' doing the heavy lift of the work in the classroom, exploring and

communicating in the learning" (Park, 2013 p. 44). The student-centered classroom focuses on activities such as "small learning groups, student led discussions, and open-ended assessment techniques that are intended to promote the development of complex cognitive skills and process" (Park, 2013, p. 42).

Several states are implementing a variety of strategies to reduce the mathematical disparity. Some strategies include recruiting individuals that want to work in a high needs area (Ronfeldt, Kwok, Reininger, 2016). Additionally, universities used preservice preparation to motivate teachers to work in underserved schools (Ronfeldt et al., 2016).

Other strategies include training teachers using differentiated professional development to address the needs of economically disadvantaged students. Correspondingly, improving teacher education by motivating teachers to be more responsive to teaching in school districts that service economically disadvantaged students (Yamada et al., 2015). Teachers have a great influence on the student outcomes in mathematics. Quality instruction is crucial to the success of all students (Bellibas, 2016).

Students perform better when more is expected of them. Research shows that teachers' expectations of a preschool child were a significant indicator of the child's high school grade point average (Boser, Wilhelm, & Hanna, 2014). Researchers found a teacher with high expectations can instill a lasting desire toward learning (Sorhagen, 2013). High teacher expectations have been a critical conversation around improving learning outcomes for students. Teacher-student relationship can support academic achievement for low-performing students especially (Sorhagen, 2013). Pygmalion in the

classroom demonstrates that children's intellectual capabilities can be dictated by a teachers' expectations which can unfold into positive self-fulfilling prophecies (Sorhagen, 2013).

Culturally Responsive Teaching

Research show there is a lack of connection between home and school culture (Ebersole, Mossman, & Kawakami, 2015). Culture is one the most important instructional considerations, conceptualized by how individuals interpret life events (Vesico, 2016). If teachers can help students make connections between home and school, students will engage in the lesson with more motivation (Vesico, 2016). When student engagement increases, academic achievement and school experiences improve (Miller & Mikulec, 2014). Children bring valuable contributions to all classrooms and teachers must use this information to create a successful learning environment for students (Vesico, 2016). Teachers must have compassion and take steps toward justice for disadvantaged students. Teachers need to learn how to respond to values, knowledge, and histories of their students (Bondy & Hambacher, 2016). Culturally responsive mathematics instruction ensures that students engage in critical thinking activities that allow disadvantaged students to engage in analysis of mathematical relationships that describe their environment (Lucey & Tanase, 2012). When teachers provide culturally responsive teaching, they become effective content teachers and create a happier learner willing to engage in the lesson (Miller & Mikulec, 2014). Universities are providing cultural diversity training to promote equity education for every student (Ebersole et al., 2015). The goal is to create a culturally healthy environment that nurtures cultural

identity and to develop cultural competencies in every teacher that serves students (Mayfield & Wade, 2015).

Blended Learning

Traditional classroom instruction could be the cause of below grade level expectations and deficiencies in math (D'addato & Miller, 2016). BLM is a combination of classroom instruction and online instruction through web-based activities and interaction (Heikoop, 2013). The web-based technology focus is to create independent and collaborative learning experiences where students collaborate apart from space and time (Heikoop, 2013). Teachers move away from traditional way of instructing and become a facilitator of student-centered activities (D'addato & Miller, 2016). The BLM empowers students to take ownership and be accountable over their learning and become more motivated about their work (D'addato & Miller, 2016). Students are encouraged to express themselves and demonstrate an understanding of their learning, which is consistent with a high performing classroom that is engaging, and student centered (West-Burns & Murray, 2016). Community in classrooms has been a topic for discussion in education, with teachers becoming community builders in the classroom (Gallagher, 2016). Children from poor communities may lack family support in many ways. Classrooms that are engaging and create a sense of belonging offer a positive image for students and the classroom (West-Burns & Murray, 2016). Students have a better experience when they have a voice and can express their thinking (West-Burns & Murray, 2016).

The BLM positions students to be an integral part of how they learn. The BLM involves online learning as a part of an integrated learning experience through multiple pathways designed to meet each student needs. Blended learning incorporates multiple ways for students to gain access to learning standards. The BLM emphasizes computer-based mathematics drills and small group learning. Some experiences include small group sessions with students working independently and collaboratively while the teacher meets with a small group. In addition, some students may have individual tutoring and complete projects (Powell et al., 2015). If teachers are trained properly in blended learning, it can enhance the quality of their performance and change their teaching and learning classroom practices (Onguko, 2014).

The behaviorist component of the BLM manifests as computer-based mathematics drills. Students are assessed through the online program so that they work at their individual level. The computer-based mathematics drills allow students to pace their work. When students are moving at their own pace, there is less pressure of keeping up with the group (Saltan, 2017). Students use web-based math sites that assess their math knowledge and begin instruction based on what students know (Saltan, 2017). The web-based math program reinforces skills through lessons, modeling, and positive reinforcement to support students to find the right answer (Saltan, 2017). Student learning online is the same as what they would learn during time with the teacher and vice versa (Salton, 2017). This targeted use of computers is more sophisticated than only putting computers in the classroom. BLM is not only about technology but creating an instructional model to personalize student learning to ensure success for all students

(Powell et al., 2015). Blended learning allows for personalized learning for all students and meets each student's unique learning needs (Powell et al., 2015). Additionally, BLM shifts the role of the teacher into the classroom facilitator, allowing students to take on the cognitive load of the learning (D'addato & Miller, 2016).

The constructivist theory framework involves students working in small learning groups collaborating to complete tasks, students supporting each other, and offsetting each other's deficiencies. In classrooms where students work in small learning groups, using a variety of strategies to improve their understanding of a subject (Capar & Tarim, 2015). The BLM allows for a flexible learning environment includes students learning in many ways while collaborating with other students (Powell et al., 2015).

The TPCK framework has a major emphasis on content knowledge, pedagogy, and technology to support teaching and learning (Mishra & Koehler, 2006). These components allow students to experience multiple ways to learn the content and gain access to the content (Mishra & Koehler, 2006). Transitioning to a BLM that has a personalized learning system that is driven by TPCK ensures that all components such as content knowledge, pedagogy, and technology are interconnected with teaching and learning. Online mathematical drills, and students collaborating in small learning groups have the potential to transform the education system.

Implications

If the results of the research indicate that the BLM supports positive gains for low-achieving economically disadvantaged students, a possible project may include professional development that supports teachers with incorporating technology into their

classroom. Mishra and Kohler (2006) developed the TPCK framework that highlights teacher knowledge and implementation of technology and illustrates how it can support effective teaching. Using the TPCK framework coupled with the data analysis of the study may help teachers develop a deeper understanding of how each component of TPACK can effectively incorporate technology, pedagogy, and content into instruction (Koehler et al., 2006). Teachers may benefit from information that supports how technology, pedagogical, and content knowledge all work together as one to support teaching and learning. The professional development sessions may include lesson planning, modeling, and demonstration lessons that support BLM.

Summary

A need exists for an instructional model to support economically disadvantaged students who are performing below grade level in mathematics in a large urban midwestern city compared with their financially stable peers. According to Bassok al. (2016), certain indicators cause a disparity between groups of students. Some of the dynamics include sociocultural factors, lack of highly qualified teachers, and low expectations for students. The teacher turnover rate is extremely high, and districts are trying to create incentives for teachers to stay in schools that mostly support economically disadvantaged and low-performing students (Park, 2013). The BLM is a proposed instructional strategy to address the instructional support economically disadvantaged students need. More school districts are beginning to model their instruction with a focus on BLM (Park, 2013). Results of the research data will determine if using the BLM with economically disadvantaged students who are performing below

grade level affects student outcomes in mathematics in a large midwestern urban school district. The literature review highlights reasons for the math disparity between groups of students and factors that affect students' success.

Districts have worked diligently to help low-performing students reach their goals and build their self-esteem. However, the research on the BLM is limited and studies have not examined whether this model can support low-performing students in the mathematics classroom. Finding an instructional model that supports economically disadvantaged and low-performing students is a major concern across the nation. A study examining the nature of the relationship between the BLM and student outcomes in mathematics for students is necessary (Pentimonti et al., 2017). The results of the present study will contribute to the decision to determine if the BLM will be the instructional model that support mathematical outcomes for economically disadvantaged students who are performing below grade level. In the next section, I will focus on the methodology. The discussion will include the process used to collect information and data for the purpose of this research project. The methodology discussion will include information about participants, design, and procedure. Additionally, I collected data using existing test assessment and completing teacher interviews.

Section 2: The Methodology

Mixed Method Design and Approach

This section includes the method and design used to collect and analyze data for this project study. Also included is the information that provided the rationale for choosing the mixed method research study design for the purpose of investigating if there was a difference between the implementation of BLM and student achievement for economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics and those students who received the traditional instruction. I used the mixed methods design to collect both quantitative and qualitative data. Furthermore, I used this design to understand the research problem (Creswell, 2015). The problem was that BLM is being implemented with the lack of data to support its effectiveness in schools for use with underachieving students. Yet, the overall effect the BLM had on student learning in the classroom had not been fully researched with economically disadvantaged students who perform below grade level in mathematics.

I derived qualitative data from interviewing teachers and seeking their perception of how BLM affects student outcomes in mathematics, which was crucial to answer the research question. Moreover, examining the quantitative data added another layer of data in understanding of how the implementation of the BLM affected student outcomes in mathematics. The mixed methods sequential research design provided an in-depth understanding of the data than either quantitative or qualitative approaches could accomplish in isolation (Creswell, 2015). This research problem required interviewing teachers and examining NWEA math assessment data to obtain a deeper understanding of

the effectiveness of BLM with economically disadvantaged and low-achieving students. Furthermore, the mixed methods design informed how qualitative data offered more insight by providing teacher perceptions of implementing BLM. Information regarding the role of the researcher, methodology, research design, and rationale is included in this section. The section also includes the methods used for collecting and analyzing data, details the design type, and the instruments used for data collection. Finally, I detail the rationale for selecting a mixed method research study design in this section.

The purpose for using a mixed method research design was to collect both quantitative and qualitative data to gain a deeper understanding of the research problem. I analyzed and interpreted both qualitative and quantitative data to support or contradict the efficacy of the BLM with respect to student outcomes in mathematics with the sample of convenience selected for the study. The advantage of using the mixed methods research design is that it involves collecting, analyzing, and integrating (or mixing) quantitative and qualitative data in a study (Creswell, 2015). I used this mixed method research design to provide the depth of understanding and corroboration to determine if the BLM is a consistent instructional method that supports student outcomes in mathematics for students who are economically disadvantaged and performing below grade level. Furthermore, the mixed method design provides a more robust understanding of the research problem by gathering different but complementary data (Creswell, 2015). I analyzed quantitative data from the district's assessment, NWEA. I analyzed quantitative data by kindergarten, first-grade, and second-grade levels to determine the difference in math NWEA assessment for economically disadvantaged kindergarten students who

experienced the BLM compared with students who experienced traditional instruction. I analyzed the quantitative data using SPSS statistical software system. I entered the data for each grade level into SPSS and then analyzed the data using a *t*-test for independent means. The qualitative data consisted of semi structured interviews with teachers who implemented BLM as an instructional tool. I collected and analyzed the qualitative data using atlas.ti. Atlas.ti is a software tool used for qualitative data analysis (Creswell, 2015). The analysis tool allows the researcher to manage, organize, and code data (Creswell, 2015). I uploaded the responses into atlas.ti and, with the use of in vivo coding, I highlighted specific words, resulting in themes gleaned from the interviews. Once both sets of data were analyzed the results were triangulated to answer each research question. The data measures for BLM are nominal and NWEA math assessment is an interval measure.

Setting and Sample

A school district in the midwestern region of the United States in an urban area where students are socioeconomically disadvantaged and performing 2 or 3 years below grade level in math achievement served as the research site for this study. The district has approximately 7,000 students and the average income in this midwestern city is $23,109. The school located in this area is a K8 grade school with approximately 600 students (Great Schools, 2016) at the time of data collection.

I collected the quantitative data from two kindergarten classes, two first-grade classes, and two second-grade classes. In each grade, one group of students received traditional classroom instruction. The other group of students received BLM instruction.

Additionally, in each grade, one teacher implemented a more traditional style of teaching, whereas the other teacher was trained and implemented the BLM.

I collected the data collected from total of 133 participants in Grades K-2. In the two kindergarten classrooms, I collected data from 22 students who received BLM instruction and 22 students who received traditional instruction. I collected data from 22 students in the first grade who received BLM instruction and 22 students in the first-grade classroom who experienced the more traditional teaching method. I collected data from 23 students in the second-grade classroom who received the BLM instruction and from 22 students in other second-grade classroom who experienced traditional teaching.

The researcher-participant relationship was established during professional development learning sessions conducted by the district throughout the academic school year. The district provided training for all instructional personnel on a new math curriculum to ensure all students received instruction aligned with grade-level Common Core State Standards. This training was intended to increase the use of the BLM in the mathematics classroom. The curriculum training occurred several times throughout the school year. During the professional learning, I was able to work with colleagues to discuss best instructional practices. I and my colleagues worked as a group to understand implementation of the new curriculum. We all learned together, which made for a smooth transition as I reached out to participants regarding their interest to participate in the study. During this time with the staff, I shared interest in interviewing staff members about BLM. Following a staff meeting, K-2 teachers were sent emails inviting them to be an interview participant. Teachers were asked to share their interest in participating in the

study through one-to-one interviews. Those who responded affirmatively were provided a consent form via email regarding their participation in the study. The statement included information about teacher participation in the study and clarification regarding job responsibilities, which is not related to the research study. The teachers were asked to bring their signed written consent form to the interview. The consent form also included language for teachers to opt out of the study or interview at any time. I did not provide incentives to interviewees for their participation. I collected the consent forms and stored the information in a locked file cabinet in a secure office. To protect each teacher's confidentiality, I coded and identified all responses using numbers 1 through 6.

Data Collection

Quantitative Data

The primary data for this study was NWEA scores administered in the fall of 2016 and late spring of 2017. I obtained permission from NWEA to use this instrument in the study. The permission letter is in Appendix C. The NWEA was deemed the most fitting instrument to collect the quantitative assessment data. NWEA provides "reliable, valid, and norm-referenced, computer adaptive assessments in mathematics and NWEA has a 90% accuracy rate for reliability purposes" (NWEA, 2016, p. 7).

NWEA data sets were cleaned and screened regularly for student enrollment updates in conjunction with the School Information System (SIS). For instance, a student who was not enrolled or not tested in the fall was not listed; however, there was a dash to denote no testing was completed. I was the only one that had access to data. NWEA had been utilized to assess student achievement in the district for several years. All

assessments developed by NWEA use the Rasch Unit Scale (RUT) scale to measure student achievement and student growth (NWEA, 2016). The RIT scale score reveals what students know how to do and what they are ready to learn. This scaled score supports teachers with instructional needs of students (NWEA, 2016). It also collects the data from year to year and growth in each subject area. The NWEA uses normative data that provides achievement norms for students. Strict procedures are in place to ensure norms were typical of school age population. NWEA determines norms using K-11 grade-level samples. The samples were drawn from a pool of 10.2 million students nationwide.

The process for collecting quantitative data included gathering individual classroom NWEA score reports for Grades K-2 after students completed the Spring 2017 assessment. The data included RIT scale scores for Fall 2016 baseline data and spring 2017 RIT scores to determine if students met or did not meet their spring target. NWEA determines target RIT value based on student's score in relation to a previous test score. RIT score is a benchmark of a student's academic knowledge over a period. The scores presented in the research study is the mean RIT scores provided by NWEA. I used a *t*-test for independent means to analyze the data. I entered individual student RIT scores in the SPSS software, which is a statistical analytic tool.

The validity and trustworthiness of the quantitative findings included using NWEA assessments to determine students gains from fall to spring. The trustworthiness and validity of the qualitative data included member checking inviting teachers to

participant in reviewing their transcription to ensure accuracy and alignment with the phenomena being investigated (Creswell, 2013).

Qualitative Sequence

The qualitative data collected for the mixed methods research study involved semi-structured interviews intended to investigate teachers' perceptions of BLM and its influence on student academic outcomes in mathematics. Semi-structured interviews allowed for a two-way conversation between the researcher and each teacher. The researcher developed open-ended questions from the literature review focused on students' working collaboratively to determine if the BLM impacted student outcomes in mathematics within the blended learning math block.

Teachers were interviewed about their perceptions of the BLM and its influence on student academic outcomes in mathematics. The researcher previously shared information about the research study at a staff meeting. After the staff meeting the K-2 teachers were sent emails inviting them to be an interview participant. Teachers were asked to share their interest in participating. Six teachers volunteered to be interviewed for the research study. Those who responded affirmatively were provided a consent form via email about the purpose of and their participation in the study. The statement included information about teacher's participation in the study and it included language for teachers to opt out of the study or interview at any time. The teachers were asked to bring their signed written consent form to the interview. The researcher did not provide incentives to interviewees for their participation. The consent forms were collected by the researcher and stored the information in a locked file cabinet in a secure office.

Teachers shared information during an interview for the researcher to gather data regarding their perceptions of implementing the BLM. The researcher sent an email to each participant providing an overview of what to expect during the interview session. Teachers were asked eight questions during their individual interview. The interview questions are in Appendix B. The researcher developed open-ended questions to determine if the BLM impacted student outcomes in mathematics and the impact of the collaborative small learning groups. Further questioning revolved around gathering information related to what teachers and students were doing while students worked collaboratively, student tracking standards mastery and web-based technology related to BLM. During the interview, the researcher captured responses through journaling the responses of each participant. The completed interview information was captured in a word document. The document was sent to each teacher to ensure the information was accurate; this process is known as a member check. According to (Creswell, 2015), all participants need to conduct accuracy checks (or member checks) to ensure the recorded information is not one-sided or biased.

Data Analysis

A mixed method study design was employed to first collect and analyze the quantitative data, followed by the collection and analysis of qualitative data to answer the research questions. NWEA math assessment data sets were used to determine if there was a statistically significant difference between economically disadvantaged students who performed 2 or 3 years below grade level and experienced BLM in mathematics and those who experienced traditional instruction. The directional hypothesis: “students who

experience BLM will show an increase in student outcomes in mathematics than those who experience traditional instruction as measured by NWEA assessments". The research results indicated that students who experienced the BLM increased in student outcomes in mathematics compared with students who experienced traditional instruction.

The statistical method used to test the directional hypothesis was the *t*-test for independent means which examined the difference between each group of students in grades K-2. The *t*-tests were used to compare the mean scores of each group who received the BLM and students who received traditional instruction to determine if there was a difference between the group mean scores for each grade level.

The focus of the qualitative analysis was to seek themes regarding teachers' perceptions of BLM and its effect on mathematical student academic outcomes. Eight semi-structured interviews were conducted before and after school, during teacher preparation periods, at a time that was convenient for each teacher. After capturing the information through a journaling process, a member-check was completed. The participants were asked to respond to eight open-ended interview questions. The teachers were not provided the questions in advance. The participants responded to the questions based on their experience with BLM. Probing questions were asked to seek greater understanding of participants' initial response to an interview question. The responses were recorded using a journal to ensure the teachers' response were accurately recorded. The Walden IRB (Institutional Review Board) did not allow the audio or video recording

of interviewee responses; therefore, using a journaling process, the researcher scribed all responses.

All interview responses were recorded in a Word document. All participants' responses were uploaded by question into atlas.ti, a qualitative analysis system. After uploading the responses, atlas.ti segmented words and phrases to align with codes that were identified in the analyses. Atlas.ti identified segments and phrases of each interview transcription and coded the responses. Five major themes emerged from the analysis include:

1. Formative and summative assessments.
2. Tracking Learning
3. Self-paced learning
4. Personalized learning with the use of technology
5. Small learning groups.

The method type of triangulation used in this research includes a range of both quantitative (NWEA assessments) and qualitative (teacher interviews focused on the use of the BLM the classroom). The use of both methods allowed for triangulation of different perspectives focused on the connections of the implementation of BLM and student achievement for economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics.

Data Analysis Results

The purpose of the mixed methods study was to investigate the effect of the implementation of BLM and student achievement for economically disadvantaged

students who are performing 2 or 3 years below grade level in mathematics. The research results indicated that there was a difference in student achievement between economically disadvantaged students who were performing 2 or 3 years below grade level in mathematics who received BLM and those who received traditional instruction aligned with the mixed method study design, quantitative data were analyzed first to address the quantitative research questions (RQ1-3) followed by the collection and analysis of qualitative data to address the qualitative research question (RQ4). In the next section, quantitative and qualitative findings are presented.

Quantitative Component

An independent means statistical *t*-test analysis was conducted to address the research questions using the IBM Statistical Product and Service Solutions (SPSS) version 26 computer software program. The researcher was the only one involved in analyzing the data. The *t*-tests were conducted to analyze the results of the NWEA data with students in grades K-2 who are economically disadvantaged and performing 2 or 3 years below grade level in mathematics. Three *t*-tests, one per grade level were conducted to examine the results of students in grades K-2. Students in each grade level had two different experiences, students who experienced BLM and students who experienced traditional instruction.

The Fall 2016 NWEA math RIT scores established the baseline data for each student and created a year end RIT score target. In addition, the results of the Fall 2016 NWEA informed and guided the teachers' instructional planning throughout the year.

The spring 2017 NWEA RIT scores determined students' growth in math, between testing events, based on the target set forth in Fall 2016.

RIT mean scores were used to determine if there was a statistically significant difference between fall 2016 and spring 2017 RIT scores. The NWEA provided a report which identified students who met their RIT target score or did not meet their RIT target score.

Kindergarten results revealed a statistically significant difference in RIT scores (t = .006 p< .05) for math outcomes from fall 2016 to spring 2017 for students who were economically disadvantaged and performing two or three grade levels below in mathematics that experienced the BLM versus students who experienced traditional instruction. A greater number of kindergarten students who experienced BLM met their target as measured by NWEA.

First grade results revealed a statistically significant difference in RIT scores (t = .002 p<.05) for math outcomes from the fall 2016 to spring 2017 for students who were economically disadvantaged and performing two or three grade levels below in mathematics that experienced the BLM versus students who experienced traditional instruction. A greater number of first grade students who experienced BLM met their target as measured by NWEA.

Second grade results revealed a statistically significant difference in RIT scores (t = .002 p<.05) for math outcomes from the Fall year 2016 to Spring 2017 for students who are economically disadvantaged and performing two or three grade levels below in mathematics that experienced the BLM versus students who experienced traditional

instruction. A greater number of second grade students who experienced BLM met their target as measured by NWEA.

The results answered the research question "What is the difference in math NWEA assessments scores for economically disadvantaged students who experience the BLM compared with students who experience traditional instruction?" The findings revealed that for all three grade levels there was a statistically significant difference between the BLM and mathematical achievement of economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics. The results confirm the hypothesis: Economically disadvantaged students who are performing two or three grade levels in mathematics who experience BLM will demonstrate greater mathematical student outcomes scores as measured by the NWEA assessment tests than similar students who do not experience BLM.

Kindergarten *t*-test Results

An independent samples *t*-test was conducted using SPSS to evaluate if there was a statistically significant difference between kindergarten students who experienced BLM and kindergarten students who experienced traditional instruction. Two kindergarten classes were utilized in this study to address research question (RQ1). Each class contained 22 students. One group of students received BLM and other group of students received traditional instruction (Figure 1). Figure 2 illustrates the comparison of students who met their target and those who did not meet their target. It illustrates a greater number of students who received BLM met their learning target. Kindergarten independent means *t*-test results revealed there was a statistically significant difference (*p*

= .006<.05) between students who experienced BLM *(m* = .73, *sd* = .456, *n* = 22) and students who experienced traditional instruction (*m* = 32, *sd* =.477, *n* = 22). Therefore, the null hypothesis which suggested there was no significant difference between students who received BLM and students who received traditional instruction was rejected. Figure 1 illustrates the number of kindergarten students who received BLM (N = 22) and those who received traditional instruction (N = 22).

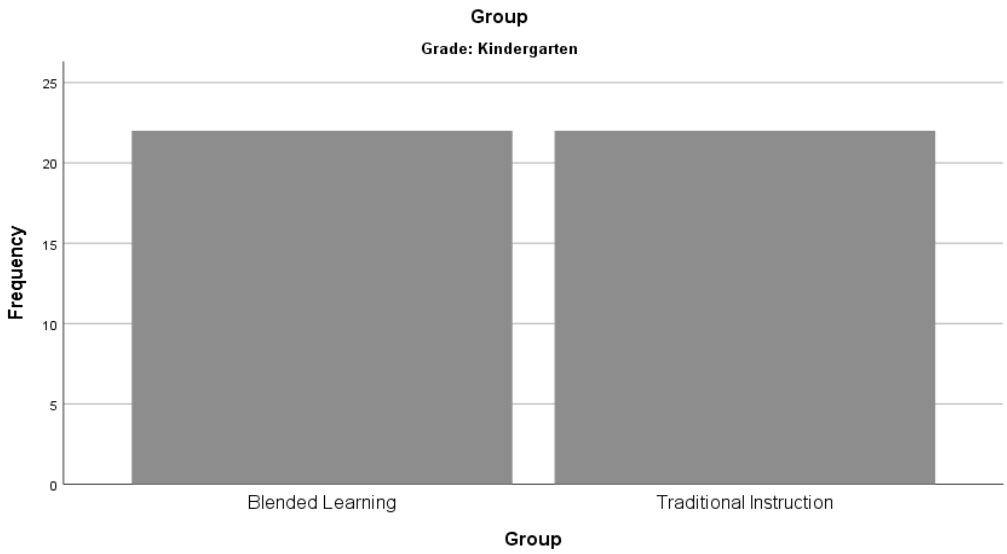

Figure 1. Kindergarten *t*-test.

Figure 2 displays the number of kindergarten students who received BLM met their target (N = 22). compared with students who received traditional instruction (N = 22).

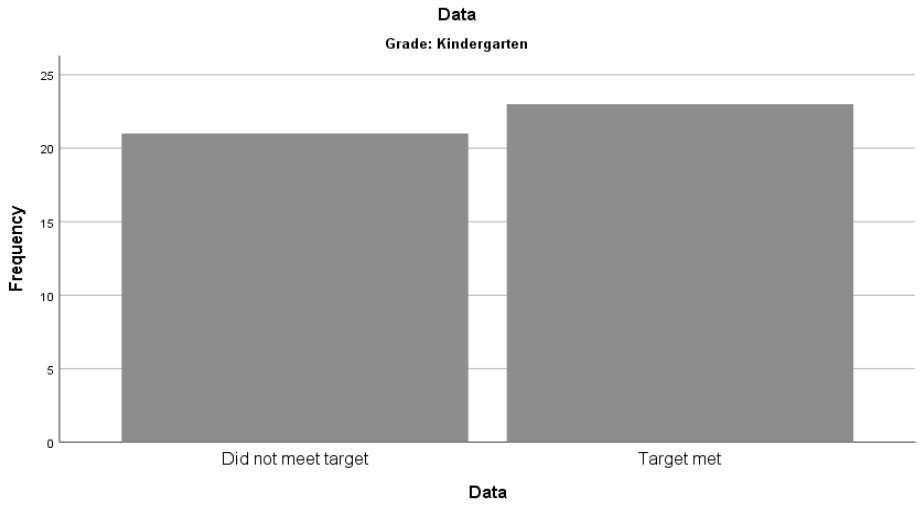

Figure 2. Kindergarten *t*-test.

First Grade *t*-test Results

An independent sample *t*-test was conducted using SPSS to evaluate if there was a statistically significant difference between first grade students who experienced BLM and first grade students who experienced traditional instruction. Two first grade classes were utilized in this study to address research question (RQ2). Each class contained 22 students. One group of students received blended learning and other group of students received traditional instruction (Figure 3). Figure 4 illustrates the comparison of students who met their target and those who did not meet their target. It illustrates a greater number of students who received BLM met their learning target. The *t*-test results revealed there was a statistically significant difference ($p = .002<.05$). between students who experienced BLM ($m = .77$, $sd = .429$, $n = 22$) and students who experienced traditional instruction ($m = .32$, $sd = .477$, $n = 22$) Therefore, the null hypothesis which

stated that there was no significant difference between students who received BLM and students who received traditional instruction was rejected.

Figure 3 identifies the number of first grade students who received BLM (N = 22) and those who received traditional instruction (N = 22).

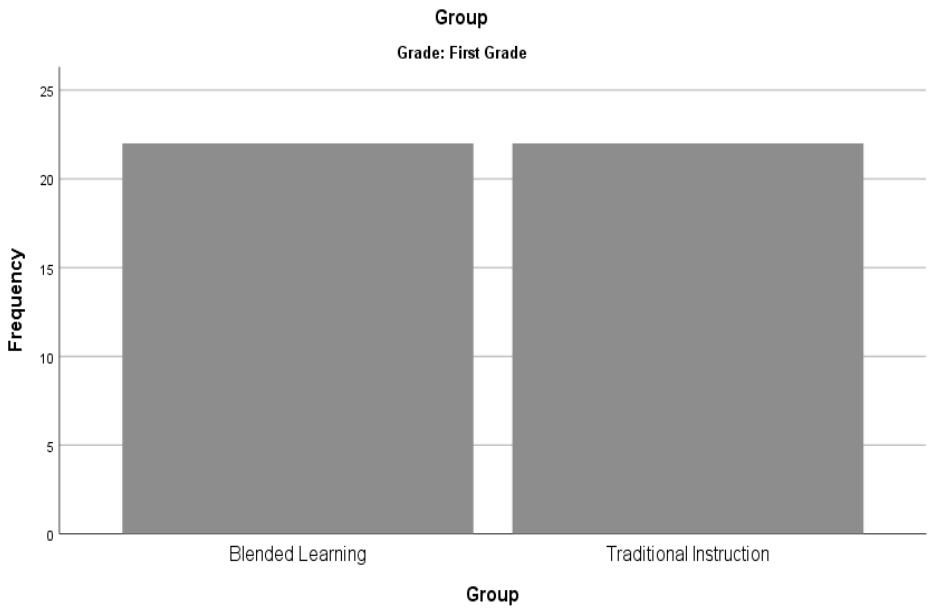

Figure 3. First Grade *t*-test.

Figure 4 displays the number of first-grade students who received BLM (N = 22) met their target compared with students who received traditional instruction (N = 22).

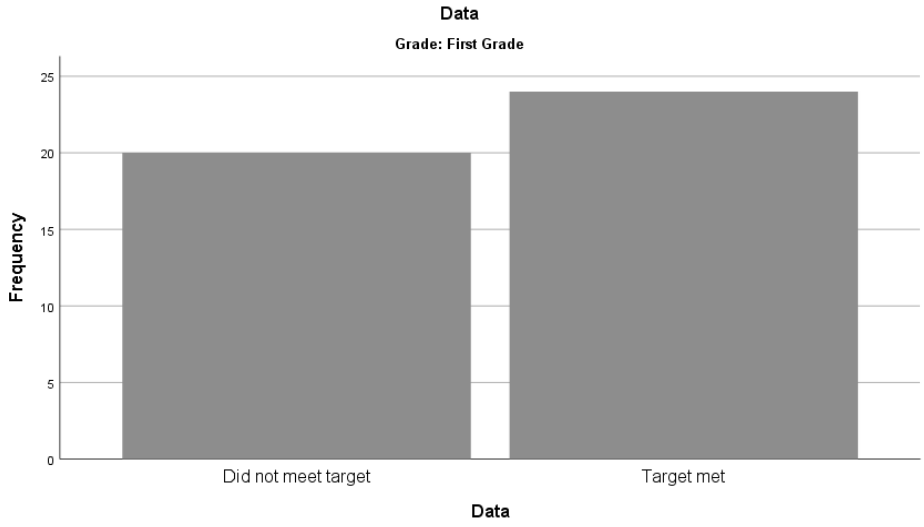

Figure 4. First Grade *t*-test.

Second Grade *t*-test Results

An independent samples *t*-test was conducted using SPSS to evaluate if there was a statistically significant difference between first grade students who experienced BLM and first grade students who experienced traditional instruction. Two second grade classes were utilized in this study to address research question (RQ3). One second grade class contained 22 students and the other second grade class contained 23 students. One group of students received blended learning and other group of students received traditional instruction (Figure 5). Figure 6 illustrates the comparison of students who met their target and those who did not meet their target. It shows a greater number of students who received blended learning met their target. The *t*-test analysis revealed there was a statistically significant difference ($p = .011<.05$) between students who experienced BLM ($m = .70$, $sd = .470$, $n = 23$) and students who experienced traditional instruction ($m = .32$,

sd = .477, *n* = 22). Therefore, the null hypothesis was rejected, which suggested there was no significant difference between students who received BLM and students who received traditional instruction. Figure 5 depicts the number of second grade students who received BLM (*n* = 22) compared with those who received traditional instruction (*n* = 23).

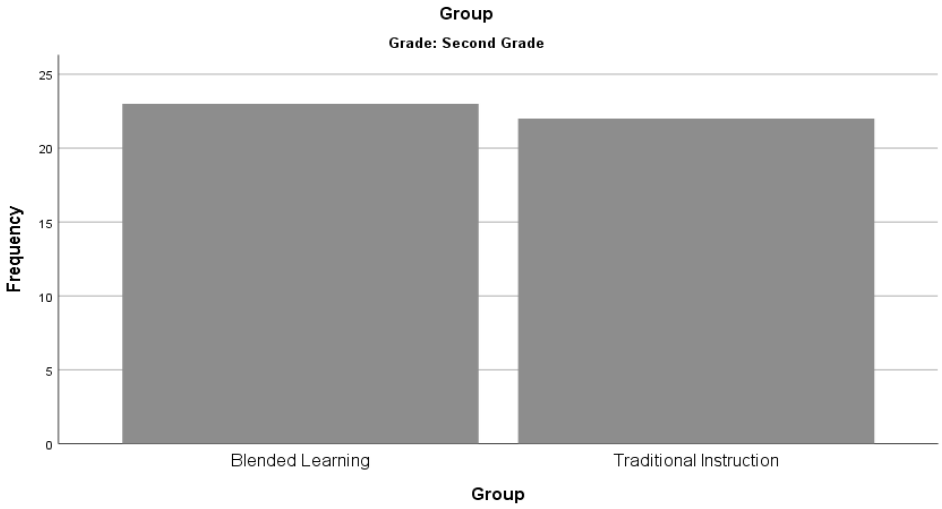

Figure 5. Second Grade *t*-test.

Figure 6 displays the number of second-grade students who received BLM (*n* = 22) met their target compared with students who received traditional instruction (*n* = 23).

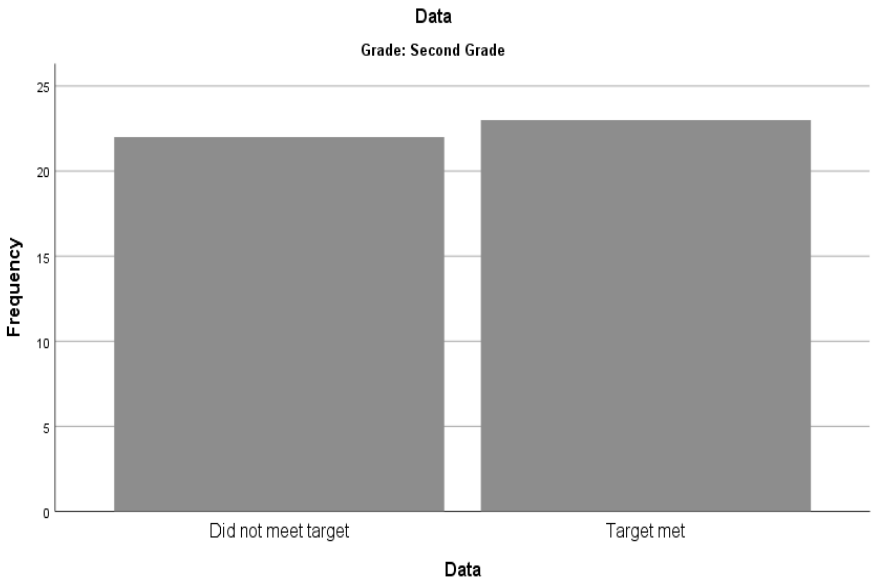

Figure 6. Second Grade *t*-test.

Finally, an independent *t*-test was conducted using SPSS to evaluate if there was a statistically significant difference between all students in grades K-2 that experienced BLM and those who experienced traditional instruction. Figure 7 displays a summary of the total number of K-2 students in the study who received blended learning and the total number of students who received traditional instruction (figure 7). Figure 8 is an overview of the number of students in K-2 who received blended learning and met their target compared with number of K-2 students who received traditional instruction and did not meet their met. Figure 8 a greater number of students K-2 who received BLM met their target (m = .73, sd = .447, n = 67) and all students K-2 that experienced traditional instruction (m =.32, sd =.469, n = 66). Table 1 reveals there was a statistically significant difference (p = .000<.05) between all students who received BLM and those who

received traditional instruction. Therefore, the null hypothesis was rejected, which suggested there was no significant difference between students who received BLM and students who received traditional instruction. Figure 7 illustrates a group of K-2 students who experienced BLM and traditional instructional instruction (N = 66).

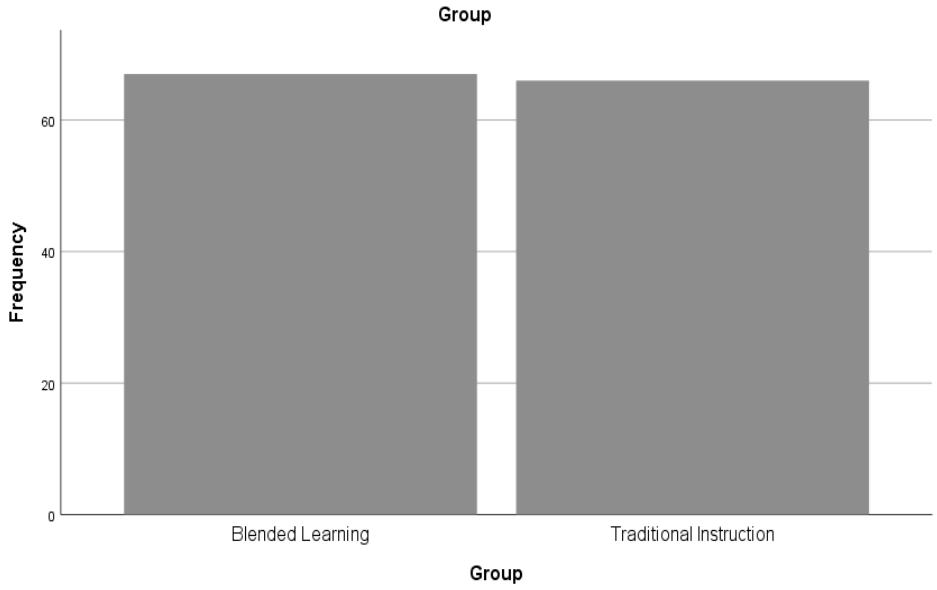

Figure 7. K-2 *t*-test.

Figure 8 displays that a greater number of K-2 students who received BLM met their target compared with students who received traditional instruction (N = 67).

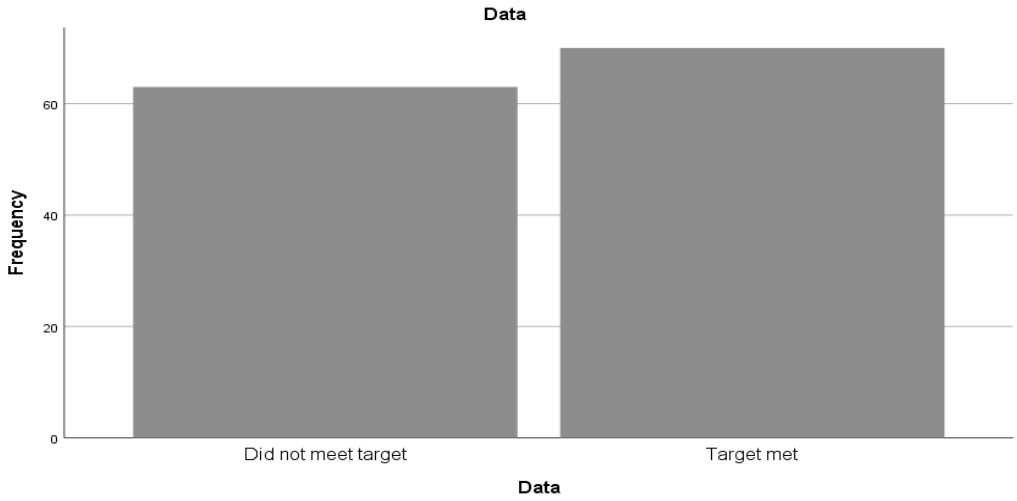

Figure 8. K-2 *t*-test.

Table 1

t-test Results for BLM and Traditional Instruction for All K-2 Students

	BLM			Traditional instruction			*t*	*df*	*p*
	M	*SD*	*N*	*M*	*SD*	*N*			
Type of instruction	0.73	0.447	67	0.32	0.469	66	5.201	131	.000

The problem identified was that BLM was implemented by the school for use with economically disadvantaged students who were performing two or three below grade level in mathematics; however, its overall effect on student learning in the classroom with mathematics for students who are economically disadvantaged and performing below grade level in mathematics had not been researched. Based on the results of the quantitative data, BLM is an instructional model that supports increased

student outcomes in mathematics. Teachers who implemented BLM had greater success with increased student outcomes in mathematics for economically disadvantaged students who were performing two to three grade levels below in mathematics achievement.

Qualitative Component

Qualitative data analysis revealed five themes. The themes were identified using the in-vivo coding in atlas.ti. Using the in-vivo coding system, the exact words of the participants' responses were entered the software system. The systems analyzed the entries and highlighted those words that were most used by the participants, known as segments, to identify specific themes (Creswell, 2013). The interview questions are found in Appendix B. The five themes identified were:

1. Formative and summative assessments.
2. Tracking Learning.
3. Self-paced learning.
4. Personalized learning with the use of technology.
5. Small learning groups.

Research Question: The focus of the qualitative analysis of interview questions was to seek themes to answer the guiding research question:

RQ4: What are teachers' perceptions of BLM and its influence on student outcomes in mathematics?

During the interviews, the researcher scribed, by hand, the response to the questions; immediately following the interviews the information was transcribed into a word document. The participants were asked to respond to eight open-ended interview

questions. The participants responded to the questions based on their experience with BLM. Probing questions were asked so that participants could elaborate on their initial response providing a more in-depth description of their experiences implementing BLM.

To ensure accuracy, prior to entering the transcribed participant responses into atlas.ti, a comprehensive member-check was achieved by sending the participants their completed document for review. According to (Creswell, 2015), it is important that all participants go through an accuracy check to ensure information isn't one-sided or distorted. All participants responded that their transcribed responses were correct. Following the member check, the aggregated responses were entered into atlas.ti. In accordance with the Walden University Institutional Review Board (IRB) guidelines, the researcher did not to audio or video-record the participants or their responses. The participants' responses were entered in the qualitative data analysis atlas.ti and themes were generated.

The BLM is an educational approach where students focus learning using an online platform and instruction that supports students deciding the path, the pace and/or place of their learning (Saltan, 2017). The mathematics focused BLM consists of two distinct components. First, students experienced individualized technology-based mathematics instruction utilizing a program which presents students with increasingly complex problems. Students are rewarded interactive incentives for correct answers and progress through increasingly difficult concepts when they are successful. The second component involved student working collaboratively in learning groups with focus on

mastery of skills. The generated themes revealed the features of the BLM and strategies to support student learning**.**

Description of Themes

Five themes were generated by atlas.ti. The following themes were generated

1. Formative and summative assessments.
2. Tracking learning.
3. Self-paced learning.
4. Personalized learning with the use of technology.
5. Small learning groups.

The themes were not identified in a rank or priority order; therefore, they are not discussed in any particular rank or priority order.

The first theme generated was formative and summative assessment. The assessments used by teachers were used to provide feedback and to modify learning activities (Zhang, 2020). The next theme was tracking learning in which students were responsible for being aware and monitoring their learning (Cronmiller, Emerick, & Flick, et al., 2017). In addition, students were aware of the tasks and or activities that needed to be completed for each unit of study. Self-paced learning was the third theme; self-paced learning emphasized students pacing their learning toward mastering standards. According to (Palaigeorgiou & Papadopoulou, 2019), students pacing their learning allows students to take ownership and to be more accountable to their learning. Personalized technology learning, the fourth theme generated, supports tailoring instruction for every student (Hallman, 2017). The district purchased technology software

to aid teachers in the classroom to support student learning. I-Ready is an interactive online learning platform that differentiates lessons based on student's initial diagnostic. Upon completion of the initial diagnostic a personal learning path is created for students based on their skill level. The fifth and final theme identified is small learning groups. Research shows that small learning groups are beneficial in supporting students with thinking and academic achievement in different fields of study such as mathematics, science, and literacy (Soffer, Khan & Nachmias, 2019). Small learning groups support social skills and relationships with students (Soffer, Khan & Nachmias, 2019). Collaborative small learning groups are essential to learning in the Blended Learning Model.

Analysis of Themes

Formative and Summative Assessments

Formative and summative assessments supported in the planning of instructional activities. All six participants shared that they use some form of summative and formative assessments. Participants 1 and 3 shared there are different questioning strategies used during small learning groups to check for understanding. Most participants shared that students completed exit tickets so the teacher could assess students' understanding of the content; and used worksheet activities to assess students' mastery of a skill. Participant 1 stated "I used the I-Ready to determine student mastery of standards". Participant 2 shared:

> I found I can assess student mastery of content and skills based on their ability to problem solve materials without needing assistance and the student's ability to

explain the task at hand. I also observed how a student navigates through the task to gauge progress.

Participant 6 mentioned “I frequently walk around listening to student’s conversation to determine their understanding and mastery of the skill/concept”.

Tracking Learning

Students tracking their learning emerged as a theme. Tracking progress is a key component of students taking ownership and accountability of their learning in BLM. All participants stated that students tracked their progress. Most participants (n = 4) stated that students have a visual aid to track their learning marking each assignment as it is completed. In addition, participants 1 and 2 commented that during student led conferences, students shared with parents their learning goals and showed evidence of tracking their learning to achieve stated goals. Participant 5 explained, “I developed a system for students to conference, self-reflect and self-evaluate their own success”. In her classroom, she has a "Tell the Teacher Box” where students give feedback regarding assignments and peer feedback. Participant 6 explained “that each of my students are provided with a math standards tracker. After each conference, students color the math standards mastered as way of tracking growth and progress towards their goals”. All the participants concluded that tracking learning allowed students to have greater participation and monitoring of their learning.

Self-paced Learning

BLM emphasizes students learning at their own pace; self-paced learning emerged as a theme. All participants shared that students pace their own learning in the

classroom. Most participants shared that the use of BLM allows for students to self-pace mastery of standards and use each other as a resource. Participant 2 shared

> I felt it was important to administer a learning style inventory to determine students' learning preference. I utilized the data to aid in creating differentiated rotation activities. I believe self-paced learning motivates students to consistently work towards mastery of standards at a pace conducive to their style of learning.

Participant 4 revealed "self-paced learning was most beneficial for students who were at grade level or above self-paced mastery of standards". Participants 5 and 6 stated that during the self-paced learning time, students used technology and paced their learning as they completed a unit of study.

Personalized Learning with the use of Technology

Infusing technology is significant in the implementation of BLM. Personalized learning with technology is a theme that emerged. All participants shared how they used I-Ready to personalize learning for their students. The participants discussed how they use I-Ready lessons which are adjusted based on the skill level of students. Additionally, the participants shared how they used the online Khan Academy as a strategy for students to practice their skills. Participant 3 shared "students love the use of technology, they enjoy playing games, when, in fact, they are engaged in learning". Participant 4 shared infusing technology allowed students to work at their own pace whereas, participant 2 shared how personalized technology allowed students to work on skills needed based pre-determined by the I-Ready. Participant 6 highlighted "the data retrieved from the use of

technology in my class is used to plan, implement, teach whole group and small group lessons".

Small Groups

The last theme identified by the participants was small learning groups. The BLM allowed for teachers to work with small learning groups of students to address similar needs. In addition, it allowed for small learning groups of students to work collaboratively with their peers. Participant 1 stated, "I use small group time daily to provide intensive targeted instruction for students with the greatest deficits. In addition, I meet with other small groups two to three times per week to differentiate instruction". All participants stated they worked with small groups of students teaching skill deficits, extended lessons, and conference one-on-one with students. Additionally, the participants shared during small group time they focused on individual students needs and differentiated the instruction. Participant 3 beamed

> It's a joy meeting with small groups, it allows students who may not be as confident in a whole group setting to participate. Often it may be a boost to students' self-esteem. It also provides students functioning beyond grade level to share and extend their knowledge.

Participant 6 shared her strategies for monitoring groups, observing, taking anecdotal notes, and facilitating students' learning using discussion and questioning techniques while students are working in small learning groups. She also used the small learning group time to address individual students' needs.

Summary of Qualitative Analysis

Overall, the participants disclosed how they use: formative and summative assessments, tracking learning, self-paced learning, personalized learning with the use of technology and small groups, to implement BLM in their classrooms. All responses were positive; any teacher dissatisfaction with BLM did not surface during the interviews. Participants shared how they use informal and formal assessments to monitor student progress and design and differentiate lessons ensure student mastery of the content. Participants discussed how students tracking their learning allows the students to be more accountable to their work and goal attainment. Using this strategy, students can self-pace to complete their goals. Through the implementation of BLM, students worked collaboratively to complete tasks and had a personalized learning plan that supported their learning. Participants revealed how technology was used to personalize instruction for students. Furthermore, they remarked during small group learning activities teachers worked with small groups to support extended lessons or remediation of deficit skill areas for students. Overall, teachers responded positively to small learning groups in the classroom. Teachers concluded it was an effective use of instructional time and it benefited student achievement in the classroom. In conclusion, the teachers interviewed perceived BLM and its components as an effective instructional model. The aggregated themes revealed the components of BLM were contributing factors to increasing student achievement in those classrooms that implemented BLM.

Data Triangulation

The qualitative data supports the results of the quantitative data that there was an increase in mathematics RIT scores from fall 2016 to spring 2017. The independent *t*-test analysis identified that there was statistically significant difference between students who received BLM and students who received traditional instruction for all three grade levels.

Thus, students receiving BLM was associated with an increase in mathematical student outcome as measured by the NWEA. The qualitative data from the teacher interviews resulted in positive feedback which confirmed the effect of BLM on student outcomes in mathematics. Quantitative data revealed that BLM had a successful impact towards mathematical students' outcomes learning. The quantitative and qualitative data were triangulated first through examining quantitative data with the number of students who met that their target and reached their mathematics goals. The method triangulation was used to understand the effect of BLM on NWEA assessment results between economically disadvantaged students who received BLM instruction and students who do not experience the BLM. The researcher triangulated the quantitative data NWEA assessment data and qualitative interview response data. Based on the themes, the teacher's perceptions supported the success of the BLM and its contributions to the increase in student outcomes in mathematics.

The quantitative data indicated that out of 67 participants who received BLM instruction, 49 or 75% of the participants met their yearly target as measured by NWEA RTI scores. Teacher's perception of the BLM strategy revealed the model contributed to student success. Students were able to build on each other's thoughts and supported each

other in the learning during small group learning time. Students were allowed opportunities to respond to mathematics in a way that increased mathematical student achievement. The six teacher participant's perceptions were positive with regard that the components of BLM contributed to student math success.

An independent means *t*-test was conducted for each grade level for grades K-2 using SPSS to evaluate if there was a statistically significant difference between students who experienced BLM and students who experienced traditional instruction. Therefore, the null hypothesis was rejected in that there was no significant difference between students who received BLM and students who received traditional instruction. This mixed method design addressed the hypothesis, economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics who experienced BLM demonstrated greater mathematics student outcomes as measured by the NWEA assessments compared with students who experienced traditional instruction. The directional hypothesis was confirmed through the quantitative data analysis that economically disadvantaged students performing two or three grade levels below in mathematics exposed to the BLM exhibited a statistically significant increase in mathematical student achievement compared with students who experienced the BLM.

Section 3: The Project

Introduction

As detailed in Section 1, the purpose of the mixed methods study that this project was based upon was to investigate the connections between the implementation of BLM and student achievement for economically disadvantaged students who are performing 2 or 3 years below grade level in mathematics. With the use of SPSS, I reported the study results quantitatively, and I used semi structured interview response questions to collect qualitative data.

Quantitative data collected included NWEA Fall 2016 and Spring 2017 RIT scores for students in Grades K-2. I conducted three independent means *t*-tests to analyze K-2 assessment data. Second, I interviewed six teachers to obtain their perceptions of the effectiveness of the implementation of BLM on student mathematics outcomes for students who are economically disadvantaged and performing 2 or 3 years below grade level. I used the atlas.ti to analyze the responses.

As a result of the data, I created a professional development plan to support teachers in their quest to implement to its fullest using the BLM in the mathematics classroom. The proposed professional development plan supports teachers by providing participants with a common language of BLM and prepares them to implement the components of BLM effectively in mathematics classrooms. The components of the BLM are differentiated center activities, mastery tracking, assessment of student learning, small group instruction, and classroom structures.

Rationale

The research findings indicated that the BLM supported increasing students in mathematical outcomes for economically disadvantaged students performing 2 or 3 years below grade level. Overall, the teachers interviewed responded, the BLM was an intricate part of successful mathematical student outcomes. The qualitative data analyzed in Section 2 indicated that all six teachers responded that there were positive student outcomes with the implementation of BLM. Furthermore, the quantitative data revealed positive mathematical student outcomes. The results of the data indicated that BLM is a beneficial model in the classroom to support students' mathematics achievement.

Based on the results, a professional development plan was appropriate to support all teachers to effectively implement BLM in the classroom. The professional development plan is aligned with the work of Nooruddin and Bhamani (2019) who asserted that teachers should be encouraged to update their skills and knowledge to support student learning and meet the needs of the 21st-century learners.

Review of the Literature

I conducted a literature review based on the study's findings that indicated the BLM is a model that support students' outcomes in mathematics. I completed a search of scholarly, peer-reviewed articles using Google Scholar and the following databases: ERIC and EBSCO. I selected the following search terms to gather information for the literature review: *teacher professional development, effective professional development, job-embedded professional development,* and *the adult learner theory.*

The literature review supported the project study through the implementation of effective teacher professional development and understanding the adult learner. I discuss both in the review of the literature.

Professional Development

High-quality teaching affects student outcomes and professional development is used to support teacher quality (McKeown et al., 2019). Teachers must be trained to facilitate high-quality instruction with the 21st-century learner. The 21st-century skills have changed tremendously with more advanced information and technology (O'Neal et al., 2017). The 21st-century skills include collaborative problem solving, complex problem solving, creativity, and digital skills (Geisinger, 2016). These skills move teachers away from teaching basic skills and focusing on rote memorization emphasizing higher order thinking skills and other multifaceted process of learning (Urbani, 2017).

With the increased rigor in curriculum and state assessments, there has been a major emphasis on teacher professional development (Ahmad-Peterson et al., 2018). Effective professional development supports better student outcomes with increasing accountability (Powell & Bodur, 2019). Professional development is planned opportunities for teachers to learn (Taylor, 2017). Research has consistently shown that teachers who are trained and prepared produce students who perform on a higher level and it is found that teachers remain in the profession (Ahmad-Peterson et al., 2018).

Teachers are expected to engage in continuous professional development to build knowledge, skills, and confidence (Nooruddin & Bhamani, 2019). Additionally, to produce sustained implementation of best practices, continuous professional development

is crucial (Ahmad-Peterson et al., 2018). Professional development consists of structured training with specific outcomes for teachers to support positive change in their teaching. Research suggests that there are three important features of professional development, including a focus on content knowledge, active learning opportunities, and coherence with other learning activities (Hardin & Koppenhaver, 2016). Professional development support teachers in building their knowledge and capacity to support the schools, students, and national needs (Ungar, 2016). Additionally, *professional development* can be defined as, "to alter the professional practices, beliefs, and understanding of school persons toward an articulated end" (Gaines et al. 2019). Effective professional development includes teachers having a voice in the professional learning that takes place. The most productive professional development would include information that is related to the classroom, allowing teachers time to meet and ensure everyone has the same understanding and build teamwork (McElearney, Murphy, & Radcliffe, 2019). Professional development should include understanding effective classroom practice and must be guided by data to ensure proper content of the professional development (Meyer-Looze et al., 2019). In addition, professional development should be differentiated to support the various skill levels of teachers (Meyer-Looze et al., 2019).

Professional development provides teachers opportunities to learn and integrate new strategies into the classroom, and sustained professional development is an intricate part of continued teacher success (Hardin & Koppenhaver, 2016). Teachers who are trained and prepared develop and cultivate higher performing students (McCray, 2016). According to Martin et al. (2019), adults usually reflect on their practices according to

values, experiences, and accumulated knowledge to frame their understanding of what is being introduced. The professional development introduced for this project study provides opportunities for teachers to examine their instructional practice through time to reflect on the benefits of the strategy learned and implemented.

According to Adu-Tineh and Sadiq (2018), professional development extended for a period of 6 to 12 months, with approximately 30 to100 hours in a year, results in positive and significant effects for increased student outcomes. Contrarily, limited professional development does not produce positive effects on student outcomes (Adu-Tineh & Sadiq, 2018). After a sustained professional development of 3 years, teachers' mindsets shifts in content knowledge and perceived effect on student learning (Miller et al., 2015).

Job-Embedded Professional Development

Job embedded professional development (JEPD) focuses on intentional support and continuous learning for teachers and other stakeholders within the educational system (Owen, Pogodzinski & Hill, 2016). The goal of JEPD is to provide professional development during work time in the daily work environment so that teachers and other personnel can learn from one another (Owen et al., 2016). Research findings has shown that JEPD focus on the needs of the teachers based on student data and classroom observations (Cavazos, Linan-Thompson, & Ortiz, 2018). According to Derrington and Kirk (2017), the role of the principal is to serve as an instructional leader working with teachers to help build capacity and grow professionally as an educator. Derrington and Kirk noted that effective learning takes place when the learning is connected to classroom

practice and work teachers are doing with students. JEPD has many advantages for the educational staff and leads to more collaborative learning amongst teachers, which leads to a shared vision and a more committed staff (Owen et al., 2016). JEPD most important features are "content-focus, active learning, coherence, duration and active participation" (Cavazos et al., 2018, p. 204). The features of job embedded professional development focused on content to improve teaching and learning resulting in positive student outcomes (Althauser, 2015).

Adult Learning Theory

Although effective professional development includes teacher input, it is also equally important to consider how the adult learner learns. The theoretical framework for this study is the adult learning theory. Adult learning is grounded in social constructivist theory (Powell & Bodur, 2018). According to Powell and Bodur (2018), characteristics of the adult learner includes "participating in planning, evaluating experiences and life experiences help contextualize adult learning. Adults want learning experiences to have immediate relevance for their professional and or personal life. Also, adults want opportunities with time to engage in problem-oriented learning" (p. 22). Adult learning should be designed with structures that will aid the adult learner in the learning process. Those structures should include collaboration, reflection, motivation, and the valuable content (Zepeda et al., 2014). The adult learner is more willing to engage in the learning when the professional development have been selected by the learner (Zepeda et al., 2014). In addition McCary (2016) asserted that the adult learner is motivated internally rather than externally. The information that focuses on the adult learner gaining

opportunities to build professional development that allows teachers autonomy to plan and evaluate their professional learning. It also allows time to develop activities that teachers can engage in problem solving that will aid teaching and learning.

There are several ways to provide support during adult learning transformation. First, teachers will examine what they believe about effective teaching and how the new instructional practice fits within their current teaching method. Second, teachers will discuss with peers or reflect individually about effective instructional practices utilized. It is collaborative reflective discourse that leads teachers to transform their instructional practices (Martin et al., 2019).

Project Description

Hardin and Koppenhaver (2016) asserted there are three important features of professional development to include a focus on content knowledge, active learning opportunities and coherence with other learning activities. This project was developed based on these three components and the adult learning theory. The professional development project requires minimal resources. The components of BLM will be presented during PLCs for instructional staff to utilize during job embedded professional development (JEPD). The administrative team will be available during implementation throughout Phase I. The administrative team includes the principal and the assistant principal. The role of the administrative team is to monitor the implementation of the BLM instruction by completing daily classroom walkthroughs, providing feedback to teachers, and facilitating the PLCs.

Teachers may be at various levels of knowledge and effective implementation of the components of BLM with proficiency. This is recognized as a potential project barrier. This potential barrier will be addressed by first using the Classroom Implementation Rubric to assess teachers' knowledge and skills in implementing BLM. Secondly by providing differentiated PLC training sessions based on the identified needs of the teachers. The professional development plan will be implemented in three phases over a period of 3 years.

Phase I

In Phase 1 teachers will complete a self-reflection assessment using the Classroom Implementation Rubric found in Appendix K. Teachers will self-assess their knowledge and skills at the beginning of the academic school year and the end of the school year to determine their individual level of BLM classroom implementation and progress.

The Classroom Implementation Rubric assesses teachers on five components and identifies the level of implementation for each. The five components are: Differentiation of Center Activities, Learning Objectives & Mastery Tracking, Assessment of Student Learning Outcomes, Small Group Instruction and Systems & Structures. Each BLM component was used to structure the qualitative interview questions. The four levels are:

1. Reimplementation – Beginning.
2. Level 1 – Just Getting Started.
3. Level 2 – On My Way.
4. Level 3 – I Got It.

Refer to the Appendix K for additional Classroom Implementation Rubric information.

Teachers will complete the Classroom Implementation Rubric during the school's three-day professional development program prior to the start of the academic school year. It is during the three-day professional development program each component of the BLM model, as identified in the Classroom Implementation Rubric, will be introduced to the faculty. Initial data from the teacher's self-assessment of the use of BLM components, using the Classroom Implementation Rubric, will be analyzed and used to develop JEPD which will be implemented during PLCs throughout the school year.

PLCs meet twice a month for 50-minutes from October through May of each academic year. Each PLC will be facilitated by a member of the instructional leadership team: principal and assistant principal. In Phase I, based on Classroom Implementation Rubric data, teachers will meet in a PLC that is aligned with a BLM component. For example, teachers at the Pre-Implementation [Beginning] stage will meet in a PLC that introduces them to the model, whereas, teachers on Level 2 [On My Way] will meet in a separate PLC to increase their proficiency implementing the model. The self-assessment Classroom Implementation Rubric will also be administered at the end of the academic year. Pre and post data from the Classroom Implementation Rubric data and walkthrough data will be analyzed to plan for additional teacher training.

Table 2

Phase I - Implementation Proposal: Year 1 (Timeline Overview of BLM Professional Development)

Year 1	Activity	Participants	Hours of PD
August	Administration of the Classroom Implementation Rubric	Teachers	The first hour of Day 1 PD
August	3-day training on the five components of BLM conducted by principal and assistant principal	Teachers	18 hours 6 hours a day
October-May	Professional development based on data analysis in PLCs	Teachers and administrators	Two 50-minute PLC sessions monthly 15 hours
October-May	Peer classroom observations classroom walkthroughs to provide support	Teachers	50 minutes per month per teacher during PLCs

Note. PD = professional development; PLCs = professional learning communities

At the end of each year, teachers who have achieved a Level 3 [I Got It] will have an opportunity to become a lead teacher who will support peer teachers as they implement newly learned BLM knowledge and skills. For a teacher to be classified as a lead teacher there must be a Level 3 self-reflection based on the classroom implementation rubric with supporting evidence and walkthrough data from administration that aligns with Level 3 indicators from each component of BLM. Teachers will be invited to become a lead teacher based on the data and administrative recommendations. Teachers who are recommended and agree to accept the role as a lead teacher will receive additional lead teacher training. This training is beyond the scope of this project.

Phase II

Year 1 post Classroom Implementation Rubric data and walkthrough data will be analyzed to plan Phase II for year 2.

In Phase II administrators will continue monitoring teacher implementation of BLM using classroom walkthroughs. Teachers will continue to meet in PLCs during Phase II with the support of lead teacher(s) and administration. Based on the Classroom Implementation Rubric data, PLC participation will vary to meet the individual needs of the teachers. In concert with district policies, teacher written permission and parental permission, administrators will video record model classrooms to be used in year 2 PLCs for training purposes. The model classroom videos will provide teachers with an opportunity to observe effective BLM implementation at each level (Level 1, Level 2 and Level 3). These videos will also provide PLC discussion topics. At the end of the second-year or Phase II teachers will complete a self-reflection using the Classroom Implementation Rubric. The rubric data and walkthrough data will be used to configure year three PLC membership and identify JEPD training needs for year three. Teachers at a Level 3 and recommended by administration at end the Phase I and II will be offered the opportunity to serve as a lead teacher. Lead teachers will support their peer teachers during PLCs and their model classrooms will be used for peer observation. A master schedule will be developed to provide lead teachers with weekly additional prep periods to conduct walkthroughs, modeling, and PLC training.

Table 3

Phase II- Implementation Proposal: Year 2 (Timeline Overview of BLM Professional Development)

Year 2	Activity	Participants	Hours of PD
August	Review classroom rubric data focused on components and celebrate Year 1 successes/challenges Assign teachers to PLCs based on Year 1 data	Teachers, lead teachers administrators	6 hours-full day
October-May	Specific professional development based on data analysis PLCs BLM mentoring for new teachers	Teachers, lead teachers Administration New teachers	Two 50-minutes PLC sessions monthly) 15 Hours

Note. PD = professional development; PLCs = professional learning community

Phase III

The end of year 2 Classroom Implementation Rubric and administrator walkthrough data will be used to configure year three PLCs and identify specific BLM content training needs. As proposed in Phase II, lead teachers will support teachers during PLCs and peer observation will be conducted in model classrooms. The master schedule will be developed to provide lead teachers with weekly additional preparation periods to conduct walkthroughs, modeling, and PLC training. The intent is all teachers will reach Level 3 proficiency in all five components of the BLM by the end of year 3.

Table 4

Phase III- Implementation Proposal: Year 3 (Timeline Overview of BLM Professional Development)

Year 3	Activity	Participants	Hours of PD
August	Review classroom rubric focused on components and share successes/challenges	Administrators, lead teachers, teachers	6 hours
October-May	Specific professional development based on data analysis PLCs BLM mentoring for new teachers	Teachers, lead teachers Administration New teachers	Two 50-minute PLC sessions monthly 15 Hours
October-May	Peer classroom observations Classroom walkthroughs to provide support	Administration, lead teachers, teachers	50 minutes per month per teacher during PLCs

Note. PD = professional development; PLCs = professional learning community

Project Evaluation Plan

The type of evaluation used for the project deliverable is outcome based. Outcome evaluations assess the effect of programs or projects and have clear objectives, meaningful indicators, and reliable data. Furthermore, an outcome evaluation can assess participant's changes associated with a program such as a professional development program (education.nsw.gov.au, 2008). The outcome-based evaluation for this project is intended to evaluate a change in teaching and learning as a result of the three-year JEPD and if this change positively impacts student outcomes in mathematics. The outcome-based evaluation will be used to determine whether the JEPD met its desired outcomes for teachers. Three indicators will be used to evaluate if the outcomes are met.

1. All (100%) of teachers will complete phase I, Phase II, and Phase III will be at a Level 3 as measured by the Classroom Implementation Rubric and summary walkthrough data by the end of year 3

2. At the end of each year 80% of teachers will move from one level to the next level as measured by the Classroom Implementation Rubric and summary walkthrough data demonstrating if teachers effectively implement all components of BLM in the mathematics classroom.

3. All new teachers to the school will matriculate at least 1 to 2 Levels on the Classroom Implementation Rubric and summary walkthrough data each year during implementation of the JEPD plan.

Project Implications

Local Community Implications

The social change of engaging in BLM will contribute to a positive impact on mathematical student outcomes. The BLM allows for smaller groups of students to work with the teacher and provides opportunities for students to work collaboratively with their peers. Study results revealed the BLM positively impacted how math instruction is delivered to students and student mathematic achievement scores. The success of the BLM has the potential for the district to promote building community of trainers to support the effective BLM implementation processes.

Research has shown high quality effective professional development is significant to the capacity building of the teachers (Ahmad-Peterson, Hovey & Peak, 2018).

Teachers gain a better sense of confidence in their instructional planning and delivery of mathematics. In addition, it contributes to positive outcomes for the students performing two to 3 years below grade level in mathematics.

Larger Community Implications

Considering the implications for the larger community and its responsibility for student accountability the BLM has the potential to positively impact student outcomes on local and state assessments. Evidence suggest that when teachers receive on-going high-quality professional development, they consider longevity in the field of education (Ahmad-Peterson, Hovey & Peak, 2018). It is the art of collaboration and the support of leadership that motivates teachers to continue to strive toward excellence. The project plan is developed on the tenets of collaboration and leadership support.

Section 4: Reflections and Conclusions

Project Strengths and Limitations

The project has a strength and a limitation. This project includes a professional development plan that occurs throughout the school year with a continuation of the plan for Years 2 and 3. The strength of the project is the professional development series which focuses on building teacher's capacity in BLM implementation to increase student outcomes in mathematics. The Classroom Implementation Rubric will be used to support the BLM implementation. Based on the results, data will be utilized to support the planning of a continued professional development program. The Classroom Implementation Rubric is a tool used to assess the level of the five components of the BLM. There are four levels used to determine the stage of implementation of each component of BLM. The four levels are Pre (Beginning), Level 1(just getting started), Level 2 (On My Way), and Level 3 (I Got It). The benefit of utilizing the Classroom Implementation Rubric is it identifies teachers' BLM implementation level.

The project's limitation could include inconsistencies or ineffective implementation if there is not commitment to the BLM implementation from the teachers or administrative team. Without regular monitoring and providing specific timely feedback, there is a risk of implementation not being as effective.

Recommendations for Alternative Approaches

The local problem identified is that BLM is being implemented by the school for use with underachieving students. However, the effect the BLM has on student learning in the classroom with mathematics for economically disadvantaged students and those

who have performed 2 or 3 years below grade level in mathematics had not been evaluated. The recommendation for an alternative approach is to connect the BLM to the end of the year teacher evaluation Domain 3 of the Charlotte Danielson Framework. Domain 3 in the evaluation framework focuses on instruction and engaging students in learning. By connecting BLM to the teacher evaluation, teachers will take the training more seriously and focus on implementation of the BLM.

Scholarship, Project Development, and Leadership and Change

My greatest takeaway from designing a research proposal, conducting the research, and developing the project has been acquiring the skills and knowledge regarding the processes and protocols of scholarly research and project design. The process of writing and developing the project study has supported me in understanding how to appropriately use a research design to answer a research question. I understand scholarly research language when reading research and reviewing scholarly works. I have developed as an educational leader as it relates to being more of an expert and feeling more confident in understanding the BLM and how to support teachers to effectively implement the model. I gained a wealth of knowledge regarding the adult learner theory and how adults learn. The opportunity to design a professional development plan to support teachers, in any district interested in implementing the BLM, has been a highlight of my research.

Reflection on Importance of the Work

Overall, the implementation of BLM showed significant gains towards closing the achievement gap among the students who are economically disadvantaged and who are 2

or 3 years below grade level in mathematics. Furthermore, the benefits of the BLM, supports academic success, which leads to an increase in self-confidence and motivation in students' effort to succeed. My professional life includes developing as a researcher and understanding the process. I have expanded my capacity in the knowledge of BLM. I feel more confident providing feedback with key components of the BLM. I feel accomplished and successful in completing my writing and project study.

Implications, Applications, and Directions for Future Research

This research can support districts with data that the BLM does have a positive effect towards increasing mathematical student achievement. There is a possibility the information may change the trajectory for students' mathematic outcomes. Districts may decide to implement BLM with fidelity and provide teachers with ongoing professional development for successful implementation. This may build confidence for those students who struggle in mathematics. The implications include providing ongoing BLM training for teachers, which directly supports mathematical student achievement. Teacher training is a key indicator for student success. My future research interests may include supporting teachers with effective strategies that provide intense intervention for small groups of students who struggling in mathematics.

Conclusion

The BLM was one school's efforts to support teachers and increase students' mathematics achievement outcomes. Although the model has been implemented in schools, based on my review of literature, there is minimum research to show the effectiveness of the BLM. This is one of the determining factors in selecting this topic for

my research. My investigation of the effects of using the BLM to support mathematical achievement among economically disadvantaged students performing 2 or 3 years below grade level had positive results. The common goal of education is student achievement. This model will potentially change the trajectory for students in mathematics, in addition to promoting social benefits.

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Appendix A: The Project

Professional Development/Training Curriculum Materials

Blended Learning Success in the Classroom

Table of Contents

Introduction

Purpose

The purpose of the BLM professional development plan is to build teachers capacity with the model. Based on the positive study results, I developed a professional development training to prepare teachers to effectively implement BLM in the mathematics classroom. Research states the Blended Learning Model provides teachers with diverse instructional opportunities when addressing student needs (D'addato & Miller, 2016). Effective professional development allows for teachers to increase teaching skills and knowledge to change instructional practice (McCray, 2016). The target audience for the professional plan is for all teachers to develop strategies to successfully incorporate BLM in the mathematics classroom.

The goals of the BLM professional development plan are:

- teachers will develop a common language and understanding of BLM
- teachers will develop strategies to effectively implement BLM in the classroom.
- teachers that complete Phase I, Phase II and Phase III will be at a level 3 implementation by the end of year 3.

Professional Development Objectives:

- to develop systems to track mastery
- to develop multiple centers based on data
- to plan activities for centers based on the bi-weekly assessments
- to plan intentional small group instruction with a focus on learning targets based on student data with the purpose of moving students towards or beyond grade level

Day 1 Blended Learning Model (BLM)

Professional Development Agenda

OUTCOME

Teachers will gain the knowledge and skills to foster professional learning that improves instruction.

LEARNING GOALS

Participants will

1. develop a common language and understanding of BLM
2. develop strategies to effectively implement BLM in the classroom, and
3. teachers that complete Phase I, Phase II, and Phase III will be at a level 3 implementation by the end of year 3.

AGENDA ITEMS

Launching the Module

- Launch: PD Overview (5 minutes)

Learning Goal 1: Exploring Blended Learning Model

- Explore: Teachers work in grade level groups to discuss what they already know about BLM. Then, complete a "KWL" chart per group (10 minutes) and give each group 5 minutes to share out. Highlight some of the common items found on the KWL chart.
- View: PowerPoint "The Basics of Blended Learning"

https://docs.google.com/presentation/d/1_r6kv0f_BAORsCdczWYbchmLzTJ0PYqbkqM760lJp9M/edit?usp=sharing

Learning Goal 2: Self Reflection using Classroom Implementation Rubric

- View: Classroom Implementation Rubric
- Explore: Teachers will complete a self-reflection rating the components of classroom implementation. Teachers will turn and talk about their rating in each implementation stage.

Learning Goal 3: Systems and Structures

- View: PowerPoint Systems and Structures
- Explore: Teachers will work on a system and structure plan

Deliverable: Begin working on System and Structure Plan

Now What? Be prepared to share system and structure plan during day 2 of the PD

Day 2 Blended Learning Model

Professional Development Agenda

OUTCOME

Teachers will gain the knowledge and skills to foster professional learning that improves instruction.

LEARNING GOALS

Participants will

1. develop a common language and understanding of BLM
2. develop strategies to effectively implement BLM in the classroom, and
3. teachers that complete Phase I, Phase II, and Phase III will be at a level 3 implementation by the end of year 3.

AGENDA ITEMS

Launching the Module

- Launch: Share deliverable from Day 1 (30 minutes)

Learning Goal 1: Using Data to develop Station Rotations

- View: PowerPoint Station Rotation
- Explore: Teachers use their classroom data to develop station rotations

Learning Goal 2: Students tracking

- View: Information on student tracker: PowerPoint

https://docs.google.com/presentation/d/1_r6kv0f_BAORsCdczWYbchmLzTJ0PYqbkqM760lJp9M/edit?usp=sharing

- Explore: Teachers will develop student trackers

Deliverable Expectations:

- Mastery Checklist for tracking mastery of skills-Day 2
- Plan for center activities based on data- Day 2

Day 3 Blended Learning Model

Professional Development Agenda

OUTCOME

Teachers will gain the knowledge and skills to foster professional learning that improves instruction.

LEARNING GOALS

Participants will

1. develop a common language and understanding of BLM
2. develop strategies to effectively implement BLM in the classroom, and
3. teachers that complete Phase I, Phase II, and Phase III will be at a level 3 implementation by the end of year 3.

AGENDA ITEMS

Launching the Module

- Launch: Share deliverable from Day 2 (30 minutes)

Learning Goal 1: Intentional Small Groups: What's your Focus

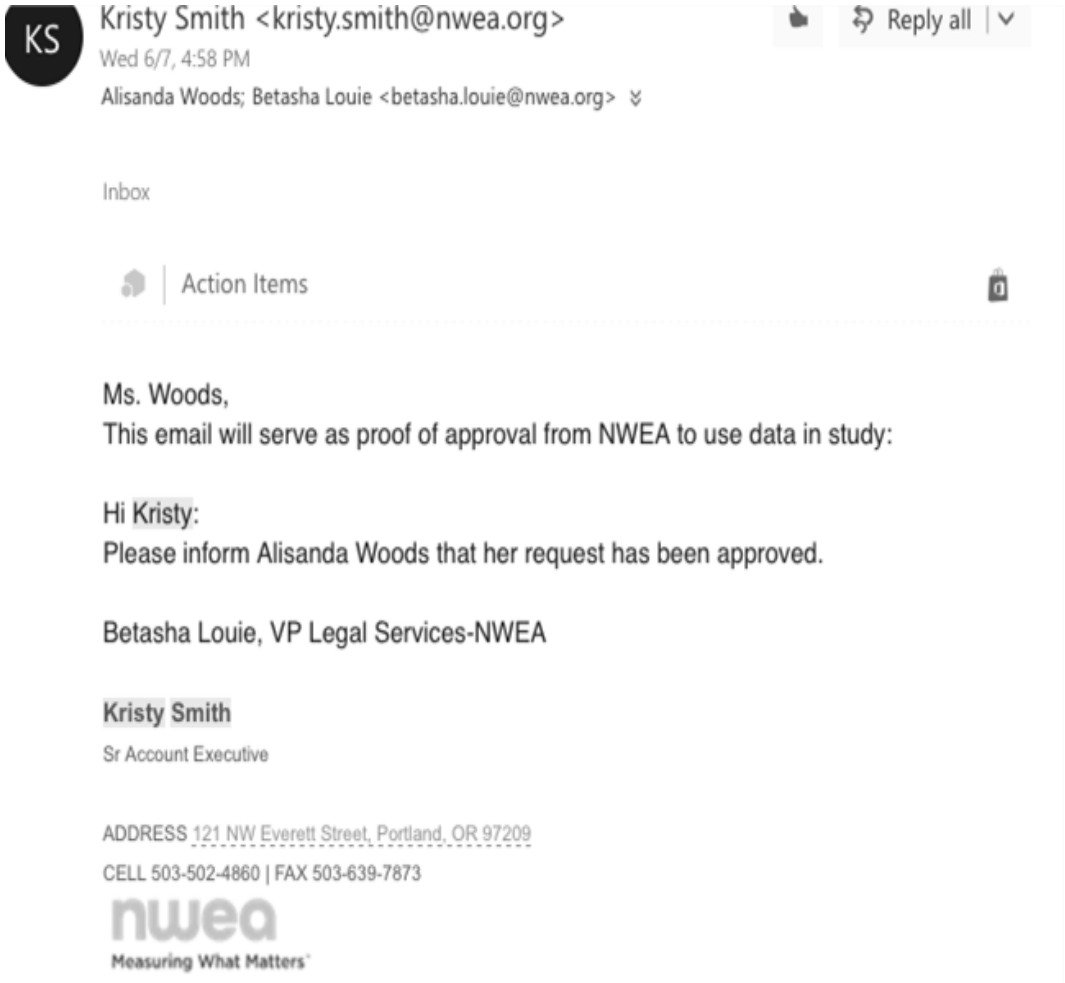
- View: Information about intentional small groups: PowerPoint

https://docs.google.com/presentation/d/1_r6kv0f_BAORsCdczWYbchmLzTJ0PYqbkqM760lJp9M/edit?usp=sharing

- Explore: Teachers use classroom data to develop intentional small groups

Now What? Teacher work time to complete Data to Instruction Framework and other deliverable expectations. Facilitators will support teachers during work time. Discuss with teachers next steps with support in PLCS, peer observation, and classroom observation with feedback.

Appendix B: NWEA Approval



KS

Kristy Smith <kristy.smith@nwea.org>

Reply all

Wed 6/7, 4:58 PM

Alisanda Woods; Betasha Louie <betasha.louie@nwea.org>

Inbox

Action Items

Ms. Woods,
This email will serve as proof of approval from NWEA to use data in study:

Hi Kristy:
Please inform Alisanda Woods that her request has been approved.

Betasha Louie, VP Legal Services-NWEA

Kristy Smith
Sr Account Executive

ADDRESS 121 NW Everett Street, Portland, OR 97209
CELL 503-502-4860 | FAX 503-639-7873

nwea
Measuring What Matters

Appendix C: Interview Protocol

My goal as a researcher is to use the data from the research to determine if the Blended Learning Model affects math student achievement for students who are performing below grade level and are economically disadvantaged. As a researcher, I would like to find a model that could potentially support math achievement for economically disadvantaged students who are performing below grade level. Thank you for being participants in this study. Your participation will help me understand more about the cooperative learning portion of the BLM and its effects on student achievement. I ask that each of you sign the statement of informed consent. I want to create a "safe" conversation where you can share some of your classroom best practices around cooperative learning. I will not use anyone's name or any other identifiers, and you can still decide not to answer any questions. Your thoughts and opinions are confidential and after the research is completed, all information shared will be discarded. There are no right or wrong answers about cooperative learning and how it is addressed in your classroom.

Appendix D: Interview Questions

Questions:

1. How do you assess if cooperative groups are helping students understand a standard?
2. Does cooperative learning benefit the students in your classroom? If so, how?
3. Describe some of the activities that take place during math cooperative learning groups.
4. What are the outcomes of your math cooperative learning groups? Are students expected to produce evidence of work during cooperative learning groups? If so, how are the expectations shared with students?
5. What are you doing as the teacher while students are working cooperatively?
6. Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
7. What are some challenges you face with cooperative learning?
8. How has cooperative learning impacted you as a teacher

Appendix E: Letter of Cooperation

DETROIT PUBLIC SCHOOLS
COMMUNITY DISTRICT

Dr. Nikolai P. Vitti
Superintendent of Schools

Fisher Building • 3011 West Grand Blvd., 14th Floor • Detroit, MI 48202
O (313) 873-7922 • nikolai.vitti@detroitk12.org

detroitk12.org

December 21, 2018

Principal Alisanda Woods
Mary McLeod Bethune Elementary-Middle School
8145 Puritan Street
Detroit, MI 48227-4068

Dear Principal Woods,

Based on my review of the proposed research, I give permission for you to conduct the study entitled "Blended Learning Model Dissertation Research" within the select Detroit Public Schools Community District ("DPSCD") school(s) identified below:

- Burns Elementary School

As part of this study, I authorize you as the researcher to coordinate directly with appropriate administrative and instructional staff at the school site specified above to coordinate and administer the semi-structured interviews with teachers as outlined in your proposal letter. Individual teachers' participation will be voluntary and at their own discretion.

We understand that the research will include semi-structured interviews with eight (8) K-2 teachers at the site specified above regarding their perceptions of blended learning and its influence on student performance in mathematics, as well as supplemental analysis of de-identified, aggregated student mathematics data at the K-2 instructional level. We also understand that conditions for data collection include an assurance that no personally-identifiable information ("PII") will be asked of teachers or otherwise tracked or reported beyond the site level, that no participants will be teachers from your own school or who report directly to you in any way, and that results of this research will not be published anywhere beyond your own dissertation without explicit additional permission from the DPSCD's Office of General Counsel.

We understand that our organization's responsibilities include: providing de-identified, aggregated student mathematics data at the K-2 instructional level for additional analysis to be conducted by you for the purposes of this specific research only. We reserve the right to withdraw from the study at any time if circumstances change.

This authorization covers the time period of December 21, 2018 to June 28, 2019.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Duval Public Schools Community District's Office of General Counsel and that both the researcher and Walden University complies with requirements of the Family Educational Rights and Privacy Act (FERPA) and the Protection of Pupil Rights Amendment (PPRA) (see attached for specific requirements) and will ensure that these requirements are followed in the conduct of this research.

Sincerely,

Nikolai P. Vitti, Ed.D.
Superintendent

Students Rise. We all Rise

DETROIT PUBLIC SCHOOLS
COMMUNITY DISTRICT
Detroit Public Schools Community District

Dr. Nikolai P. Vitti
Superintendent of Schools

Fisher Building • 3011 West Grand Blvd., 14th Floor • Detroit, MI 48202
O (313) 873-7922 • nikolai.vitti@detroitk12.org

detroitk12.org

Key FERPA and PPRA Conditions Assumed and Acknowledged by Acceptance of Approval:

- The right of a parent or legal guardian (hereafter referred to collectively as "parent") of a student to inspect, upon the request of the parent, a survey created by a third party before the survey is administered or distributed by a school to a student. Any applicable procedures for granting a request by a parent for reasonable access to such survey within a reasonable period of time after the request is received.

- Arrangements to protect student privacy that are provided by the agency in the event of the administration or distribution of a survey to a student containing one or more of the following items (including the right of a parent of a student to inspect, upon the request of the parent, any survey containing one or more of such items): Political affiliations or beliefs of the student or the student's parent. Mental or psychological problems of the student or the student's family. Sex behavior or attitudes. Illegal, anti-social, self-incriminating, or demeaning behavior. Critical appraisals of other individuals with whom respondents have close family relationships. Legally recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers. Religious practices, affiliations, or beliefs of the student or the student's parent. Income (other than that required by law to determine eligibility for participation in a program or for receiving financial assistance under such program).

- The right of a parent of a student to inspect, upon the request of the parent, any instructional material used as part of the educational curriculum for the student. Any applicable procedures for granting a request by a parent for reasonable access to instructional material received.

- Prohibition of access, without additional written consent pre-approved by DPSCD's Office of General Counsel, to information regarding the administration of physical examinations or screenings that the school or agency may administer to a student.

- Prohibition of the collection, disclosure, or use of personal information collected from students for the purpose of marketing or for selling that information (or otherwise providing that information to others for that purpose), including arrangements to protect student privacy that are provided by the agency in the event of such collection, disclosure, or use.

- The right of a parent of a student to inspect, upon the request of the parent, any instrument used in the collection of personal information before the instrument is administered or distributed to a student. Any applicable procedures for granting a request by a parent for reasonable access to such instrument within a reasonable period of time after the request is received.

Appendix F: Member Checking Email Teacher Participant 1

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing two to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: You check for understanding using different questioning strategies. Also, exit tickets during groups and the I-Ready platform to support students' progress and skill mastery.
- **Tracking Learning:** You shared you have trackers posted with assignments within the classroom as a visual aid for students to track their learning and to monitor progress. Students take ownership of their learning by marking off each assignment as they complete it to track their progress
- **Self-Paced Learning**: You believe cooperative groups gives students an opportunity to self-pace mastery of standards and to use each other as a resource, as needed. You also felt that students had more of a chance to collaborate and build on each other's thinking.
- **Technology Integration**: I-Ready is a web-based program for students that is personalized for students once students complete the diagnostic. You shared that students use I-Ready at least 20 minutes a day during cooperative groups. Students have the benefit to utilize I-Ready outside of school.
- **Small Group:** learning during small groups to strengthen deficits. You check in with your higher performing group to ensure the learning those students are on track to meet their goals.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix G: Member Checking Email Teacher Participant 2

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing two to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: You shared the student's ability to explain the task at hand and how to navigate through the task is used to gauge progress.
- **Tracking Learning**: You stated students maintain individual student folders, which are used as a portfolio of work. You shared you meet with students to ensure students are on track to hit their goal.
- **Self-Paced Learning**: You stated you administer a learning style inventory at the beginning of the year. You frequently consider students' learning styles, behaviors and work ethics when developing cooperative groups. This consideration supports students in their self-paced learning.
- **Technology Integration**: You shared how all students have a personalized plan tailored to each individual student based on initial diagnostic in I-Ready. You shared how the data from the personalized plan is used to support students in whole group instruction.
- **Small Group**: you replied, during cooperative groups you work with small groups supporting deficits. In addition, this is a time when you do one-on-one conferencing with students to support mathematics goals.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix H: Member Checking Teacher Participant 3

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing 2 to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: You stated that you observe and walk around during cooperative groups discussing student work by asking questions
- **Tracking Learning**: revealed she does not use any form of tracking, but very often students will share what they think about the activity. She relies on reflection at the end of groups to hear what students learned, what they did, and what they thought of the activities.
- **Self-Paced Learning**: thinks cooperative groups allows students to be more independent. Also, you believe cooperative groups allow all students to self-pace their learning of skills. In addition, you observed positive gains in the social behaviors of students.
- **Technology Integration**: shares how students engage in the learning because they love working with the technology. You exclaimed the great opportunity that students must work at their level which is what the technology provides after the diagnostic. The web-based program creates a learning plan for students and allows the pacing of how fast or slow they want to move with their learning.
- **Small Group**: shared during cooperative groups she works with small groups of students and monitors other cooperative groups to ensure students are on track with their learning goal.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix I: Member Checks Teacher Participant 4

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing 2 to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: You shared that you use exit tickets to determine if students mastered a standard. Additionally, you stated you check the worksheets students may be asked to complete during a rotation.
- **Tracking Learning**: You review learning targets before students begin rotations. You require students to track their assignments. Students color or shade a box that that has an assignment listed that students need to complete.
- **Self-Paced Learning**: You shared that you use small group as an extension of the whole group. Students functioning at level and beyond are given a great role in self-pacing their learning
- **Technology Integration**: You responded that I-Ready and Khan Academy are two programs used during station rotation. Students spend at least 20-30 on the web-based technology.
- **Small Group**: revealed, you use the allotted time during cooperative groups, to work with small groups of students. Additionally, you spend this time conferencing with individual students.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix: J Member Check Participant 5

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing 2 to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: you use formative and summative assessment through math activities for students to complete during the cooperative group to ensure mastery or progress of the standard.
- **Tracking Learning** allows students to track their progress through their grades and/or completion of their exit tickets. Currently, you are working on a system to have students be able to conference, self-reflect or self-evaluate their own success. In her classroom, she has a "Tell the Teacher Box, where students give feedback regarding anything going on in the room.
- **Self-Paced Learning**: expects during cooperative groups for students to work with technology. The students work with I-Ready, which is personalized for students based on their diagnostic. The participant meets with students to discuss their goals and determine the pacing to meet the goal.
  Technology Integration: I-Ready is used daily to support deficits and to provide students with grade level content. You shared how you are notified through I-Ready if students are stuck on a skill. The learning is targeted for the needs of students. You determined the needs of the students based on the data and teach the skill in small group.
- **Small Group**: you utilized the time to set individual goals with students and work with small groups of students.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix K: Member Check Participant 6

Member Checking Email

Thank you for your participation in my project study to determine how Blended Learning affects mathematical student achievement with students that are economically disadvantaged and performing 2 to 3 years below grade level. Themes from the interviews are captured below. Please let me know if this is an accurate representation of what you shared. If you have any questions or if you need me to make any changes, please contact me.

- How do you assess if cooperative groups are helping students understand a standard?
- Are there any ways students can track their success during cooperative groups?
- Does cooperative learning benefit the students in your classroom? If so, how?
- Describe how technology is integrated during math cooperative grouping? How does it support learning for students?
- What are you doing as the teacher while students are working cooperatively?
- Are there any ways students can track their success during cooperative learning? Is there a way a student can share with you that a cooperative learning group is working well for them or not working well?
- What are some challenges you face with cooperative learning?
- How has cooperative learning impacted you as a teacher?

Key themes captured from interviews

- **Formative and Summative Assessment**: you used formative and summative assessment by walking around to hear student conversations and completing task gives tons of information about whether students are learning. Each activity has a practice exercise that shows if students are making progress.
- **Tracking Learning**: you shared students were given trackers and individual folders with assignments for the entire semester. In the folder, students' goals were reviewed and were provided strategies to ensure they were making progress toward their goal. You concluded the BLM allowed students to have greater participation and monitoring of their learning.
- **Self-Paced Learning:** believes that cooperative learning is an opportunity, which allows students to learn from each other. Students can work at their own pace with the support of others.
- **Technology Integration:** You used different web-based technology to support student learning (I-Ready, Khan Academy, Brain Pop, Kahoot, and Zearn). You shared that these web-based programs support students with grade level standards or other skills students may need to focus on.
- **Small Group:** you monitored the room, observing, taking anecdotal notes, and facilitating students' learning using discussion and questioning techniques. She also uses the time to conduct small groups to address students' needs.

Please email me if you want to add additional information or clarification you would like to add. Thank you for your participation in my research.

Alisanda Woods

Appendix L: Classroom Implementation Rubric

	Pre- Implementation Beginning	Level 1 Implementation Just Getting Started	Level 2 Implementation On my Way	Level 3 Implementation I Got It	Rating & Evidence
Differentiated Center Activities	Differentiated activities have not yet been integrated into workshop time	Multiple centers have been implemented but none are data specific Or Only 1-2 centers comprise workshop time	Multiple centers (3+) have been implemented but only some of them are data specific and cater to individual needs	Multiple centers are implemented during workshop time and all are data specific and cater to individual needs.	
Learning Objectives & Mastery Tracking	There is no system for tracking workshop objectives mastery in the classroom yet	Workshop objectives mastery is tracked and displayed as whole class data	Workshop objectives mastery is tracked individually for at least 50% of all centers, and students are sometimes able to articulate their purpose for learning	Workshop objectives mastery is tracked individually by the student for all centers and everyone is able to articulate their purpose for learning	
Assessment of Student Learning Objectives	There is no assessment (formal or informal) of workshop activities yet	Some Center activities are assessed, but assessments are sporadic and may or may not influence planning	At least 50% of centers are assessed every 1-2 weeks, and data from these assessments is reflected in planning	All center activities are assessed every 1-2 weeks and data from these assessments is reflected in planning.	
Small Group Instruction	Small group instruction is not yet happening during workshop time	Small group instruction is happening sporadically during workshop time, but lessons may not be explicitly focused on one learning target and/ or are not derived from student data	Small groups are being pulled during most center rotations, and/or most content is derived from student data	Small groups of 3-5 are being pulled by the teacher during each center rotation. Instruction is focused on a single learning target derived from student data that will move student towards or beyond grade level.	
Systems & Structures	There are not yet systems and structures in place to time, rotate, and transition during workshop	Some systems for workshop time are present but rely heavily on the teacher to be carried out, and need more practice	Workshop systems are established but are lacking student autonomy. The teacher is facilitating most or all the systems.	Workshop systems include timed centers, posted/projected center rotation charts, and well established & executed transitions with little to no prompting from the teacher	

Appendix M: Kindergarten Student Tracker

Student's Name______________________________

Number Recognition 0-10	1-to-1 Correspondence up to 10	Adding to 5	Adding to 10	Subtraction 0-2	Subtraction 3-5

Appendix N: Data to Instruction Framework

Class
Kindergarten

Content area
Math

Standard or focus of instruction	**Goal performance/instructional area**
K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20. K.CC.4a Understand the relationship between number and quantities; connect counting to carnality • When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object K.CC.6- Identify whether the number of objects in one group is greater than, less than, or equal to the number of	Counting and Cardinality/ Operations and Algebraic Thinking/ Geometry/Measurement and Data **Sub-goal performance/instructional area** Counting one to one, greater than less than, Addition/Subtraction, Position Words, Measuring objects **Topic** Counting and writing numbers/ Greater than less than/ Addition/ Subtraction/Position Words/ Measuring objects

objects in another group. K.OA.1- Represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations. K.G.1- Describe objects in the environment using names of shapes and describe the relative position of these objects. (above, below, behind, etc.) K.MD.1 Describe measurable attributes of objects, such as weight or length.	

GROUP A

Ability Level	**Learning Statements**
number identification	Writing only numbers 0-15 One to One Correspondence with number 0-15 Adding within 5 Subtracting within 5 Basic position words Using common measurement vocab

Students	**Student activities, instructional strategies, and resources** White Board Writing Numbers Number Puzzle Number Bingo Play Show Me Math Talks Counting a given set of objects One to one correspondence Number Order More and less games and pictures Basic story problems Addition sentences Subtraction sentences Measuring objects with non-standard forms of measurement Position word activities
	Assessments Teacher generated math assessment

GROUP B

RIT range	**Learning Statements**
Know numbers	Writing only numbers 0-20 One to One Correspondence up to 20 Addition to 10 Subtracting to 10 Using measurement vocab Position Words

Students .	**Student activities, instructional strategies, and resources** White Board Writing Numbers Number Puzzle Number Bingo Play Show Me Math Talks Counting a given set of objects One to one correspondence Number Order More and less games and pictures Basic story problems Addition sentences Position word activities Subtraction sentences Measuring objects with non-standard forms of measurement
	Assessments Teacher generated math assessment

GROUP C

Ability Level	**Learning Statements**
Know numbers	Writing numbers 0-20 One to One Correspondence up to 20 Addition to 10 Position words Subtracting to 10 Using measurement vocab

Students	**Student activities, instructional strategies, and resources** White Board Writing Numbers Number Puzzle Number Bingo Play Show Me Math Talks Counting a given set of objects One to one correspondence Number Order Play Show Me Math talks More and less games and pictures Basic story problems Addition sentences Position words Subtraction sentences Measuring objects with non-standard forms of measurement
	Assessments Teacher generated math assessment