# THE SUMMIT LEARNING PLATFORM AND ITS EFFECTS ON MIDDLE SCHOOL STUDENTS ACHIEVEMENT IN MATHEMATICS

by

Brenda Nicole Jones

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in

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Brenda Jones

Dissertation

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EaD Program Director

Dean, School of Graduate & Continuing Studies

<u>July 18, 2018</u> Date

<u>July 18, 2018</u> Date

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<u>July 23, 2018</u> Date

July 23, 2018 Date

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**)** \

## DEDICATION

This is for ALL of the people who are told they could not and would not succeed. Life may provide a deck that is not in your favor but YOU CAN and WILL be great because GOD is always on the side of the righteous.

## ABSTRACT

by

Benda Nicole Jones, EdD Trevecca Nazarene University August 2018

Major Area: Leadership and Professional Practice Number of Words: 113 The purpose of this study was to investigate the effects the Summit Learning Platform on middle school student mathematics achievement. The study analyzed the effect of the Summit Learning Platform on the students' performance on the NWEA MAP Mathematics Assessment and report card grades. The Student Attitude Survey measured the effect the platform had on student attitudes. The data from the report card grade analysis report and the NWEA MAP assessment in mathematics found a significant difference in scores based on the implementation of the Summit Learning Platform. Data from the Student Attitude Survey and stakeholder interviews suggested a significant difference in the attitudes and self- perceptions of these students on specific question items.

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#### **CHAPTER I**

#### **INTRODUCTION**

Most policy work and reforms have been focused on recruiting better teachers: increasing the qualifications of teachers, making the certification processes more rigorous, improving the salaries, and improving working conditions (Stigler & Heibert, 1999, p. 14). Recently, attention has been given to the methods teachers employ to promote increased student achievement. The latest reforms in education focused on teaching practices that will ensure students are genuinely ready for college. The literature on this topic determined more than academic knowledge is necessary to predict student success. Hoover and Love (2011) conducted research that suggested, "Educators need to distinguish between the issues concerning the overall curriculum or issues that are specific to teaching practices to determine the best solutions to meet the needs of students" (p. 43). Summit Public Schools in California created an innovate approach to learning mathematics online which altered the practices of traditional teachers.

In 2000, Summit Public Schools launched in Silicon Valley, California. "Hundreds of parents and community members came together to reimage the American high school. They wanted to create an innovative and replicable model for secondary education" (Summit, 2016, p. 1). The Summit Learning Platform launched in 2003 by parents and community leaders. As the platform expanded, the school collaborated with Facebook to create their current design in 2014. This platform helps students track progress toward their short and long-term academic and behavioral goals. Students learned content at their own pace and reflected on their learning with mentors. The platform is a web-based curriculum model combined with teaching practices that flips the traditional setting. Using this platform, allowed students to drive their learning while teachers served as mentors and facilitators. The platform came with a comprehensive curriculum

developed by teachers in classrooms (Summit, 2016, p. 2). The platform curriculum aligned with the Common Core and each course included customizable projects, playlists of content and assessments. The platform provided data daily to teachers to personalize instruction and provided additional support for mentoring and coaching. Summit collaborated with Northwest Evaluation Association, which created Measures of Academic Progress (MAP) to track academic achievement in mathematics, reading, and language conventions. MAP created a personalized assessment experience by adapting to each student's learning level (NWEA, 2016, p. 1). This allowed the assessment to precisely measure student progress and growth. The essential information about what each student knows and is ready to learn is available within 24 hours.

The purpose of this study is to investigate the effects of The Summit Personalized Learning Platform in mathematics on student achievement. The Summit Platform has shown to be effective in improving students' math achievement based on the NWEA MAP data. Summit reported students who were furthest behind (in that lowest MAP testing bracket) outperformed the national U.S. average by 1.23 years of growth in math (Madda, 2016, p. 1). The literature review research covered the historical background of mathematics education in the United States, the major mathematical reforms, and current mathematical standards. The researcher will study the development of mathematical education in the United States that led to its connection to charter schools and their mission for increasing academic achievement. The literature review will examine this relationship and methods used by charter schools to increase academic achievement.

#### **Statement of the Problem**

According to the 10th annual report issued by the National Alliance for Public Charter Schools, student enrollment in public charter schools has grown by 62 percent over the past five years. Charter schools enrolled over 2,500,000 students across the country (National Alliance for Public Charter Schools, 2014, p. 4). This accounts for six percent of the total number of students enrolled in all public schools across the country. Although charter schools continue to increase, the research is not conclusive as to whether these schools increase student achievement more or less than traditional public schools. The United States Department of Education (2009) reported, "Results can be contributed to the school culture and operational structure which is quite different from those in neighboring schools" (p. 8).

"Various groups, ranging from politicians to educational researchers to everyday citizens, have called for a reform of the U.S. educational system, particularly in the area of mathematics education" (Washington, 2012, p. 1). According to the results of multiple international studies, the United States K-12 system continues to fail in mathematics and performance falls below the median.

A study two years ago indicated that only 15% of 12<sup>th</sup> grade US students were academically ready to take a college-level course, which means that they have not mastered high school Algebra I. Thus, 70-80% of college-bound students require remediation. This is not confined to the average student: the top 10% of U.S. students achieve at only the median level for their South Korean counterparts (National Center for Education Statistics, 2010, p. 3). The response to the mathematical deficiencies in the United States has been countless reforms focused on teacher recruitment, qualifications, standards, and working conditions. Although many of the reforms have moved mathematical teaching methods on student achievement. Evidence from past efforts suggested tracking effective mathematical teaching methods is difficult. Instructional practices have proved to be deeply ingrained and difficult to change; for example, teacher-led instruction (Cuban, 1993 p. 10; Tyack & Cuban, 1995, p. 12). Ambitious agendas for instructional change are filtered through teachers' belief systems, resulting in implementation that may not be well aligned with the reform vision (Rohrer & Pashler, 2010, p. 409).

Several researchers have examined the differences or lack thereof between public charter schools and traditional charter schools (Kane & Staiger, 2012, p. 13) Results of these studies have been inconclusive at best or at worse determined a gap between the promise and performance of charter schools (Fabricant & Fine, 2012, p. 21). Fewer studies have examined teaching methods

or innovative programs that successful charter schools have used to increase student achievement (Clark, Gleason, Tuttle, & Silverberg, 2015, p. 421). Minimal research attention has been directed toward the teaching methods and/or programs charter schools have employed to increase student achievement. Each charter school have determined a unique approach, so their school is different from the rest or fills a need for a different type of learner. The approaches they have employed are supposed to ensure that what they offer is different from a traditional school setting. However, the lack of research on the topic is insufficient with charter schools continuing to increase across the country.

The purpose of the study was to determine teaching methods and learning platforms that have help increase student achievement in mathematics. This study provided data to charter schools, district boards, and public schools as a contribution to the limited research on teaching methods and student achievement. These results served as a model for successful implementation of teaching methods and learning platforms that increased student achievement in mathematics. The data supported a positive outcome of tracking teaching methods on student mathematics achievement in a charter school in Tennessee.

This study used both quantitative and qualitative analysis to determine the effects this learning platform had on student achievement in mathematics. The purpose of this mixed methods study was to (a) determine the effects that implementing a personalized learning platform had on student achievement in mathematics and (b) how implementing a personalized learning platform affected student perception of their mathematical ability. This study was conducted in a charter school located in southeast Nashville. The charter school was in its fifth year of operation and the second year using this program. The participants in this study included 111 7<sup>th</sup> and 8<sup>th</sup> grade students, twelve teachers, and two administrators.

#### Rationale

Mathematics education in the United States is complicated. Mathematics is under the control of a locally elected board of education in each school district (Broman, Hewes, Overman,

& Brown, 2003, p. 130). The boards in each district set standards, designed delivery programs, and provided financial support for its own mathematics education program. Research has reported the United States had 13,867 regular public school districts in 2,356 charter schools, and a growing number of homeschooled students. "The diversity in educational models mirrors a diversity in mathematics education" (Keaton, 2011, p. 2; Snyder & Dillow, 2011, p. 3). The difficulty in describing educational quality of mathematics is not a recent phenomenon; mathematics education has been plagued with reforms and teacher shortages since before the common school movement. Every state has identified a set of standards or curricular frameworks. These standards or frameworks outline what students should understand and be able to do at the conclusion of each academic year. In most cases, it also defined the boundaries for state assessment programs in mathematics. Research studies have shown a number of variables, which included the adopted textbook series (Freeman, Floden, Porter, & Schwille, 1988, p. 6), state and national standards (Reys, 2006, p. 5), influences decisions and school curricula.

Although mathematics education is complex, there have been some noteworthy reforms in the past 20 years that defined the current landscape of mathematics education in the United States. The first reform is the No Child Left Behind Act in 2001. The role of the federal government in education has significantly increased since the implementation of the No Child Left Behind Act (NCLB). NCLB authorized the U.S. Department of Education to manage a program that provided financial incentives for schools that demonstrated successful academic performance and penalties for schools with poor performance profiles. This type of program was the first of its kind in United States history (U.S. Department of Education, 2008, p. 1). President George W. Bush announced No Child Left Behind as his framework for education reform. The NCLB Act had four initiatives: (1) increased accountability for states, school districts, and schools, (2) greater choice for parents and students, particularly those attending low-performing schools, (3) more flexibility for states and local educational agencies in the use of federal education dollars, and (4) a stronger emphasis on reading. NCLB also mandated all students, which included exceptional education students, receive a high-quality mathematics education (Bush, 2001, p. 2).

The Common Core State Standards Initiative is the latest standard reform/movement in the United States (Hwang, McMaken, Porter, Yang, 2011, p. 105). This movement was designed to establish a common curriculum for mathematics for the United States. As of 2010, 45 states and the District of Columbia had indicated that they have adopted the Common Core Standards for language arts and mathematics (NGA Center and CCSSO 2010a). This established a de facto national curriculum for school mathematics (Hwang et al., 2011, p. 107). In addition to the Common Core Standards for mathematics, the Standards for Mathematical Practice were developed. These practices complimented the content standards by describing ways in which students engaged in mathematics. The Standards for Mathematical Practice are based on the NCTM Process Standards (NCTM 2000) and the levels of mathematical proficiency described in Adding It Up (Kilpatrick, Swafford, & Findell, 2001). According to the NCTM, their process standards "highlight the mathematical processes that students draw on to acquire and use their [mathematical] content knowledge" (NCTM, 2000, p. 1). The process standards are Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.

The second reform involved charter schools. In the midst of focused standard reform and quality teaching, charter schools gained national attention over the past 10-15 years. The emphasis in many of these charter schools have been to increased student achievement in mathematics through unique approaches to the curriculum. Charter schools are public schools that are privately operated (National Alliance for Public Charters, 2014, p. 2). They are funded with public money and they are an alternative to district public schools. They do not receive any public funds for their facilities. Charter schools receive waivers from public school districts in exchange for promising better academic results. Charters are given three to five years to demonstrate academic achievement. If increased academic performance is not met, the charter is pulled, and the school is closed (Center for Public Education, 2010, p. 1).

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Research found effective charter schools reflect the school's freedom to experiment (National Alliance for Public Charters, 2014, p. 3). This means that charter schools tend to be creative in terms of organization, scheduling, curriculum, and instruction. "The schools are infused with innovation (Chen, 2016, p. 2). For example, one charter school implemented a longer school day; in a different charter school, it is in the teaching pedagogy or scheduling configuration. Researchers have determined these practices are not necessarily new to the field of education. However, the ways charter schools configured these innovative ideas "often results in a school culture and operational structure quite different from those in neighboring schools" (U.S. Department of Education, 2009, p. 1).

The perception of a worsening system can be linked to measurements on assessments that have reported stagnating test scores and deficits when compared to international test scores. Most reforms have focused on improving teacher education and not the different methods of teaching the subjects. The recent movement of charter schools has led to an influx of innovative ways to teach content, which is why these methods should be studied.

### **Research Questions**

The following three questions guided this study:

- How did the Summit Learning Platform affect student achievement in 7<sup>th</sup> grade Mathematics, 8<sup>th</sup> grade Pre-Algebra, and 8<sup>th</sup> grade Algebra I?
- How did the Summit Learning Platform affect student attitudes toward learning 7<sup>th</sup> grade Mathematics, 8<sup>th</sup> grade Pre-Algebra, and 8<sup>th</sup> grade Algebra I?
- 3. What was the perspective of parent and administrator stakeholders on the impact that the Summit Learning Platform had on student achievement in mathematics?

#### **Description of Terms**

*Traditional Classroom.* Traditional classrooms are teacher –led with more than fifty percent of instruction being taught through direct instruction. (The Glossary of Education

Reform, 2014, p. 1).

*Benchmark Assessments*. Benchmark assessments are short tests administered throughout the school year that give teachers immediate feedback on how students are meeting academic standards. Regular use of benchmark assessments is seen by many as a tool to measure student growth and design curriculum to meet individual learning needs (Porter, 2002, p. 11).

*Focus Area Assessments*. A ten-question multiple-choice content assessment taken by students during their mentoring time. The information to pass the content assessments are learned through an online platform and self-directed by the students (Summit, 2016, p. 3).

*NWEA Map Assessments*. Measures of Academic Progress (MAP) creates a personalized assessment experience by adapting to each student's learning level. It provides assessment data and essential information about what each student knows and is ready to learn within 24 hours (NWEA, 2016, p. 4).

*Stanford's Cognitive Skills Rubric*. Cognitive skills are those that apply to every subject area and the real world, such as asking questions, researching, identifying patterns and relationships, and speaking and listening. Summit developed the Cognitive Skills Rubric built into the Personalized Learning Plan (PLP) software. This was conducted in collaboration with the Stanford Center for Assessment, Learning, and Equity (SCALE). The mission is to improve instruction and learning through the design and development of innovative, educative, state-of-the-art performance assessments. They believe that by building the capacity of schools to use these assessments in thoughtful ways it will promote student, teacher and organizational learning. The rubric is based on prior learning from the Buck Institute's (2017) work in cognitive skill analysis. The rubric spans 4th grade through pre-professional programs, and helps students not only understand how they are doing, but also understand that they can transfer these valuable skills from subject to subject, and achieve mastery day-by-day, year-by-year as they work toward college and career readiness (Summit, 2016, p. 5).

Summit Learning Platform. Summit Basecamp provides teachers and schools across the

US with the resources they need to bring personalized learning into the classroom. The approach to personalized learning encourages students to drive their own education by determining for themselves how they learn best, setting goals and developing habits of success. Through the Summit Basecamp program, partner schools explore personalized learning and adapt it to meet the specific needs of their individual school populations" (Summit, 2016, p. 7). The personalized learning platform is a multi-tiered approach to implementing self-directed learning. The approach includes the following:

- 10-minute weekly mentoring session
- Focus Area Assessments
- Project Based Learning with scores based on Stanford's Cognitive Skill Rubric

## **Contribution of the Study**

This study investigated a web-based learning platform that is used as the primary source for a local charter school's mathematical instruction. This data was analyzed and offered this expanding charter school tangible evidence on whether to expand the platform for other grade levels. This provided other interested charter schools who aspire to increase student achievement using this platform with information on the extent of student achievement using the NWEA MAP results and benchmarks as well as the effect this platform had on student perception of their mathematical skills. Not only did charter schools benefit from this study, but students and families as a whole benefited from the identifying ways that their children learn best, goal set, and strengthen habits of success. Identification of learning strategies allowed not only charter schools but also all K-12 institutions to provide targeted programs for their students as the programs offered and decisions made aimed to increase student achievement in mathematics.

Additionally, such research contributed to the growing data collection that aimed to offer clarity on understanding charter schools and their growing significance. This translated to better charter school policies that helped mend the tensions between a local charter school and local public schools. Research found charter schools and local school districts communicate with one another better than in the past, and some even shared instructional strategies. Still, collaboration in all cities is limited and often fragile (Northern & Petrilli, 2015, p. 1).

Finally, students who will be entering high school, college, or a competitive workplace will benefit from a program that has promoted identified cognitive skills that correlate with successful endeavors.

A fundamental goal of education is to equip students with the knowledge and skills necessary to think critically, solve complex problems, and succeed in the 21<sup>st</sup> century society and economy. Measurement of such knowledge and skills is essential to tracking students' development and assessing the effectiveness of educational policies and practices. (Borman et al., 2003, p. 127; Hanushek & Rivkin, 2010, p. 267)

### **Process to Accomplish**

The purpose of this study was to analyze the effects of the Summit Learning Platform on student achievement in mathematics. This study was conducted in one charter school located in Southeast Nashville. The participants included 111 seventh and eighth grade students and their families, twelve teachers, and two administrators.

#### **Research Questions**

The research questions were:

- How did the Summit Learning Platform affect student achievement in 7<sup>th</sup> grade Mathematics, 8<sup>th</sup> grade Pre-Algebra, and 8<sup>th</sup> grade Algebra I?
- How did the Summit Learning Platform affect student attitudes toward learning 7<sup>th</sup> grade Mathematics, 8<sup>th</sup> grade Pre-Algebra, and 8<sup>th</sup> grade AlgebraI?
- 3. What was the perspective of parent and administrator stakeholders on the impact that the Summit Learning Platform had on student achievement in mathematics?

#### **Data Collection and Analysis**

The research questions are both quantitative and qualitative. This mixed method action

research approach helped the charter school determine to expand or eliminate the program. The first question was assessed three times per the school testing schedule using the NWEA MAP assessment. The NWEA test results were analyzed using a mixed model ANOVA and followed up with a paired samples t-test. A grade comparative grade analysis was conducted to assess student achievement in a traditional classroom versus the Summit Learning classroom. The results were analyzed using a mixed model ANOVA and followed up with a paired samples t-test. The second question was measured using The Student Attitude Survey (SAS). A sample of the survey is found in Appendix A.

This survey was developed as part of the SimCalc Classroom Connectivity 2 Project: Understanding Classroom Interactions among Diverse, Connected Classroom from 2004- 2008. The project was centered on a 3 to 6-week quasi-experimental intervention that was conducted in several 9th grade Algebra 1 classrooms across two media to low achieving districts, with teachers of varying experience. This survey explored students' deeply held beliefs about mathematics and learning of mathematics, as well as their propensity for sharing private thinking (Brookstein, Dalton, Hegedus, & Moniz, 2011, p. 10). The SAS was given at the beginning of the year, middle, and at the end of the year for a total of three times. The results of the SAS were analyzed using a mixed – model ANOVA. The last question was assessed using parent focus groups that were held at the end of the year. The researcher analyzed the data and reported the results using a concept map. The researcher reported:

- Patterns/common themes emerge
- Are there any deviations from these patterns?
- Patterns/emergent themes that suggest that additional data needs to be collected?
- Patterns that emerge support the findings of other corresponding qualitative analyses that have been conducted.

#### Validity Threats

There were threats to validity for this study. First, external validity was threatened due to the sample. It represented one school in the state of Tennessee. In addition, it was the only school in Tennessee using the platform. Generalization of the results were not possible unless replicated in other schools with similar populations where the platform was being used. Secondly, the study was limited in the area of mortality/maturation. The charter school recruitment process allowed students to drop out of the program and enter the program on a continuous loop. The third threat was construct validity. The instrument aligned with the research question to collect qualitative data from other stakeholders (not including students). English-Language Learners (ELL) took assessments in their non-primary language; the researcher was unable to predict their level of understanding. Both the student and teacher's background knowledge in technology, specifically the Chrome Book computer, were affected as measured by the SAS.

#### **CHAPTER II**

#### **REVIEW OF LITERATURE**

#### **INTRODUCTION**

Education is the primary method of ensuring people continue an upward trajectory into the future with the acquired knowledge and skills. "Education is an experience or act that has a formative effect on the mind, character or physical ability of an individual" (Permanent Culture Now, 2016, p. 2).

Paulo (1968) stated the following about education:

Education either functions as an instrument which is used to facilitate integration of the younger generation into the logic of the present system and bring about conformity or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. (p. 34)

The beliefs of the revolving door of decision-makers hold about human potential directly influence the set up and outcomes that all children are able to attain. The beliefs of these decision makers are not the only influence on the educational system. The values of an ever- changing society combined with political and economic situations have dictated a specific purpose of education. These realities require educators to combine all influences and decisions into clear student outcomes and evidence-based principles. These decisions