

PROJECT BASED LEARNING VERSUS TRADITIONAL INSTRUCTION: THE EFFECT
ON FIFTH GRADE STUDENTS' SOCIAL STUDIES SCORES

by

VaRondi Brown

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

This study examined possible differences between a project-based learning (PBL) instructional approach and a traditional textbook-based instructional approach. The study's importance was derived from the fact that additional exploration is needed to show that PBL can promote student learning and may be more effective than traditional instruction in social studies. The purpose of this quantitative causal-comparative study was to test the constructivist theory of instruction as it relates to a comparison of PBL and a traditional textbook-based instructional approach. The researcher identified two population samples. The first population sample was designated as the treatment group consisting of all fifth-grade students attending a public charter school in north Georgia ($n = 83$) that utilized a PBL instructional approach. The second population sample was designated as the comparison group consisting of all fifth-grade students attending a public elementary school in central Georgia ($n = 115$) that utilized a traditional textbook-based instructional approach. A causal-comparative design with a t -test analysis was conducted on the difference between social studies achievement scores based on the Georgia Milestones Assessment System Social Studies Grade 5 End-of-Grade content assessment. The results of an independent samples t -test did not reveal a statistically significant difference between the PBL treatment group and the traditional textbook-based comparison group on social studies achievement. From this result, the conclusion was that PBL and non-PBL instructional modalities yield similar results. Further research should include a closer examination of which instructional modality is more effective.

Keywords: Georgia Milestones Assessment System, project-based learning, social studies achievement, traditional textbook-based instructional approach

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Dedication

The researcher dedicates the manuscript with love to her precious darlings: Chris III, Nixterius, Collina, Liam, and Malik. Additionally, this dissertation is in memory of her loving parents, and her sister, Alexia. The researcher, an educator and ordained minister, reflects on the following scripture:

And the LORD answered me, and said, Write the vision, and make *it* plain upon tables, that he may run that readeth it. For the vision is *yet* for an appointed time, but at the end it shall speak, and not lie: though it tarry, wait for it; because it will surely come, it will not tarry. (*King James Bible*, 1769/2017, Habakkuk 2: 2–3)

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List of Abbreviations

College and Career Readiness (CCR)

Common Core State Standards (CCSS)

Criterion Referenced Competency Test (CRCT)

Elementary and Secondary Education Act (ESEA)

End-of-Grade (EOG)

Every Student Succeeds Act (ESSA)

Georgia Milestones Assessment System (GMAS)

Individualized Education Plan (IEP)

Institutional Review Board (IRB)

National Institutes of Health (NIH)

No Child Left Behind Act (NCLB)

Project-Based Instruction (PBI)

Project-Based Learning (PBL)

Science, Technology, Engineering, and Mathematics (STEM)

Socioeconomic Status (SES)

State of Texas Assessments of Academic Readiness (STAAR)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

The current study examined social studies achievement of fifth-grade students in a state charter school that utilized components of project-based learning (PBL) and a public elementary school that did not use PBL. This chapter describes the resurgence of PBL as a method to improve student achievement. The problem statement, purpose of the study, and significance of the study are discussed. The research question for this study is provided with definitions of pertinent terms.

Background

The challenge for American education is to prepare students for college, careers, and citizenship. “Learning, and citizenship demand that we all know how to *think*—to reason, analyze, weigh evidence, problem solve—and to *communicate* effectively” (Wagner, 2008, p. xxiii). Larmer et al. (2015) stated:

Current concerns with college and career readiness, and the performance-based emphases of Common Core State Standards have caused educators to take another look at project-based learning (PBL) and recognize its ability to not only help students develop deep content understanding, but also to help students learn and practice the skills they will need for college, career, and life success. (p. ix)

Markham (2012) offered a concise definition of PBL: “PBL can be defined as an extended learning process that uses inquiry and challenge to stimulate the growth and mastery of skills” (p. 8). Although initially developed for use in the medical teaching community, in recent decades, PBL has spread across many disciplines and various levels of non-medical education to

include K–12 institutions. The following section provides a historical, social, and theoretical context regarding PBL.

Historical Context

Dewey (1938) developed project-based learning over a period of several years. Later in his career, Dewey worked with William Kilpatrick, a colleague at Columbia University, who would take Dewey's approach and develop it further as the Project Method (Kilpatrick, 1918). Kilpatrick (1918) is generally credited with bringing a project/experienced based curriculum into the mainstream (Kliebard, 1995). The first large-scale implementation of a problem-based learning model came from McMaster University's College of Medicine in the 1960s (Neufeld & Barrows, 1974). Modern-day PBL, as described by Larmer et al. (2015), is called the gold standard.

Social Context

The social context of the study involves the issue of a global community of learners with the common goal of transforming the instructional system that had not been effectively serving the needs of 21st century learners. Wagner (2008) described the new skills all students need for careers, continuous learning, and citizenship in an increasingly flat world. Wagner called these the Seven Survival Skills. They are:

1. Critical thinking and problem solving
2. Collaboration across networks and leading by influence
3. Agility and adaptation
4. Initiative and entrepreneurialism
5. Effective oral and written communication
6. Accessing and analyzing information

7. Curiosity and imagination. (Wagner, 2008, p. 67)

PBL has gained popularity as a comprehensive instructional methodology for acquiring content knowledge and building 21st century skills for all students (Kokosaki et al., 2016). In PBL, students collaboratively produce a product. Scholars have identified PBL as having the most significant potential to produce rigorous learning outcomes (Larmer et al., 2015). However, proponents of the traditional approach argue that it has been successfully tried and tested in many disciplines and thus is a better approach than PBL (Najdowski, Bottoms, Stevenson, & Veilleux, 2015).

Socially, PBL has received mixed support among school stakeholders. Teachers often lack the pedagogical knowledge of how to implement a student-centered environment (deChambeau & Ramlo, 2017). Students usually lack the requisite collaborative learning and self-regulation skills required by PBL (Bransford et al., 1999). With PBL students may gain knowledge, develop problem-solving skills, and lifelong learning skills that will bring about social change in the form of a higher quality of life for the students and the community as a whole.

Theoretical Framework

The theoretical framework on which the current study was based involves the work of Piaget (1952, 1966, 1975), Vygotsky (1978, 1986), and Bruner (1960, 1986, 1990). Piaget (1952) contended that the cognitive development of children occurs in four stages: (a) sensorimotor (birth to 2 years), (b) preoperational (ages 2 to 4), (c) concrete operational (ages 7 to 11), and (d) formal operational (beginning at ages 11 to 15). Vygotsky (1978) believed that learning takes place through direct interaction between children and others as opposed to learning, which occurs alone and independently. Vygotsky's (1978) sociocultural theory

incorporates two concepts that promote social interactions: (a) social scaffolding and (b) zone of proximal development (ZPD). Bruner (1960, 1986, 1990) posited that learning is an active social process. People construct knowledge by drawing upon their expectations to extend meaning to a new situation. Bruner (1960, 1986, 1990) outlined three stages of development: (a) enactive, (b) iconic or pictorial, and (c) symbolic. Examining PBL through the lens of constructivism could help school leader to better understand the intervention.

Legislative Acts Influencing Educational Policy

The No Child Left Behind Act of 2001 (NCLB, 2002) was initiated to increase student achievement for all students. Every Student Succeeds Act (ESSA), the latest installment of the Elementary and Secondary Education Act (ESEA), focusing on ensuring student success, but allows for increased flexibility in decision making at the local level and removes penalties that schools faced under NCLB (Every Student Succeeds Act, 2015). High schools with a graduation rate of 66.7% or lower are given more support under ESSA, as well as schools with a traditionally underserved population that consistently demonstrates low performance. With ESSA, schools, districts, and states decide what support interventions are implemented. ESSA also allows federal grants at the state and school district levels to aid in the improvement of schools identified as low performing by state accountability systems. The districts are responsible for the design of interventions for low-performing schools that are evidence-based (ESSA, 2015). As budgetary constraints tighten, school leaders are under pressure to implement strategies that will elicit 100% high stakes testing rates for all subgroups.

Charter School Context

At the macro level, one method to increase academic achievement has been to provide an alternative to traditional public schools: the charter school. Charter schools have emerged to fix

chronically failing schools. Charter schools are alternative public schools that are founded by teachers, parents, corporations, and other activists (Davis, 2011). Advocates believe charter schools, coupled with competitive pressures of the market, will lead to the development of schools more focused on the needs of students, increased innovation, and greater efficiency (Rotberg & Glazer, 2018). Minnesota passed the first charter school laws in 1991. In 1998, the Georgia legislature passed laws to establish start-up charter schools. There are currently 115 charter schools in Georgia. In reference to the 115 charter schools in Georgia, there are 97 start-up charter schools and 18 conversion charter schools (Georgia Department of Education, 2019a). The treatment school used in this study is a tuition-free public charter school.

The Resurgence of Project-Based Learning

At the micro level, another approach to improving student achievement concerns is rethinking traditional classroom teaching methods. Resultantly, PBL has resurged in use and popularity. Research has shown PBL can promote student learning and may be more effective than traditional instruction in social studies, science, mathematics, and literacy (Kingston, 2018). It is crucial to understand the effectiveness of PBL and measure quantitatively the impact on student achievement.

Problem Statement

For this study, the target school was a public charter school sponsored by the local school district and utilized components of PBL. The K–8 charter school has a stand-alone school board that hired an education management company to operate the school and provide the curriculum. The charter school model provides opportunities for flexibility, governance, and best aligns with the needs of the students. The school's enrolled students come from various ethnic, racial, and socioeconomic backgrounds. Through academically rigorous PBL projects, students acquire

deep content knowledge while also mastering 21st-century success skills (Boss & Larmer, 2018). Research has indicated that over the last 10 years there were generally positive findings regarding the effectiveness of PBL instruction (Holm, 2011). Studies have also supported that PBL in science, technology, engineering, and mathematics (STEM) education cultivates 21st-century skills (Shaw, 2018). The literature on PBL and social studies achievement is scarce, and results are mixed (Condliffe et al., 2017; Kingston, 2018; Kokosaki et al., 2016; Thomas, 2000). There is a paucity of studies available that have researched the effectiveness of PBL and social studies achievement in elementary schools (Condliffe et al., 2017). A causal link between PBL instruction and positive student outcomes cannot be established with certainty (Kokosaki et al., 2016). Relevant literature yielded inconsistent results about the effectiveness of PBL on all students' academic achievement (Kingston, 2018). The problem of this study was that relevant literature yielded inconsistent results about the effects of PBL and social studies achievement, and there is a paucity of studies available that have researched the effectiveness of PBL on social studies achievement.

Purpose Statement

The purpose of this quantitative causal-comparative study was to test the theory of constructivism, which suggests that PBL will improve student achievement. The study compared 198 fifth-grade students' social studies achievement score on the GMAS Social Studies Grade 5 EOG content assessment between students who were taught using PBL and students who were taught using a traditional textbook-based instructional approach. The independent variable was defined as PBL participation with two levels: PBL and non-PBL. The dependent variable was posttest scores on the GMAS Social Studies Grade 5 EOG content assessment.

Significance of the Study

The study provided comparative data on student achievement on the GMAS Social Studies Grade 5 EOG content assessment for students in a PBL instructional environment and students in a traditional textbook-based instructional environment. The study was significant as it provided empirical evidence examining the impact of PBL on academic achievement in social studies. The results of the study may offer practical and theoretical implications in the areas of instructional design, professional development, and resource allocation.

Potential significance includes the extension of knowledge due to the paucity of current research pertaining to the PBL instructional approach. Condliffe et al. (2017) stated evaluations of PBL's effectiveness have been hampered by "the paucity of valid, reliable, and readily usable measures of the kind of deeper learning and interpersonal and intrapersonal competencies that PBL aims to promote" (p. iii). The literature on PBL and student outcomes is scarce, and results are mixed (Kingston, 2018; Kokosaki et al., 2016; Wilder, 2015). Wilder (2015) stated there is a lack of consensus regarding the impact of PBL on academic outcomes. According to Kingston (2018), "more research is needed to show causality between PBL and student outcomes" (p. 2).

While research has been conducted on the impact of PBL on student achievement, this study specifically speaks to a gap in the literature relating to social studies achievement. The study's significance lies in the examination of the impact of PBL on social studies achievement. Unlike reading and mathematics, social studies is not often regarded as an essential academic domain. The aim of this research was to fill this gap.

The findings of the current study might add to the body of knowledge on the PBL instructional approach. Results from the research may assist the educational community in determining the more effective instructional modality. Educational leadership positions rely on

research to guide effective decision making. Information could be of use to policymakers, school boards, and legislators who decide how tax dollars are best spent. Principals, instructional designers, and lead teachers need specific criteria and a sound basis for initiating changes. School administrators may benefit from the results of this study when having to make decisions on which resources to purchase. Funding may be directly applied to an intervention if it is deemed effective.

Moreover, the results of this study may assist educators in determining if a PBL instructional approach yields more positive results in student achievement of fifth-grade students compared to the traditional textbook-based instructional approach. While the information should be beneficial specifically to the targeted schools, other educators from school systems seeking information on the potential relationship between PBL and fifth-grade social studies achievement could also find the current study informative, especially when viewed in conjunction with the extant body of literature. Other schools may become aware of the efficacy of PBL in their transition to more student-centered approaches such as PBL. Additionally, this study aimed to add what is known about the theory of constructivism. Constructivism posits that students construct knowledge from their own experiences (Bhattacharjee, 2015). Furthermore, Bhattacharjee (2015) also noted, “teachers serve in the role of guides, monitors, coaches, tutors and facilitators” (p. 68).

Research Question

The research question for the current study asked the following:

RQ1: Do social studies end-of-year test scores differ between fifth-grade students taught using a PBL instructional approach versus fifth-grade students taught from a traditional textbook-based instructional approach?

Definitions

The following terms pertinent to the current study are defined:

1. *Constructivism* – Constructivism is an active process where learners generate new knowledge based on their experiences and ideas (Bruner, 1960).
2. *Problem-based learning* – Problem-based learning is “an instructional (and curricular) learning-centered approach that empowers learners to conduct research, integrate theory and practice, and applies knowledge and skills to develop a viable solution to a defined problem” (Savery, 2006, p. 9).
3. *Project-based learning* – Project-based learning is derived from the constructivist approach to teaching and learning. PBL is a model that centers on learning around projects (Thomas, 2000). It is a teaching method whereby students gain knowledge and skills by working for extended periods of time, both individually and in small groups, to investigate and respond to authentic and engaging questions and problems.
4. *Student achievement* – Student achievement generally refers to “a student’s performance in academic areas such as reading, language arts, math, science and history as measured by achievement tests. These include statewide exams, SAT/ACT scores, or National Assessment of Educational Progress (NAEP) scores” (Cunningham, 2012, p. 1).
5. *Zone of proximal development (ZPD)* – Vygotsky (1978) defined the ZPD as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86).

CHAPTER TWO: LITERATURE REVIEW

Overview

This causal-comparative study was designed to determine whether students taught using a project-based learning (PBL) instructional approach tend to score higher on the GMAS Social Studies EOG content assessment in fifth grade. Chapter Two provides a report of the research and literature specifically related to the effect of PBL on fifth-grade students' social studies scores. Relevant literature within the last five years was reviewed. Classical works were included, where appropriate. Chapter Two is comprised of the following sections: (a) Overview, (b) Theoretical Framework, (c) Related Literature, and (d) Summary.

Theoretical Framework

The theoretical framework on which the current study was based involves the work of Piaget (1966, 1975), Vygotsky (1978, 1986), and Bruner (1960, 1986, 1990). These constructivists and their theories are delineated in this section.

Piaget's Theory of Cognitive Development

Piaget (1966, 1975) posited that children develop through four stages. These four stages are (a) sensorimotor (birth to 2 years), (b) preoperational (ages 2 to 4), (c) concrete operational (ages 7 to 11), and (d) formal operational (beginning at ages 11 to 15). At the sensorimotor stage children want to see, hear, smell, taste, and touch everything around them to learn new information. During the late sensorimotor stage of cognitive development, children begin to learn the concept of object permanence (objects still exist even if they cannot see them). During the concrete operational stage of cognitive development, children learn to think abstractly, understand symbolic concepts, and use language in more sophisticated ways. During the concrete operational stage, children can understand more complex abstract concepts. During the formal

operational stage of cognitive development, children become more capable of more abstract, hypothetical, and theoretical reasoning.

Vygotsky's Sociocultural Theory

Vygotsky's (1978) sociocultural theory is based on the premise that learning takes place through direct interaction between children and others as opposed to learning which occurs alone and independently. Vygotsky's (1978) sociocultural theory incorporates two concepts that promote social interactions. These two components include (a) social scaffolding and (b) zone of proximal development (ZPD). Scaffolding is the temporary support provided to a child by a more knowledgeable peer or adult, which allows a learner to experience success at a higher level (Isenberg & Jalongo, 2003). The concept of ZPD is the gap between where a learner can operate if she or he was interacting with more capable peers. Through continued practice, learners increase their capability to think since they are being encouraged by more capable peers to extend themselves to higher levels of thought (Vygotsky, 1978).

Bruner's Constructivist Theory

The elements of Bruner's (1960, 1986, 1990) constructivist theory included structuring knowledge through experience working with materials, tools, and interacting with others. He emphasized that people construct knowledge by drawing upon their expectations to extend meaning to a new situation.

Bruner outlined three stages of intellectual development. The first stage is *enactive*. During this stage, children learn about the world through their actions and their consequences. The second stage is *iconic* or *pictorial*. During this stage, children use models and pictures to understand the concept. The third stage is the *symbolic*. During this stage, children begin to think abstractly (Bruner, 1960, 1986, 1990).

Bruner (1960) stated that the purpose of education is to facilitate the development of problem-solving skills among learners. Bruner (1986) focused on the discovery of learning whereby learners sought understanding of some issue. Bruner (1960) found that the actual act of learning contains three basic processes: (a) the acquisition of new information (to include a refinement of past knowledge or the replacement of previous knowledge), (b) transformation or using previous knowledge and utilizing it in a new task, and (c) evaluation, which is used if the knowledge was manipulated into a given task correctly.

Related Literature

While the theoretical framework sets a foundation, this portion of the literature review continues with an examination of research of primary (original) and secondary sources, including classic or landmark studies. The first subheading in this section is project-based learning. The second subheading is PBL and student achievement, followed by PBL in social studies, and student outcomes in previous studies.

Project-Based Learning

The beginning: *Progetti*. The essence of PBL was practiced in 16th century Italy. Architects, painters, and sculptors believed their occupations were built on the union of scientific and artistic knowledge rather than oral tradition and practice (Larmer et al., 2015). Under the patronage of Pope Gregory XIII, an art school called Academia di San Luca was founded in Rome (Knoll, 1997). In this educational institution, nascent architects and sculptors were required to complete scale models of churches, monuments, or palaces—what we might today call “design challenges” (Larmer et al., 2015, p. 25). These assignments were called *progetti* (projects), to indicate that they were works of imagination and creativity as opposed to constructions that would be built in the real world. About 20 years later, the Academia di San

Luca began holding competitions in which students' models were judged against specific criteria (Larmer et al., 2015).

These 16th century competitions established many of the characteristics that define Gold Standard PBL today (Larmer et al., 2015). First, *progetti* were organized around the solution of a *challenging problem*. Second, *progetti* were intended to reflect the experience and professional expectations of the working architect and to include the sorts of tasks architects confront daily. Today, we say the *progetti* were *authentic* (Larmer et al., 2015). Third, students had considerable *voice* and *choice* in deciding how they would solve these problems and create their own models. Fourth, the goal of *progetti* was to create a *public product* that could be viewed and examined by others (Larmer et al., 2015).

Defining PBL. Problem-based learning represents an instructional model whereby learning is initiated by a relevant problem and followed by students' small-group discussions to seek the solution to the problem (Hmelo-Silver, 2004). Barron et al. (1998) proposed that *problem-based learning* is a scaffold to *project-based learning* inasmuch as *project-based learning* approaches start with a driving question leading to an authentic product. *Problem-based learning*, however, is usually teacher driven. The teacher assigns rich problem tasks and serves as facilitator, providing a scaffold. *Project-based learning*, on the other hand, stems from a guiding question determined by the teacher or student (Thomas, 2000). Van den Bergh et al. (2006) defined project-based learning as "a pedagogical innovation which integrates theory and practice by means of problem solving of working life issues" (p. 347). Markham (2012) offered a concise definition of PBL: "PBL can be defined as an extended learning process that uses inquiry and challenge to stimulate the growth and mastery of skills" (p. x). Some researchers use the term problem-based learning and project-based learning interchangeably (McDowell, 2017). For the

current study, the terms are used interchangeably (combined and discussed as one) because they are closely related and promote the same ends: collaborative learning that promotes self-directed learning and deep understanding. Proponents of problem-based learning have described its characteristics. First, it is a problem-centered instructional method. Second, collaboration is essential in problem-based learning. Third, students should reflect on their learning during the lesson. Finally, a tutor acts as a facilitator and guides the student to seek information and develop understanding (Hmelo-Silver, 2004; Savery, 2006).

For a project to be considered an example of project-based learning, Thomas (2000) offered the following criteria:

1. Project-based learning projects are central, not peripheral, to the curriculum. In the case of project-based learning, projects are the curriculum.
2. Project-based learning projects are focused on questions or problems that “drive” students to encounter (and struggle with) the central concepts and “crafted to make a connection between activities and the underlying conceptual knowledge that one might hope to foster.”
3. Projects involve students in a constructive investigation. An investigation is a goal-directed process that includes inquiry, knowledge building, and resolution.
4. Projects are student-driven to some significant degree. Project-based learning projects are not, in the main, teacher-led, scripted, or packaged.
5. Projects are realistic, not school-like. Projects embody characteristics that give them a feeling of authenticity to students (pp. 3–4).

Challenges of PBL. Blumenfeld et al. (1991) cited factors that adversely affected the tractability of PBL: (a) inadequate support of teachers and students, (b) project development with no real appreciation for the intricate nature of student motivation and knowledge, (c) little attention given to the extent of teacher knowledge, and complexity in the classroom organization, and (d) lack of consideration of questions from students' points of view. While the introduction of technology is changing things, teachers often do not have the resources and curriculum materials to create authentic learning experiences. Many traditional teacher beliefs about learning must be abandoned in favor of the innate curiosities of students. Cintang et al. (2018) cited the inability to manage the classroom as an implementation challenge. In Cintang et al.'s research, six challenges emerged: concern with students' capabilities, discipline, time constraints, inequality, equipment, and costs of implementation.

The meta-synthesis review conducted by Kartal (2020) interpreted and evaluated qualitative data, analyzed the results of the studies in question, and presented similarities and differences. Primary school social studies research in Grades 1–5 focuses on curriculum evaluation; however, it fails to provide insight into how curricula are put into practice (Kartal, 2020). In addition, Kartal recommended further research conducted on the practical aspect of primary school social studies curricula. Studies should select appropriate methods and techniques that identify concept teaching as well as misconceptions in primary school social studies education.

Roots of PBL. Dewey developed PBL over a period of several years in the late 1800s. PBL has a foundation in brain-based learning demonstrating that “knowledge, thinking, doing, and the contexts for learning are inextricably tied” (Markham et al., 2003, p. 3). It is built on several learning theories, including constructivism, experiential learning, and problem-based

learning (Markham et al., 2003; Thomas, 2000). The PBL approach was modeled in medical school. Medical educators at Canada's McMaster University developed problem-based learning. Medical schools utilize the practice of PBL under the mentorship of an experienced facilitator. The concept is meant to incorporate the instructional and managerial skills and behaviors necessary for Gold Standard PBL (Larmer et al., 2015, pp. 29–34).

Gold Standard PBL. Gold Standard PBL, as described by Larmer et al. (2015, p. 34), is meant to be an aspirational goal, a composite of the best research-based and classroom-proven project design elements and instructional practices. The Buck Institute's formulation of Gold Standard PBL is a description of what PBL looks like when it is done well—a North Star to shoot for and approach through problem solving, practice, and reflection (Larmer et al., 2015, p. 34).

Boss and Larmer (2018) stressed well-designed and well-implemented projects had to be perceived as personally meaningful to students, as well as fulfill an educational purpose, for them to serve their intended purpose. They further listed the following seven essential project design elements: “(a) challenging problem or question; (b) sustained inquiry; (c) authenticity; (d) student voice and choice; (e) reflection; (f) critique and revision; and (g) public product” (Boss & Larmer, 2018, p. 3). The Buck Institute created a similar model for best project-based teaching practices. This model assists teachers in making the transition to a project-based style from a traditional style of teaching. The seven project-based teaching practices that support students' success are: (a) build the culture; (b) design and plan; (c) align to standards; (d) manage activities; (e) assess student learning; (f) scaffold student learning; and (g) engage and coach (Boss & Larmer, 2018, pp. 6–7).

PBL and Student Achievement

In the article “The Impact of PBL as a STEM School Reform Model,” Odell et al. (2019) examined the following three questions: What outcomes occur when PBL is implemented in a low-performing school district? What is the role of PBL in school improvement? What are the challenges to implementing PBL with high fidelity? The project examined a charter school district in Texas that did not meet the accountability standards on its initial launch of a new charter school model and the role that formative evaluation played in turning the school district around. Formative evaluation was used to assist the district in examining its own processes and practices. Another goal of the formative evaluation was to embed ongoing evaluation strategies throughout the district and its programs.

The developers of the charter school district submitted a charter school application to create a district comprised of specialty STEM schools. The charter operators adopted the Texas STEM (T-STEM) academy model. There are two primary T-STEM academy models: stand-alone T-STEM academies and school-within-a-school T-STEM academies. The seven benchmarks of the T-STEM academies’ Design Blueprint are as follows: 1) mission-driven leadership, 2) T-STEM culture, 3) student outreach, recruitment, and retention, 4) teacher selection, development, and retention, 5) curriculum, instruction, and assessment, 6) strategic alliances, and 7) academy advancement and sustainability (Avery et al., 2010). Avery et al. (2010) cited common areas of need across the district and within academies.

Numerous challenges were identified when implementing PBL in the study conducted by Avery et al. (2010). Implementing PBL required teachers to reexamine their role in the classroom. Teachers had to become coaches who facilitated knowledge. Thus, there was a shift from a teacher-centered classroom environment to a student-centered learning environment.

Another area that merited additional investigation was fidelity. There was a lack of fidelity to the school model as outlined in the blueprint; there was a lack of fidelity in the implementation of the PBL instructional model (Avery et al., 2010).

Cervantes et al. (2015) conducted a causal-comparative study comparing seventh- and eighth-grade students who had utilized the PBL with a comparison group in which PBL was non-existent. Using outcome measures of reading and mathematics achievement, multivariate analysis of variance of the data revealed that the PBL groups performed at a higher achievement level than did non-PBL students. The purpose of the study was to explore how a middle school redesign using PBL impacted student achievement in reading and mathematics. Kolb's (1984) experiential learning theory (ELT) provided the study's theoretical framework. The ELT complements the tenets of PBL because children are naturally inclined to the scientific method and are curious to learn how various objects they encounter in daily life operate. Kolb's ELT framed the study based on meaningful and authentic experiences for understanding how learning takes place in PBL. Cervantes et al. utilized an ex post facto, causal-comparative research design (Gall et al., 2007) which seeks to identify potential cause-and-effect relationships by forming groups of individuals in whom the independent variable is present or absent, followed by comparing the groups on the basis of one or more dependent variables. The characteristic-present group was identified as the group in which PBL was utilized. The comparison group was the group in which PBL was non-existent. The outcomes were the State of Texas Assessments of Academic Readiness (STAAR) Reading and Mathematics scores (Cervantes et al., 2015).

According to Cervantes et al. (2015), participants were from two middle schools in an urban school district in South Texas during the 2011–2012 school year. The comparison group consisted of 140 seventh-grade students and 150 eighth-grade students in the other middle school

where PBL was not used as part of the curriculum (Cervantes et al., 2015). The majority of students in the PBL group (83.3%, $n = 70$) and non-PBL group (96.0%, $n = 144$) were Hispanic. The majority of students in the PBL group (76.2%, $n = 64$) and non-PBL group (90.7%, $n = 136$) were economically disadvantaged (Cervantes et al., 2015). The 2012 STAAR scores in reading and mathematics for seventh and eighth grades were used. The proportion of the current answers were used to measure each STAAR reporting category. The data were obtained from the district in which the study took place (Cervantes et al., 2015). The findings revealed the PBL group outperformed the non-PBL group, and post hoc analyses showed that group differences were statistically significant with respect to all three reading and five mathematics reporting categories. The post hoc analysis for reading showed that the PBL group outperformed the non-PBL group on all three STAAR Reading Reporting Categories: Understanding/Analysis across Genres, Understanding/Analysis of Literary Texts, and Understanding/Analysis of Informational Texts. Mean difference effect sizes, as computed by Cohen's d , were used to examine practical significance of the findings. Effect sizes for the three reporting categories were as follows: .64, .43, and .63, respectively. For mathematics, the post hoc analysis showed that the PBL group outperformed the non-PBL group on Reporting Category 3: Geometry and Spatial Reasoning only. A small effect size (.41) was reported for Category 3 (Cervantes et al., 2015).

Cervantes et al. (2015) offered several implications including changing the teaching and learning environment in schools and districts, and professional development for teachers and administrators. The teachers must learn a new primary role as facilitator. Professional development implications were continuous training and coaching. School administrators and central office administrators were encouraged to leverage resources, address curricula issues, model motivation, and adjust strategies to meet student success goals (Cervantes et al., 2015).

Cervantes et al. concluded that PBL calls for teachers and administrators to redesign instruction and assessments by giving students real-world problems to solve. Educators must help students graduate with 21st-century skills such as collaboration, creativity, teamwork, problem-solving and decision making for the students to learn, practice, adapt, thrive, and succeed in the future.

Liu et al. (2019) examined science learning and attitude by at-risk students after they used a multimedia enriched problem-based learning environment. The study utilized a quantitative, mixed-methods design. In the study, gender served as the independent variable and science knowledge and attitude toward science pre- and post-scores served as dependent variables respectively. Two research questions were addressed:

1. Are there any differences in these at-risk students' science knowledge and attitude toward science after they used a multimedia enriched PBL science environment?
2. What is the relationship between students' science knowledge and attitudes toward science after they engage in a multimedia enriched science environment?

Participants in the Liu et al. (2019) study were 32 students, 24 in fifth grade or sixth grade and 8 in ninth or 10th grade. These students were all from three priority (or failing) schools, according to the state academic standards, in a northeastern state in the United States. All three schools were Title I schools with an exceedingly high percentage of minority populations. These students were enrolled in a free science, technology, engineering, arts, and mathematics (STEAM)-based summer program funded by a state grant that served at-risk youth. The demographics of School 1 were 31% African American, 53% Hispanic, 5% Asian, 10% White, and 1% Multi-racial. The percentage of students qualifying for free and reduced lunch was 86%. The demographics of School 2 were 6% African American, 87% Hispanic, 3% Asian, and 4% White. The percentage of students qualifying for free and reduced lunch was 90%. The

demographics of School 3 were 26% African American, 60% Hispanic, 3% Asian, 10% White, and 1% Multi-racial. The percentage of students qualifying for free and reduced lunch was 94% (Liu et al., 2019).

The intervention in the Liu et al. (2019) study was a 3D multimedia enriched PBL environment called *Alien Rescue*, designed as a 15-hour curriculum unit in sixth-grade space science. A 20-item science knowledge test, measuring student understanding of the various scientific concepts introduced in the PBL environment, was used. The science knowledge test had been used in previous studies and had an $\alpha = 0.77$. To measure students' attitude toward science, the instrument Attitude Toward Science in School Assessment (ATSSA; Germann, 1988) was used. The instrument had a reported $\alpha = 0.95$. It consisted of 14 Likert-scale items with 1 being "strongly disagree" and 5 being "strongly agree." Negative statements were reverse coded. Open-ended questions were given as part of the questionnaire to the students. Interviews were conducted with a total of 25 students (male = 15, female = 10), one per student, randomly selected and interviewed by the summer program staff (Liu et al., 2019). Using both quantitative and qualitative data, Liu et al. found that a group of at-risk students significantly improved their knowledge and attitude toward science after they engaged in the multimedia enriched PBL environment. The girls, though having lower pretest scores, increased more at the posttest. There was no significant difference in the scores of science knowledge and attitude toward science between boys and girls (Liu et al., 2019).

Liu et al. (2019) used regression analysis to demonstrate the significant relationship between students' science knowledge and attitude toward science. Two-way analysis of variance (ANOVA) was used to detect differences in students' science knowledge and attitude toward science scores. Qualitative data sources consisted of open-ended questions and interviews, which

provided more detailed insights into the two research questions. Traditional qualitative data analysis of coding was used following the qualitative data analysis framework by Miles et al. (2014) and constant comparative analysis (Creswell & Poth, 2018; Liu et al., 2019). The study was limited in that the participants were an intact group enrolling in a summer program from three priority (failing) schools. All participants used the PBL program and having a control group for experimental purposes was not an option. Therefore, the sample size was limited (Liu et al., 2019).

In a qualitative study, deChambeau and Ramlo (2017) investigated teachers' needs related to developing and implementing authentic, interdisciplinary PBL activities in an urban, public STEM high school. Anecdote circles and themes were used to gather data in the form of specific examples of learning coaches' experiences as described by the learning coaches. The following themes emerged for further exploration: assessment; coaching and training; and authentic learning. Within each theme, the team prepared two or three prompting questions designed to elicit relevant anecdotes from the participants. Anecdote circles are not intended to answer a specific question or test a hypothesis (deChambeau & Ramlo, 2017).

All learning coaches (seven full-time at the STEM high school and two shared between buildings) as well as the program specialists were invited to participate in the anecdote circles (deChambeau & Ramlo, 2017). Two separate anecdote circles were held, one morning and one afternoon. Generally, anecdote circles are comprised of 4–12 people who share a common experience and a facilitator. No demographic data were provided for the participating learning coaches (deChambeau & Ramlo, 2017). Anecdote circles were used to gather data in the form of specific examples of learning coaches' experiences as described by the learning coaches. Within the themes identified for exploration, the research team prepared two or three prompting

questions designed to elicit relevant anecdotes from the participants (deChambeau & Ramlo, 2017). Validity and reliability issues were not discussed in the article.

In the deChambeau and Ramlo (2017) study, the umbrella categories that emerged from the coding (i.e., challenges and strategies) were relevant across all three of the original themes (assessment, coaches and training, and authentic learning). The challenge of designing and effectively implementing a school-wide (i.e., interdisciplinary/multidisciplinary) PBL was clearly evident across all three themes. Involvement with outside experts and agencies appeared across all three themes as important for different ways and for different reasons, and thus an increase in interactions with external partners was the secondary recommendation indicated by the research. Challenges and strategies were listed in table form under each topic area:

assessment; coaching and training; and authentic learning. Three other areas emerged for further consideration as professional development opportunities: adding variety to rollouts, more—and more effective—use of reflective time and activities in groups as well as by individuals, and better preparation for working with groups of learners within the PBL exercise (deChambeau & Ramlo, 2017).

According to deChambeau and Ramlo (2017), anecdotal circles proved to be an effective method for gathering stories from learning coaches that provided specific examples of their experiences in implementing PBL in a STEM high school. The study's (deChambeau & Ramlo, 2017) findings confirmed that confidence in integrating resources and linking teaching to realities beyond the classroom are critical factors that may require additional training, administrative support, and action beyond the initial professional development activities provided by the teachers and beyond the mandate of the school structure (deChambeau & Ramlo, 2017). Two hours of recorded anecdote sessions were professionally transcribed and then coded.

The coding was a blend of provisional and exploratory coding as described by Saldaña (2013). No limitations were discussed, and no limitations were identified as they relate to the methodology.

Through the meta-analysis method, Dagyar and Demirel (2015) provided relevant literature that included studies on different educational fields, lectures, and student groups concerning PBL's effects on achievement when compared to traditional teaching. The need for people to solve problems diverge the value of problem-based learning approach which provided students the platform to work in groups on the topic (Dagyar & Demirel, 2015). In their independent studies, Dagyar and Demirel (2015) aimed to determine PBL's impact on achievement when compared to traditional teaching, which focused on a particular type of application or operation. The studies, which were meta-analyzed regarding predefined criteria, were examined and 98 studies which fulfilled these criteria were identified.

In addition, the pre-studies which investigated the effectiveness of the PBL approach were examined, and the factors that influence the approach described in the studies were factors related to executors, sample size, field of science, and application time (Dagyar & Demirel, 2015). The determined factors were assigned as mediator variables of the study, and the independent variables of the study were useful to determine whether there was a significant difference between effect sizes of the meta-analyzed studies and interpreting effective and ineffective features of these findings about PBL's effects on student achievement (Dagyar & Demirel, 2015).

PBL in Social Studies

McRae-Jones (2017) conducted a study to examine the effectiveness of inquiry-based instructional strategies to improve third-grade students' performance in social studies. The

research design for the study was action-research using a mixed-methods approach. Participants in the study included 22 third-grade African American students (13 female and 9 male) in a self-contained classroom in a large urban school system. Instruments used in the study were a teacher created pre- and post-survey, a frequency behavior checklist, and a 4-point rubric. The researcher stated the quantitative surveys were valid and reliable. No validity or reliability evidence was offered other than saying the instruments had been vetted by colleagues and administration and data triangulation was used. Students were given a pre- and post-survey to assess their perception of their inquiry skills before and after the study. The findings revealed no impact between inquiry-based instructional strategies and student achievement in social studies among third-grade students based on data from the Inquiry-Based Instructional Strategies 4-point rubric and Inquiry-Based Instructional Strategies Frequency Behavior Checklist. Implications of the study included improving teacher pedagogy in inquiry-based learning and instructional strategies, more professional development in PBL and integration in social studies, and using current events to make social studies relevant. A limitation of the study was the small sample size.

In a qualitative experimental study, Overholt (2017) compared the academic achievement of sixth-grade students taught with traditional teaching and those taught with PBL methods. Student assessments were examined to determine how students scored on lower-level thinking questions and higher-level thinking questions as defined by Bloom's taxonomy of learning. Results indicated that students who were taught through traditional methods scored significantly higher on lower-level thinking questions than those taught through project-based learning. Conversely, students taught through PBL scored significantly higher on higher-level thinking skills questions than those taught through traditional methods. Two research hypotheses were tested: (a) Students instructed by means of project-based learning will score lower on questions

requiring lower-level skills on Bloom's taxonomy and (b) students instructed by means of project-based learning will score higher on questions requiring higher skills on Bloom's taxonomy.

Overholt's (2017) study used a posttest only design. Students were randomly assigned to one of two sections of social studies classes. Fifty-four students—25 in the project-based (experimental) group and 29 in the traditional (comparison) group—participated in the study. There were 27 male and 27 female student participants. Forty-seven of the students were Caucasian; three were Hispanic; three were African American; and one was Native American. The study took place in an urban independent religious school in Florida.

The unit taught during the Overholt (2017) study was the ancient civilization of Greece. The standards addressed in the unit were from the New Generation Sunshine State Standards. The post-unit assessment was a teacher-developed assessment that had been used in the school for assessment purposes for two years. Most of the questions on the assessment were taken from the test bank that had been developed by the publisher of the textbook while the teacher developed the remainder of the questions. The assessments were in accordance with the administration-approved school curriculum guide and scope and sequence, verified by two accreditation commissions who accredited the school (Overholt, 2017). In addition, all parents were notified prior to the study and signed a letter of agreement, allowing their student scores to be a part of the study. Students signed consent forms, allowing their scores to be used (Overholt, 2017).

The independent variables examined by Overholt (2017) were student grade-point averages (GPA), semester social studies grade, and gender. Dependent variables were lower-level questions and higher-level questions. Independent *t*-tests were conducted to determine if

groups were comparable on GPA and social studies grades before the instruction intervention was applied. Correlations were conducted to determine if there was a statistically significant correlation between the independent variables (GPA, semester social studies grade, and gender) and the dependent variables (lower-level questions and higher-level questions). Hierarchical multiple regression was then conducted to determine if semester social studies grade, GPA, or gender had a significant correlation to the dependent variables of lower-level questions and higher-level questions (Overholt, 2017).

Brisini (2018) conducted a research study, utilizing an exploratory action research design, to ascertain the possible impact of PBL on student learning perspective and achievement in a social studies classroom. The study was conducted in the researcher's AP Human Geography class in a large South Georgia high school. In the study, students became self-directed learners by using PBL to prepare for the class final examination and AP examination administered in May. Students used PBL to apply practically the ideas, concepts, and theories required to be successful on both examinations. Both qualitative and quantitative data collection occurred through field notes, observations, interviews, surveys, and summative assessments (Brisini, 2018).

The intervention in Brisini's (2018) study was called *Sovereignty*, a year-long project where the students developed a fabricated country in relation to the key concepts and ideas learned in the AP Human Geography curriculum. Using surrounding countries in their *Sovereignty* country's region, students had to research real-world statistics and country features to develop their own country (Brisini, 2018). The selection of the participants was based on the teacher-created final class examination that served as practice for the AP examination. The top 15 and bottom 15 scores on the class examination were the participants. Students were assigned

pseudonyms (Brisini, 2018). Moreover, four themes emerged to describe the students' perspectives and awareness of their own learning in the PBL process: (a) adapting to a self-directed learning model; (b) displaying a deeper understanding of the curriculum; (c) time management; and (d) adaptive, choice, ownership, and resilience in the learning process (Brisini, 2018).

Quantitative survey data in the Brisini (2018) study helped capture how students felt about the PBL process and their own learning. The survey utilized a 5-point Likert scale with a rating of 1 being "Strongly Disagree" and 5 being "Strongly Agree." Quantitative data analysis from the student surveys showed an increase in how to be a self-directed learner and interest in social studies. The final phase of the study was the development of an action plan. A limitation of the study was the small sample size (Brisini, 2018).

An ex post facto study conducted by Mika (2015) assessed the impact of project-based learning in eighth-grade social studies on students' academic achievement, attendance, and discipline in a north Texas independent school district. De-identified archival data were obtained from the Accountability and Student Support Office within the Curriculum and Instruction Department in the school district. The results of the study found that PBL students performed better on the STAAR social studies test and all four of the social studies objectives tested by the STAAR. No difference was found between PBL and non-PBL groups regarding attendance and discipline. The sample consisted of 366 students (84 PBL versus 282 non-PBL). Independent samples *t*-tests and a series of ANOVAs were used to analyze historical data. Slightly more than half (52.8%) of the students were economically disadvantaged. The racial composition of the sample was 39.9% White, 18.6% Black, 38.0% Hispanic, 0.8% Asian, and 2.7% Multi-racial. The researcher recommended expansion of PBL within social studies and science classrooms.

Duke et al. (2018) conducted a cluster randomized controlled trial investigating the impact of PBL with professional development supports on social studies and literacy achievement and motivation of second-grade students from low-SES school districts. The independent variable was PBL participation (PBL vs. non-PBL). Experimental group teachers taught four PBL units designed to address nearly all social studies standards and some literacy standards. Comparison group teachers taught social studies students as they normally would. Dependent variables were social studies and literacy achievement and motivation, which included pre- and post-standards-aligned measures of social studies, information reading, and information writing, and a Likert-scale motivation survey about social studies, literacy, and integrated instruction. Duke et al. posited two research questions:

1. What is the impact of being in classrooms of teachers randomly assigned to implement, with some professional development, an integrated project-based approach, as compared to business-as-usual (with a promise to teach a target number of lessons) instruction, on (a) social studies learning, (b) informational reading, (c) informational writing, and (d) motivation of second-grade students in low-SES school settings?
2. Among teachers randomly assigned to implement integrated project-based units, is greater consistency with unit lesson plans associated with greater student learning and motivation?

Descriptive statistics were used in the Duke et al. (2018) study to examine student achievement and motivation in the experimental and comparison groups. Inferential tests (*t*-tests) were used to determine any significant differences in raw scores on pre-assessments of student achievement and motivation between students in the experimental and comparison groups.

Hierarchical linear modeling was used to explore the effects of the intervention (controlling for female status, minoritized status, mother's education, and pre-assessment) on social studies achievement, informational reading, informational writing, and motivation. Teachers randomly assigned to the experimental group did implement PBL, and teachers assigned to the comparison group did not. Controlling for female status, minoritized status, parent education, and preassessment, the experimental group scored statistically higher than the comparison group on the social studies measure (effect size [ES] = 0.482, $p < .001$). Controlling for female status, minoritized status, parent education, the experimental group scored statistically higher on the informational reading measure (ES = 0.181, $p < .001$). Controlling for female status, minoritized status, parent education, and preassessment, the experimental group did not score higher than the comparison group on the writing measure (ES = -0.045, $p = 0.594$). Controlling for female status, minoritized status, parent education, and preassessment, the experimental group declined less on motivation than the comparison group (ES = 0.135, $p = 0.198$; Duke et al., 2018).

Participants in the Duke et al. (2018) study were second-grade teachers ($N = 48$) and their students ($N = 684$; comparison group = 289, experimental group = 395) from 20 elementary schools (16 schools with two participating second-grade classrooms and 4 participating second-grade classrooms) in 11 school districts. Classrooms were drawn from schools in a Midwestern state that met the following criteria: (a) at least 65% of the student population qualified for free or reduced-price lunch; (b) below state average performance on state examinations in social studies (assessed in Grade 4); and (c) location within an hour's drive of either of the university sites where the principal investigators were located. The free or reduced-price lunch rates of participating schools ranged from 65% to 100%, with a mean of 80.35% (Duke et al., 2018).

Forty-eight teachers in the Duke et al. (2018) study were assigned randomly to an experimental ($n = 24$) or a comparison ($n = 24$) group within second grade in each school. All second-grade teachers within qualifying schools were invited to participate in the study. Teachers were paired within school grade in each school; one member of each pair was randomly assigned to implement four units of integrated PBL approach to teaching social studies and informational reading and writing (the experimental group) whereas the other was asked to teach social studies using the usual approach they normally would during any other school year (the control group). In addition, the four outcome measures were as follows: (a) a standards-aligned social studies assessment administered one-on-one; (b) a standards-aligned informational reading assessment administered one-on-one; (c) a writing assessment comprised of a group-administered paper-and-pencil persuasive writing assessment and informative/explanatory writing assessment; and (d) a group-administered paper-and-pencil motivation assessment (Duke et al., 2018).

The social studies assessment in the Duke et al. (2018) study contained 11 items with multiple subparts measuring student achievement in economics; geography; history; civics and government; and public discourse, decision making, and citizen involvement. Blind condition, responses to the 11 questions were scored on a scale of 0 to 3, with a score of 3 indicating fully meeting the standard, for a total of 10 points. To examine assessment validity, five reviewers were asked to identify the question(s) that best aligned with each content expectation. Regarding reliability, project members established a high inter-rater reliability at Fleiss' Kappa = 0.883, and the 10 social studies items with an acceptable internal consistency ($\alpha = 0.715$; Duke et al., 2018).

In the Duke et al. (2018) study, the informational reading assessment was comprised of 31 items that measured student achievement of six of the 10 second-grade Common Core State

Standards (CCSS) for Reading Information Text. The research team scored questions blind to condition on a scale of 0 to 3 with a score of 3 meaning fully meeting the CCSS expectation. This provided a total possible score of 87. To examine validity, five experts in the field of early literacy reviewed the assessment and were asked to identify which CCSS in Reading Information Text corresponded with each assessment item. There was 96.5% agreement between the expert reviewers. Inter-rater reliability of Fleiss' Kappa = 0.874 was established when scoring this assessment, and items had high internal consistency ($\alpha = 0.863$; Duke et al., 2018).

The informational writing assessment in the Duke et al. (2018) study measured student achievement in writing for two distinct purposes: to opine or persuade and to inform or explain. Responses were scored blind to condition using a rubric aligned to expectations in CCSS Writing Standard 1 for second grade. A persuasive writing prompt and an informative/explanatory writing prompt were combined to yield an overall informational writing assessment score of 18. Regarding validity, an inter-rater reliability of Fleiss' Kappa = 0.734 was established. Internal consistency reliability was borderline at 0.661 (Duke et al., 2018).

The motivation assessment in the Duke et al. (2018) study was modeled after validated motivation assessments (e.g., McKenna & Kear, 1990). Children were read 24 statements and were asked to circle one of four images of a character. Responses were scored on a scale of 1 (very happy) to 4 (very upset) for a total score of 96. Cronbach's alpha reliability for the assessment was 0.884 (Duke et al., 2018). Furthermore, two limitations of the study were identified. The measures were researcher-developed (not national standardized tests). There was inconsistency in the number of lessons across experimental and control groups.

Halvorsen et al. (2012) addressed the question: Do second-grade students from low-socioeconomic status (SES) schools taught with an iteratively designed project-based approach

to social studies and content literacy instruction: (a) make significant gains on standards-based social studies and content area literacy assessments, and (b) reach a benchmark on these assessments set by a group of students from high-SES schools? If so, what did the project-based approach entail? Sixty-three students from four classrooms in low-SES schools were assessed before and after experiencing two project-based units focused on standards in economics; civics and government; public discourse, decision making, and citizen involvement; and content area literacy. Results showed that low-SES students made statistically significant gains in social studies and content literacy and, at post-test, showed no statistically significant differences from the students in the high-SES schools. Following instruction there was no SES achievement gap on the assessments (Halvorsen et al., 2012).

Eighty percent of the students from low-SES schools in the Halvorsen et al. (2012) study were eligible for free and reduced-price lunch and with below average academic achievement in social studies, reading, and writing. In high-SES schools, 2% or fewer students received free or reduced-price lunch and school achievement was above the state average on state examinations in social studies, reading, and writing (Halvorsen et al., 2012). Reported limitations were small sample size, lack of control groups, researcher-created measures, and lack of information on instruction in classrooms in high-SES schools (Halvorsen et al., 2012).

Parker et al. (2013) conducted a mixed-methods experiment aimed to achieve deeper understanding in a breadth-oriented, college preparatory course—AP U.S. government and politics. The study was conducted with 289 students in 12 classrooms across four schools and in an “excellence for all” context of expanding enrollments in AP courses. Findings suggested that a course of quasi-repetitive projects can lead to higher scores on the AP test but a floor effect on the assessment of deeper learning.

Another study by Wirkala and Kuhn (2011) explored the effectiveness of PBL with middle school social studies students and determined that students engaged in PBL instruction versus lecture-based instruction performed better on several outcome variables including content knowledge and argumentation. Assessments of comprehension and application of concepts in a new context nine weeks after instruction showed superior mastery of both PBL conditions, relative to the lecture/discussion condition, and equivalent performance in the two PBL conditions.

Dobbs (2008) compared traditional teaching methods with problem-based learning and found that there was no significant difference in student achievement. The study added research-based data to help teachers and schools choose one teaching method over another. Wirkala and Kuhn's (2011) study was an experimental study of PBL in a middle school population. Between- and within-subject comparisons were made of students learning the same material under three conditions: PBL individual, PBL team, and lecture/discussion. Participants were sixth-grade students at an alternative middle school. Students were assigned to three equivalent classes based on their gender, ethnicity, standardized test scores, essay responses on the school's admission examination, and previous academic records. All three classes participated with *Ns* of 30, 29, and 31. The student body was highly diverse with African American, White, and Hispanic ethnicities in approximately equal proportions. Sixty percent of students qualified for free or reduced-price lunch.

Wynn and Okie (2017) analyzed the impact of problem-based learning and cognitive scaffolding techniques introduced in their social studies methods course on the perceptions and practices of 12 preservice teachers (PSTs). The authors' PSTs reported teaching 54 PBL lessons and identified factors that encouraged their use of PBL methods course PBL experiences;

improved examination scores and writing skills; increased engagement; and improved collaborative, deliberative, and cognitive skills. Discouraging factors included the time and effort to plan PBL lessons, coverage demands, and standardized testing. Findings suggested that PBL methodology, supported by professional modeling and metacognitive training, had a transformative impact on their PSTs in terms of the student outcomes they sought to facilitate, how they perceived their relationship with their students, and their operational understanding of the goals of social studies education offered by the National Council for the Social Studies.

Wynn and Okie (2017) selected PBL because of the alignment between empirical evidence of outcomes facilitated by the methods and emphasis the National Council for the Social Studies places on decision-making and problem-solving skill sets required to be effective, competent citizens. The authors posited that immersing students in multiple PBL experiences and guiding them to discover this alignment and to recognize the advanced thinking systems that guided them to practice during PBL activities in their methods course would facilitate their PSTs' use of PBL when they taught in the field.

In their case study, Wynn and Okie (2017) discussed PBL and the development of advanced cognitive skills and PBL in teacher training. The primary research question addressed the extent to which the authors' PBL modeling and scaffolding practices in a secondary social studies methods course context influenced PSTs' perception of their use of PBL in the field. The case study research design was chosen to gain an understanding of PSTs' perceptions related to the primary question. Through data source triangulation, the authors identified themes and consistencies that helped explain factors that affected PSTs' use and perception of PBL over time and in different social studies classrooms. Participants were 16 students enrolled in the required senior secondary social studies methods block at the writers' university in the fall of 2015. Each

of the 16 students completed an end-of-practicum questionnaire, an end-of-practicum focus group, and an end-of-student-teaching focus group. The purpose of the questionnaires and focus groups was to determine PSTs' perceptions of the following: (a) preparation and confidence to plan and teach PBL lessons; (b) the number of PBL lessons taught; (c) the positive aspects/outcomes and challenges of the PBL lessons taught; (d) factors that encouraged and discouraged the use of PBL; and (e) the extent to which PSTs planned on using PBL during student teaching and during the first teaching job (Wynn & Okie, 2017).

The PBL procedures used in the Wynn and Okie's (2017) study were based on Wynn's PBL instructional model. Data were collected at two points. The End of Practicum Questionnaire was administered in December 2015. The End of Student Teaching Questionnaire and the End of Student Teaching Focus Group sessions were administered during the final week of student teaching in April 2016. Open coding was used to analyze and triangulate the data to identify themes (Wynn & Okie, 2017).

In Wynn and Okie's (2017) study, two primary themes emerged from the cross-case analysis of the post-practicum responses regarding PSTs' perceptions of their readiness to teach PBL lessons: (a) PSTs were tentatively confident about planning and implementing PBL and attributed that confidence to their experience with multiple PBL activities in the methods course itself and (b) PSTs were very anxious about how their students would respond to PBL lessons. The themes that emerged from the cross-case analysis of the post-student teaching responses regarding PSTs' perceptions of readiness to teach PBL lessons were like those identified from the practicum data. The analysis of data included verbatim passages and direct quotations from the study participants (Wynn & Okie, 2017). Furthermore, Wynn and Okie (2017) reported two implications regarding PBL changes. The research confirmed the importance of the model

process in their social studies methods course. Second, an understanding of the cognitive dynamics of PBL was critical. Limitations included the inability to generalize the results to a broader context. Data collected were based on PSTs' self-reported experiences and performance during their practicum and student teaching. No observational data were collected to triangulate PSTs' experiences.

Summers and Dickinson (2012) implemented a randomized longitudinal design comparing the social studies achievement and grade retention rate of students in one school district who attended a high school with either a project-based instruction (PBI) or traditional approach to instruction. Their findings generally supported the efficacy of the PBI approach for the general student population. PBI students outperformed peers who learned from a traditional curriculum in social studies in both social studies achievement and College and Career Readiness (CCR) preparedness. The PBI high school had the highest PBI pass rates for all students (99%) as well as for African American (97%), Hispanic (99%), and socioeconomically disadvantaged (98%) subgroups in 2010. The study examined the following three research questions:

1. Would the experimental (PBI curriculum) group have higher rates of promotion to the next grade level than the control (traditional curriculum) group?
2. Would students in the experimental PBI group have higher social studies achievement than the control group as measured by standardized assessments?
3. Could a PBI curriculum facilitate the realization of the CCR standards alongside enhancing students' social studies learning?

The longitudinal study took place in a diverse rural district with two high schools—one high school utilized a PBI curriculum while the other high school utilized a traditional curriculum. The PBI curriculum emphasized sustained inquiry, collaborative work, in-depth concept

exploration, and work products communicating results through various media (Summers & Dickinson, 2012).

Descriptive statistics, *z* scores, and demographic analyses were used by Summers and Dickinson (2012) to investigate differences in students' social studies achievement and persistence toward CCR between the PBI and traditional campuses. Qualitative data were collected and analyzed to triangulate with quantitative results through an open coding process (Summers & Dickinson, 2012). Several limitations were reported, and randomization was an issue. There was an inadequate distribution of socioeconomically disadvantaged students between the two campuses. The PBI curriculum was not described by the researchers.

Student Outcomes in Previous Studies

Various reviews and meta-analyses reported on the effectiveness of PBL. Condliffe et al. (2017) conducted a systematic literature review of PBL. The authors suggested that the evidence of PBL's effectiveness in improving students' outcomes is "promising but not proven" (p. iii). Some studies have found positive effects associated with the use of PBL curricula in science and social studies classes. The authors also suggested some studies in schools that follow PBL approaches pointed to positive effects on students' engagement, motivation, and beliefs in their own efficacy (Condliffe et al., 2017). In a review of literature conducted by Kokosaki et al. (2016), no causal link between PBL instruction and student outcomes could be established with certainty. The authors reported on the defining characteristics of PBL, provided evidence for the effectiveness of PBL, reported results of studies conducted at pre-school and primary school, secondary school, higher education, and preservice teacher training. On the basis of the literature review, six key recommendations were made for the successful adoption of PBL in the mainstream school setting: (a) student support, (b) teacher support, (c) effective group work,

(d) balance between didactic instruction with independent method, (e) assessment emphasis on reflection, self and peer evaluation, and (f) an element of *student choice* and *autonomy*.

Wilder (2015) conducted a systematic literature review of the current reported evidence of PBL effectiveness in secondary education. Gall et al. (2009) pointed out:

We use the term *systematic literature review* to characterize literature syntheses that involve the use of standard procedures developed by the research community for the purpose of insuring that a comprehensive search of the literature has been conducted and evaluating the soundness of research evidence revealed by the search. (p. 93)

Wilder asserted it is not possible to claim with a high degree of confidence that PBL is more effective in increasing student content knowledge. The following two research questions were addressed: (1) What are the limitations of current research studying the impact of PBL on student academic achievement in secondary grades and what recommendations can be made for future research? (2) Does the PBL approach to teaching in secondary education result in higher student academic achievement than a more traditional direct approach?

A wide range of educational databases (e.g., Academic Search Complete, Academic Search Premier, Education Research Complete, Education Full Text, and PsycINFO) were searched by Wilder (2015) to identify primary studies focusing on the impact of PBL on student academic achievement in secondary grades. The literature searches were conducted using various combinations of the following keywords: “problem-based learning,” “PBL,” “secondary,” and “high school” (Wilder, 2015). Next, titles and abstracts of these articles were reviewed to assess their suitability for inclusion. The inclusion/exclusion process resulted in 13 articles which were then read by the researcher in their entirety and assessed based on the following criteria:

(a) experimental or quasi-experimental study design, (b) study compared impact(s) of PBL and

traditional teaching methods on student academic achievement, and (c) study sample consisted of secondary school students (Grades 9–12 [age range 13 to 18 years]). The PBL models in the reviewed studies were examined against components of PBL described by Schmidt (1983) and presented in a table (Wilder, 2015). Tabular presentations of main study characteristics, such as content descriptions, teacher and student populations were given. Additionally, tabular presentations of summaries of the purpose, design, academic achievement measures, and outcomes of the reviewed studies were also provided (Wilder, 2015).

Wilder (2015) deemed four studies of moderate/high quality. Two studies were viewed as low quality. Only one of the reviewed studies (Finkelstein & Hanson, 2011) was rated high quality (Wilder, 2015). The publication dates of the reviewed studies ranged from 2004 to 2013. Four studies were conducted in the United States, four in Turkey, and two in Nigeria. Seven of the 10 studies reviewed demonstrated significant achievement levels among the students taught using PBL compared to the achievement levels of the students engaged in more traditional curricula. The sample sizes in the studies ranged from 40 to 4350 high school students (Grades 9–12). The measures of student academic achievement included standardized tests or achievement assessments that were adequately validated by the researchers (Wilder, 2015). The findings of the two reviewed studies revealed no significant differences between the academic achievement of students in the PBL groups and their counterparts in the control groups. One of the reviewed studies revealed that the PBL group scored significantly lower on a standardized test than the control group (Wilder, 2015). The author cautioned the findings of the reviewed study could not be generalized to a wider, secondary education population. There was a relatively small number of empirical studies with a narrow discipline focus. The current reported

literature lacked sufficient, rigorous evidence that supports superiority of PBL over traditional methods instruction regarding the student achievement of secondary education (Wilder, 2015).

Education researchers at University of Michigan and Michigan State University (Duke & Halvorsen, 2017) addressed the effect of PBL in social studies second-grade classrooms as well as informational reading and writing standards in the initiative Project PLACE: A Project Approach to Literacy and Civic Engagement. Duke and Halvorsen (2017) reported the research analyses established statistically significant differences overall favoring the PBL group over the control group in social studies ($ES = 0.482$) and informational reading ($ES = 0.181$). Further, the PBL group gains were 63% higher for social studies and 23% higher for informational reading the control group (Duke & Halvorsen, 2017).

Summary

In summary, Chapter Two of the current study has provided a review of selected research and literature. The literature review reported several studies on the effects of PBL in social studies. The literature addressed in this review presents a sampling of arguments by proponents for and critics of PBL. Chapter Three will present the design and methodology used to determine the effects of PBL on the Georgia Milestones Grade 5 EOG content assessment in social studies.

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative causal-comparative study was to test the theory of constructivism, which suggests that PBL will improve student achievement. The study compared 198 fifth-grade students' social studies achievement scores on the GMAS Social Studies Grade 5 EOG content assessment between students taught using a PBL instructional approach and students taught from a traditional textbook-based instructional approach. In addition, the study provides information to the principals and board of directors, parents, stakeholders as it relates to the influence of PBL on social studies achievement as measured by the GMAS Social Studies Grade 5 EOG content assessment. Administrators and teachers may use the information to enhance, modify, or change the PBL instructional approach and improve students' academic achievement. The problem of this study was that relevant literature yielded inconsistent results about the effects of project-based learning (PBL) and social studies achievement, and there was a paucity of studies available that have researched the effectiveness of PBL on social studies achievement. Chapter Three explains the design, research question, hypothesis, participants and setting, instrumentation, procedures, and data analysis.

Design

A quantitative causal-comparative design, often referred to as *ex post facto*, framed and guided the data collection and analysis. Causal-comparative research design seeks to identify the potential cause-and-effect relationships by forming groups of individuals in whom the independent variable is present or absent, followed by comparing groups based on one or more independent variables (Gall et al., 2007). The design was selected primarily because the study analyzed archival data wherein the independent variable could not be manipulated. There also

was no random assignment to groups by the researcher (Gall et al., 2007; Johnson & Christensen, 2017). The independent variable was PBL participation with two levels: PBL and non-PBL. The dependent variable was social studies achievement, as measured by the GMAS Social Studies Grade 5 EOG content assessment.

Research Question

The research question for this study asked the following:

RQ1: Do social studies end-of-year test scores differ between fifth-grade students taught using a PBL instructional approach versus fifth-grade students taught from a traditional textbook-based instructional approach?

Hypothesis

The null hypothesis for this study was as follows:

H₀1: There is no statistically significant difference in social studies end-of-year test scores (as measured by the GMAS Social Studies Grade 5 EOG content assessment) of fifth-grade students taught using a PBL instructional approach compared to fifth-grade students taught using a traditional textbook-based instructional approach.

Participants and Setting

The participants were selected from a convenience sample of 2017–2018 archival data of fifth-grade student at XYZ Charter Academy (pseudonym) in north Georgia and fifth-grade students at ABC Public School (pseudonym) in central Georgia. Choosing convenient sampling of participants in this study was the most appropriate method as this method allowed the researcher to “select a sample that suits the purpose of the study and that is convenient” (Gall et al., 2007, p. 175).

The sample size for the study was $N = 198$. The sample was a nonprobability convenience sample. For an independent samples t -test, the sample size of 198 exceeds the required minimum of 100 participants for a medium effect size with a statistical power of 0.7 at the 0.05 alpha level (Gall et al., 2007). The sample represented all fifth-grade students in the two schools. A census sample was chosen to acquire data from every member of the population to inform the results of the current study more comprehensively and will more accurately yield information for all subgroups of the population (Fraenkel & Wallen, 2009). The researcher identified two population samples. The first population sample was designated as the treatment group (School A, $n = 83$) consisting of fifth-grade students at XYZ Charter Academy receiving PBL instruction. The second population sample was designated as the comparison group (School B, $n = 115$) consisting of fifth-grade students at ABC Public Elementary School where PBL was not used as part of the curriculum.

The K–8 charter school utilized components of PBL in its integrated, hands-on curriculum. The school serves approximately 780 students in kindergarten through eighth grade. The racial composition of the student body is 70.9% White, 1.7% Black, 6.0% Hispanic, 4.2% Two or More Races, 1.0% Asian, 0.8% Native Hawaiian/Pacific Islander, and 0.4% American Indian/Alaskan Native. Twenty-five percent are eligible for free/reduced price meals (National Center for Education Statistics, 2019).

The ABC Public School District serves 30,221 students in prekindergarten through 12th grade, which includes 24 elementary schools, eight middle schools, and seven high schools. The elementary school enrollment is 14,330 (Georgia Department of Education, 2019a). Racial composition of the district is 42.34% White, 38.49% Black, 10.2% Hispanic, 6.31% Multi-racial, 2.52% Asian, and 0.17% Indian (Georgia Department of Education, 2019b).

School B, one of 24 elementary schools in ABC Public School District, was purposively selected as a comparison school based on demographic similarities and its use of a teacher-centered, traditional textbook-based instructional approach. The school serves approximately 803 students in prekindergarten through fifth grade (Georgia Department of Education, 2019e). The racial composition of the student body is 63.3% White, 21.5% Black, 7.4% Hispanic, 6.3% Two or More Race, and 1.5% Asian. Forty percent of students are economically disadvantaged (Georgia Department of Education, 2019b).

Instrumentation

Per Gall et al. (2007), standardized tests are useful for collecting data in causal-comparative research. The instrument used in the study was the Georgia Milestones Assessment System (GMAS) Social Studies Grade 5 End-of-Grade (EOG) content assessment. The GMAS is a comprehensive assessment system spanning Grades 3 through 12. The GMAS measures how well students have learned the knowledge and skills outlined in the state-adopted content standards in English Language arts, mathematics, science, and social studies. Students in Grades 3 through 8 take the EOG measure in each content area, while high school students take the appropriate EOG measure for the 10 identified courses (Georgia Department of Education, 2019c).

Georgia Milestones Social Studies EOG Grade 5 Content Assessment

The Social Studies Grade 5 EOG content assessment measures the Social Studies Grade 5 standards described at www.georgiastandard.org. The content of the assessment covers standards that are reported under these domains: history, geography, government and civics, and economics. The Social Studies Grade 5 EOG content assessment has a total of 76 items. The test is given in two sections. Students will have up to 30 minutes per section to complete Sections 1

and 2. Students will have about 90 to 140 minutes to complete the Social Studies EOG content assessment (Georgia Department of Education, 2019c).

Operational items in the Social Studies portion of the Grade 5 EOG content assessment consist of selected response (multiple choice) and technology enhanced items. Technology enhanced questions are questions that require students to write a short response, click on multiple answers, or drag items to their appropriate place in a question (Georgia Department of Education, 2019c). The GMAS replaced the Criterion-Referenced Competency Test (CRCT) in the fall of 2014 and was introduced to students in the spring of 2015. Georgia law mandates that student achievement scores from the assessment be used to promote or retain students (Georgia Department of Education, 2019c).

Georgia milestones achievement levels. The GMAS utilizes four achievement levels to describe student mastery and command of the knowledge and skills outlined in Georgia’s content standards. The four achievement levels on Georgia Milestones are *Beginning Learners* (do not yet demonstrate proficiency), *Developing Learners* (demonstrate partial proficiency), *Proficient Learners* (demonstrate proficiency), and *Distinguished Learners* (demonstrate advanced proficiency; Georgia Department of Education, 2019d).

Validity and reliability of the Georgia Milestones. Validity for the GMAS was established by the clear indication of the purpose of the test, which is a measure of how well students have mastered the state’s standards. Validity also relies on how the instrument matches the content standards and how the reported scores inform the stakeholders about the student’s performance. Overall, validity is established by the process of test development (Georgia Department of Education, 2018).

Reliability for the GMAS is determined by the degree to which the students' scores are consistent and stable over time. The Cronbach alpha reliability for fifth grade ranged from 0.89 to 0.91 (Georgia Department of Education, 2018). George and Mallery (2008) gave the following rule of thumb while interpreting the value of Cronbach's alpha coefficient: >0.9 – excellent; >0.8 – good; >0.7 – acceptable; >0.6 -questionable; <0.5 – unacceptable. So, the internal consistency reliability of the standardized test used in the current study is deemed good to excellent.

Features of the Georgia Milestones Assessment System. The GMAS includes open-ended (constructed response) items in English language arts and mathematics (all grades and courses); a writing component (in response to passages read by students) at every grade level and course within the English language arts assessment; norm-referenced items in all content areas and courses, to complete the criterion-reference information and to provide a national comparison; technology-enhanced items including multiple part/multiple answer, graphing, drag and drop; and online administration considered the primary mode of administration and paper-and-pencil as back-up for those students with disabilities identified through the Individualized Education Plan (IEP) process that does not allow them to access a computer or device (Georgia Department of Education, 2019c).

Procedures

The researcher submitted a dissertation proposal to the dissertation committee chair and the full committee. Additionally, the researcher completed the National Institutes of Health (NIH) Office of Extramural Research web-based training course, "Protecting Human Research Participants." Prior to collecting any data, the researcher obtained permission from the principals, board of directors, and the superintendent of the two research sites, respectively, to conduct the study by accessing and analyzing fifth-grade end-of-year social studies scores.

Approval was also secured from the Institutional Review Board (IRB) of Liberty University (see Appendix for IRB approval). Because the study involved analysis of data and not direct contact with students, there was no risk to the students.

The researcher submitted a data file request for de-identified student data. The researcher agreed to abide by the data usage guideline provided by the respective research sites. Information included in presentations, technical reports, journal articles, or any other publications of study results will be reported in a way that prevents the identification of students, schools, and school districts. The schools maintain archival Georgia Milestones data in an Excel spreadsheet. The researcher obtained students' GMAS Social Studies Grade 5 EOG content assessment data from the respective research sites. The researcher entered the data from the schools' archival data Excel spreadsheet into IBM® SPSS® statistical software (Rovai et al., 2014). Confidentiality was maintained throughout the process. The study used anonymous archived data; therefore, participant consent or assent was not required.

The researcher conveniently sampled one public charter school that previously used a PBL instructional approach during the 2017 – 2018 school year and one public elementary school that previously used the teacher-centered, traditional textbook-based instructional approach during the 2017 – 2018 school year. In addition, the researcher collected archived GMAS Social Studies Grade 5 EOG data for all participants ($N = 198$). The researcher divided the participants into two groups based on the two levels of the independent variable—Group 1 (treatment, $n = 83$), Group 2 (comparison, $n = 115$). School names were redacted and replaced with pseudonyms (School A and School B). Data will be kept in a secure, locked file cabinet in the researcher's office for a minimum of three years at which time the data will be destroyed. Data were analyzed as indicated in the following Data Analysis plan.

Data Analysis

Data were analyzed using IBM® SPSS® Statistics, version 26.0. Both descriptive and inferential statistics were used to analyze the data. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to organize and summarize the data. The independent samples *t*-test was conducted at a 95% confidence level to determine what, if any, statistically significant difference existed when comparing the end-of-year social studies achievement test scores (as measured by the GMAS Social Studies Grade 5 EOG content assessment) of students participating in PBL learning versus students not participating in PBL learning. The *t*-test “is a statistic that can be used to test many different hypotheses about scores on quantitative variables—for example, whether the means on a quantitative variable *Y* differ between the groups” (Warner, 2013, p. 112). The dependent variable, end-of-year social studies test scores, is continuous (assessed on an interval- or ratio-level of measurement). The independent variable consists of two categorical, independent groups (PBL or characteristic present, PBL nonexistent). Since there was one dependent variable that is continuous and a nominal level variable (e.g., two groups), the appropriate test was the independent samples *t*-test (Warner, 2013; Yockey, 2018).

Data screening was conducted to check for missing data. Box and whisker plots were used to check for extreme outliers. The researcher used boxplots generated by SPSS (Green & Salkind, 2017; Rovai et al., 2014; Yockey, 2018). In the boxplot, outliers that lie outside the adjacent value are graphed using small circles. Observations that are extreme outliers are shown as asterisks (*). Following an alternative suggested by Warner (2013), the researcher can use a standard rule for exclusion of extreme scores (e.g., drop all values that correspond to *z* scores in excess of 3.3 in absolute value).

The assumptions of an independent samples *t*-test were examined prior to analysis. When computing the *t*-test, it is assumed that the samples are independent, and the samples meet the assumption of homogeneity of variances (Green & Salkind, 2017; Yockey, 2018). The cases represent a random sample from the population and participants' standardized scores are independent of each other. Normality was checked using the Kolmogorov-Smirnov (K-S) test. Histograms with a normal (bell) curve superimposed were also visually examined to assess the normality of the data. Levene's Test of Equality of Variances was used to verify that distributions had the same variances.

If the assumption of normal data is not tenable, the use of the non-parametric Mann-Whitney U test is appropriate, per Warner (2013). However, according to Warner (2013), the *t*-test is robust to violations of the normality assumption. In addition, an alpha level of 0.05 was used to determine whether to reject the null hypothesis. Effect size was measured using Cohen's *d* (Yockey, 2018). Cohen (1988) assigned the magnitude of *d* as small, $d = 0.20$; medium, $d = 0.50$; and large, $d = 0.80$.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this quantitative, nonexperimental causal-comparative study was to determine if there was a statistically significant difference between the social studies scores of fifth-grade students who were taught using a project-based learning (PBL) instructional approach versus fifth-grade students who were taught using a traditional textbook-based instructional approach as measured by the 2017–2018 Georgia Milestones Assessment System (GMAS) Social Studies Grade 5 End-of-Grade (EOG) content assessment. An independent samples *t*-test was used to test the hypothesis. Chapter Four includes the research question, null hypothesis, descriptive statistics, and results.

Research Question

The research question for this study asked:

RQ1: Do social studies end-of-year test scores differ between fifth-grade students taught using a PBL instructional approach versus fifth-grade students taught using a traditional textbook-based instructional approach?

Null Hypothesis

The null hypothesis for this study stated:

H₀1: There is no statistically significant difference in social studies end-of-year test scores (as measured by the GMAS Social Studies Grade 5 EOG content assessment) of fifth-grade students taught using a PBL instructional approach compared to fifth-grade students taught using a traditional textbook-based instructional approach.

Descriptive Statistics

Independent Variable

The independent variable used in the study was instructional modality (PBL, non-PBL).

Social studies achievement was analyzed between two instructional modalities to determine significant differences. Students in the population included all fifth-grade students whose records were reviewed, as shown in Table 1. The population total was 105 (53.0%) females and 93 (47.0%) males. Table 1 shows the instructional modality and gender.

Table 1

Demographics: Instructional Modality and Gender

Gender	Project-Based Learning		Non-Project-Based Learning	
	Frequency	Percent	Frequency	Percent
Male	37	44.600	56	48.700
Female	46	55.400	59	51.300
Total	83	100.000	115	100.000

Dependent Variable

The dependent variable of the study was social studies achievement as measured by the GMAS Social Studies Grade 5 EOG content assessment. Descriptive data on the dependent variable are presented in Table 2.

Table 2*Descriptive Statistics for Social Studies Achievement Scores*

Statistic	Project-Based Learning	Non-Project-Based Learning
<i>N</i>	83.000	115.000
<i>M</i>	522.810	518.680
Std. Error of the Mean	3.915	3.396
Median	522.000	515.000
Mode	518.000	502.000 ^a
<i>SD</i>	35.667	36.412
Variance	1272.133	1325.939
Skewness	0.589	0.205
Std. Error of Skewness	0.264	0.226
Kurtosis	2.142	0.022
Std. Error of Kurtosis	0.523	0.226
Minimum	440.000	432.000
Maximum	665.000	617.000
25% Q1 (first quartile)	497.000	494.000
75% Q3 (third quartile)	542.000	545.000

a. Multiple modes exist. The smaller value is shown.

Results

Null Hypothesis

The null hypothesis states, “There is no statistically significant difference in social studies end-of-year test scores (as measured by the GMAS Social Studies Grade 5 EOG content

assessment) of fifth-grade students taught using a PBL instructional approach compared to fifth-grade students taught using a traditional textbook-based instructional approach.” An independent samples *t*-test was used to test this hypothesis. “The *t*-test evaluates whether the population mean of the test variable for one group differs from the population mean of the test variable for the second group” (Green & Salkind, 2017, p. 125). The independent variable was instructional modality, and the dependent variable was social studies end-of-year test scores. In addition, Table 3 is a SPSS output which shows the descriptive statistics for the dependent variable. The researcher failed to reject the null hypothesis at the 95% confidence level where $t(196) = .794$, $p = .428$, $d = 0.114589$, a small effect size based on Cohen’s (1988) guidelines. The 95% confidence interval ranged from -6.126 to 14.384. Students in the PBL group had similar social studies achievement scores ($M = 522.81$, $SD = 35.67$) to their peers in the non-PBL student group ($M = 518.68$, $SD = 36.41$). See Table 4 for independent samples *t*-test results. Table 4 shows the descriptive statistics for the dependent variable.

Table 3

Independent Samples t-test

Variable	PBL		Non-PBL		<i>t</i>	<i>df</i>	<i>p</i>	95% CI		Cohen’s <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				<i>LL</i>	<i>UL</i>	
Social Studies	522.81	35.667	518.68	36.413	.794	196	.428	-6.126	14.384	0.114589

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table 4

Descriptive Statistics for Social Studies Scores by Intervention

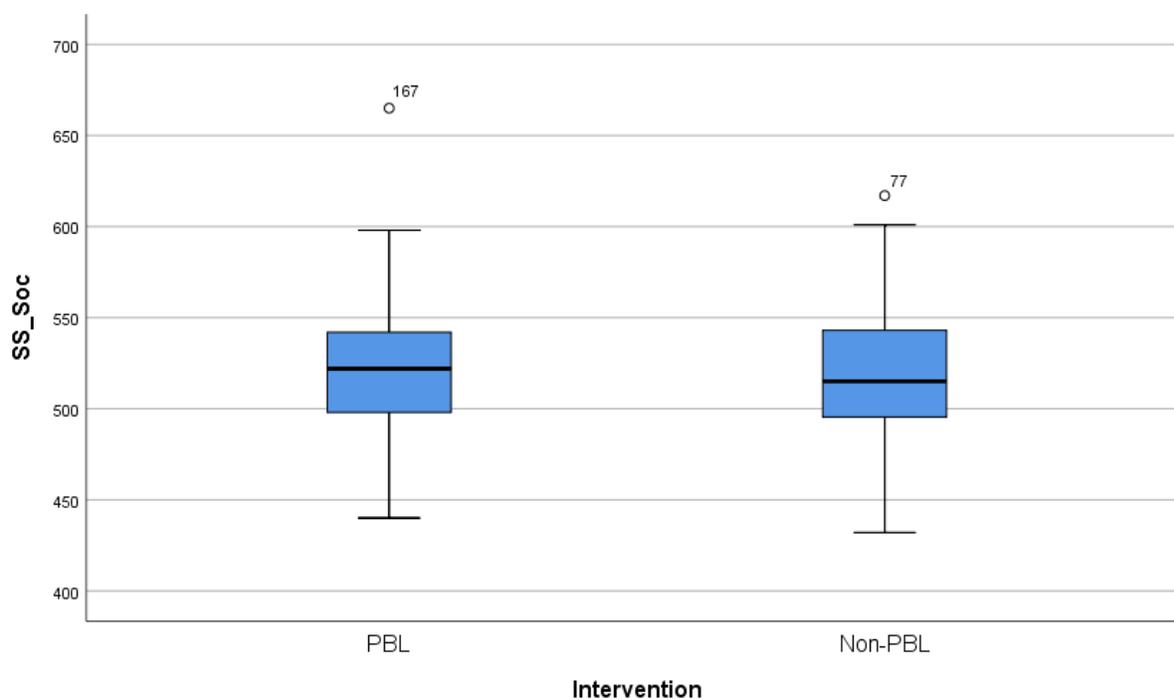
Social Studies SS	Intervention	<i>N</i>	Mean	<i>SD</i>	<i>SEM</i>
	PBL	83	522.81	35.667	3.915
	Non-PBL	115	518.68	36.413	3.396

Data Screening

Data screening was conducted on the dependent variable. The data were scanned for inconsistencies. No data errors or inconsistencies were identified. Box and whisker plots were used to detect outliers as illustrated by Figure 1. As seen in Figure 1, there was one outlier for the PBL student group (case 167), and one outlier for the non-PBL student group (case 77). There were no extreme outliers (marked as asterisks [*]). Thus, no observations were removed from the data analysis.

Figure 1

Box and Whisker Plots for Social Studies Scores and Intervention



Assumption Tests

Assumptions were addressed for the independent samples t -test. The assumptions of a t -test are as follows: (a) the observations are independent; (b) the dependent variable is normally distributed; and (c) the variances for each of the groups are equal (Yockey, 2018, pp. 78–79).

For the analysis of the GMAS Social Studies Grade 5 EOG data, all participants were independent of each other. Each score was obtained through the institution's database. Since each case in the data set represented a different person (or statistical unit), the first assumption was met. The assumption of normality was examined and determine tenable using a Kolmogorov-Smirnov (K-S) test and a visual inspection of histograms. See Table 5 for normality testing. Figure 2 presents a histogram of GMAS Social Studies EOG scores for the PBL student group. Figure 3 presents a histogram of GMAS Social Studies EOG scores for the non-PBL student group. The findings of the Kolmogorov-Smirnov test were non-significant ($p = .200$) indicating the distribution of each variable was approximately normal (Warner, 2013). All measures on both histograms were within range and the assumption of normality was not violated (see Table 5 and Figures 4 and 5).

Table 5

Kolmogorov-Smirnov Test of Normality^a for Social Studies Scores

Instructional Modality	Statistic	<i>df</i>	Sig.
Project-Based Learning	.066	83	.200*
Non-Project-Based Learning	.050	115	.200*

* This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Figure 2

Histogram of Social Studies Scores for PBL Student Group

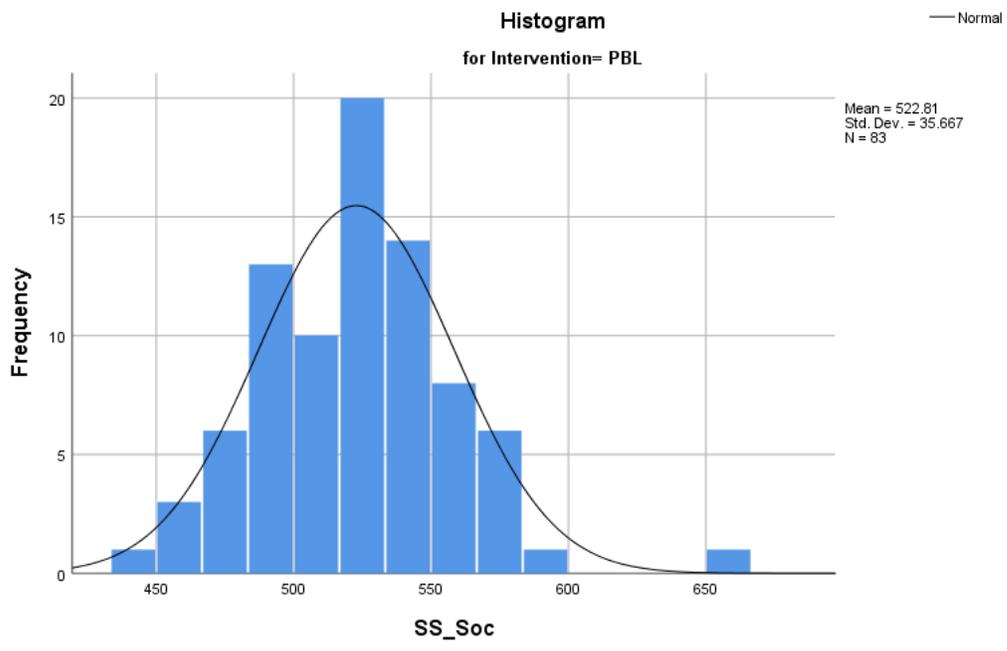
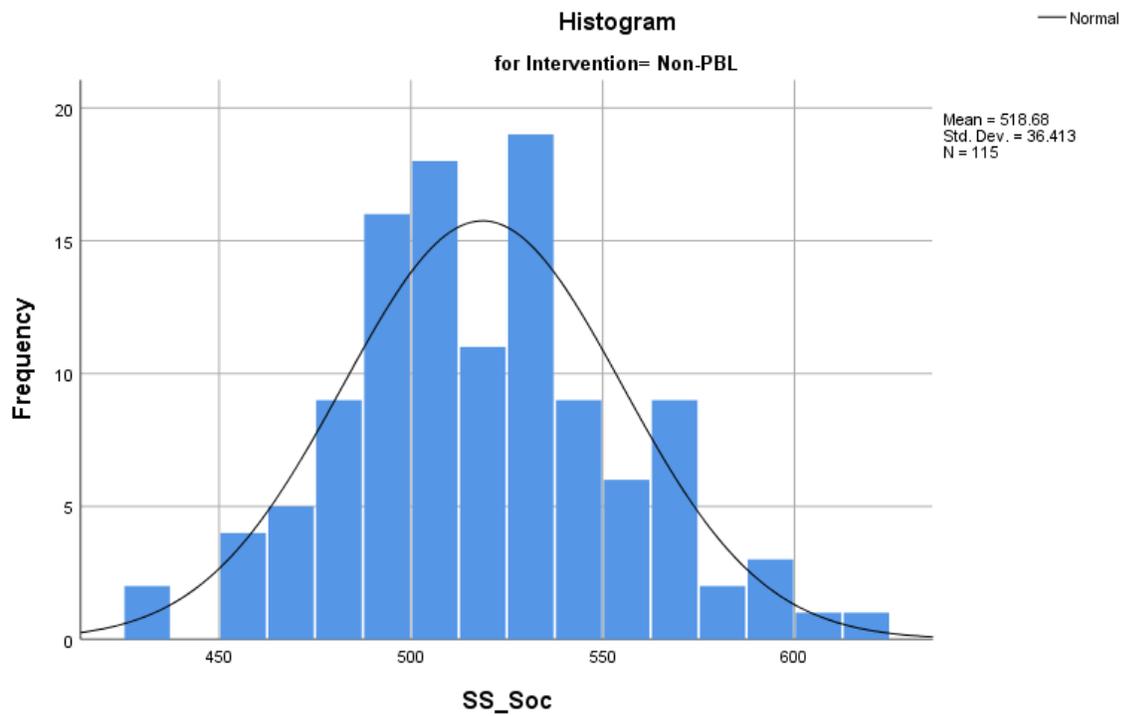


Figure 3

Histogram of Social Studies Scores for Non-PBL Student Group



Homogeneity of variance was examined using Levene's Test for Equality of Variances, $F(1, 196) = .210, p = .647$. This indicated no significant violation of the equal variances assumption as seen in Table 6.

Table 6

Test of Homogeneity of Variances

<i>F</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>
.210	1	196	.647

CHAPTER FIVE: CONCLUSIONS

Overview

This study is an examination of fifth-grade students' social studies achievement in a state charter school setting that utilizes components of project-based learning (PBL) and a public elementary school that does not use PBL. Chapter Five includes the discussion, implications, limitations, and recommendations for future research.

Discussion

The purpose of this quantitative causal-comparative study was to determine if there was a statistically significant difference between social studies achievement scores of fifth-grade students who were taught using a PBL instructional approach versus fifth-grade student who were taught using a traditional textbook-based instructional approach, as measured by the 2017–2018 Georgia Milestones Assessment System (GMAS) Social Studies Grade 5 EOG content assessment. The independent variable was defined as instructional modality with two levels: PBL and traditional textbook-based instruction. The dependent variable was social studies achievement as measured by the GMAS Social Studies Grade 5 EOG content assessment. The researcher examined the following research question:

Research Question One

RQ1: Do social studies end-of-year test scores differ between the fifth-grade students taught using a PBL instructional approach versus fifth-grade students taught from a traditional textbook-based instructional approach?

The results showed no statistically significant difference between the end-of-year social studies test scores of fifth-grade students taught using a PBL instructional approach compared to fifth-grade students taught using a traditional textbook-based instructional approach. Thus, the

null hypothesis was not rejected. These results corroborate the study by Dobbs (2008). She compared traditional teaching methods with problem-based learning and found that there was no significant difference in student achievement. Likewise, a study by McRae-Jones (2017) revealed no impact between inquiry-based instructional strategies and student achievement in social studies among third-grade students based on data from the Inquiry-Based Instructional Strategies 4-point rubric and Inquiry-Based Instructional Strategies Frequency Behavior Checklist.

The results contradict most of the literature referred to in this study that found a linkage between PBL and academic achievement (Brisini, 2018; Cervantes et al., 2015; Condliffe et al., 2017; Duke et al., 2018; Holm, 2011; Kingston, 2018; Kokosaki et al., 2016; Mika, 2015; Overholt, 2017; Summers & Dickinson, 2012). The result is in contrast to the study by Mika (2015), who found that PBL students performed better on the State of Texas Assessments of Academic Readiness (STAAR) social studies test and all four of the social studies objectives tested by STAAR. Analysis of the results from the null hypothesis does not support the constructivist theory of learning.

These results contrast with the study by Summers and Dickinson (2012). Their findings generally supported the efficacy of the project-based instruction (PBI) approach for the general student population. PBI students outperformed peers who learned from a traditional curriculum in social studies in both social studies achievement and College and Career Readiness (CCR) preparedness.

Cervantes et al. (2015) compared the reading and mathematics achievement of seventh- and eighth-grade students who had utilized the PBL instructional approach with a comparison group in which PBL was non-existent. Findings revealed the PBL group outperformed the non-

PBL group, and post hoc analyses showed that group differences were significant with respect to all three STAAR Reading reporting categories and all five STAAR Mathematics reporting categories.

Overholt (2017) compared the academic achievement of sixth-grade students taught with traditional teaching and those taught with PBL methods. Student assessments were examined to determine how students scored on lower-level thinking questions and higher-level thinking questions defined by Bloom's taxonomy of learning. Results indicated that students who were taught through traditional methods scored higher on lower-level thinking questions than those taught through PBL. Conversely, students taught through PBL scored significantly higher on higher level thinking questions than those taught through traditional methods.

This study was grounded in constructivism. PBL focuses on experienced-based or inquiry-based learning by utilizing projects to create authentic, engaging, and rigorous experiences. The results of the current study do not support the constructivist theory given that there was no significant difference in the GMAS Social Studies Grade 5 EOG content assessment scores between the PBL and non-PBL instructional modalities.

Correlations in PBL

The researcher found no significant difference in the academic achievement of students taught using PBL when compared to students not taught with PBL. The results of this research supported the findings of Wilder (2015) as two reviewed studies revealed no significant differences between the academic achievement of students in the PBL groups and their counterparts in the control groups. However, one of the reviewed studies revealed that the PBL group scored significantly lower on a standardized test than the control group (Wilder, 2015). According to Wilder (2015), there was a relatively small number of empirical studies with a

narrow discipline focus. Wilder (2015) reported literature lacked sufficient rigorous evidence that supports superiority of PBL over traditional methods of instruction regarding the student academic achievement in secondary education, which is another correlation of the current study. According to the current study, there was no statistically significant difference in social studies end-of-year test scores, as measured by the GMAS Grade 5 Social Studies EOG content assessment of fifth-grade students taught using a PBL instructional approach compared to fifth-grade students taught using a traditional textbook-based instructional approach.

The current study has similarities and differences related to Dagyar and Demirel (2015), whose combined findings of independent studies using a meta-analysis method were as follows:

1. The average effect sizes of studies included in meta-analysis done in line with random effects model is calculated as 0.83, which showed that according to traditional teaching, PBL's effects on academic achievement are higher and contradicts the current study.
2. It was found that PBL's effects on student achievement when compared to traditional teaching has not changed according to field of sciences when PBL was applied, which supports the current study.
3. There is no difference between the academic achievements of different educational levels where PBL was applied, and the finding supports the current study.
4. PBL's effects on academic achievement do not depend on the approach's application time in the teaching-learning process.

Thus, Dagyar and Demirel (2015) determined there was a significant difference between effect sizes of the meta-analyzed studies and in interpreting effective and ineffective features of these findings about PBL's effects on student achievement.

Differences Favoring PBL

The results of this current research are in contrast to the results of an additional study by Cervantes et al. (2015) that compared seventh-grade and eighth-grade students who had utilized PBL; Cervantes et al.'s study found that the PBL group performed at a higher level than the non-PBL group. The findings revealed the PBL group outperformed the non-PBL group, and post hoc analyses showed that group differences were statistically significant with respect to all three reading and five mathematics reporting categories. The post hoc analysis for reading showed that the PBL group outperformed the non-PBL group on all three STAAR Reading reporting categories.

Liu et al. (2019) examined science learning and attitude of at-risk students after they used a multimedia enriched problem-based learning environment. Interestingly, the study utilized a quantitative, mixed-methods design. In the study, gender served as the independent variable and science knowledge and attitude toward science pre- and post-scores served as dependent variables respectively. The researchers (Liu et al., 2019) used both quantitative and qualitative data, and the findings illustrated a group of at-risk students significantly improved their knowledge and attitude toward science after they engaged in the multimedia enriched PBL environment. There was no significant difference in the scores of science knowledge and attitude toward science between boys and girls (Liu et al., 2019). However, the study was limited in that the participants were an intact group enrolled in a summer program from three priority schools. All participants used the PBL program and having a control group for experimental purposes was not an option. As a result, the sample size was limited (Liu et al., 2019).

PBL and Academic Achievement

The present study disputed the study conducted by Brisini (2018) considering he utilized an exploratory action research design to ascertain the possible impact of PBL on student learning perspective and achievement in a social studies classroom. The study was conducted in the researcher's AP Human Geography class in a large South Georgia high school where students became self-directed learners by using PBL to prepare for the class final examination and AP examination administered in May (Brisini, 2018). Students used PBL to apply practically the ideas, concepts, and theories required to be successful on both examinations; and both qualitative and quantitative data collection occurred through field notes, observations, interviews, surveys, and summative assessments (Brisini, 2018). Quantitative survey data helped capture how students felt about the PBL process and their own learning. The survey utilized a 5-rating Likert scale with a rating of 1 being "Strongly Disagree" and 5 being "Strongly Agree." Quantitative data analysis from the student surveys showed an increase in how to be a self-directed learner and interest in social studies. The final phase of the study was the development of an action plan. A limitation of the study was the small sample size (Brisini, 2018).

The results of this research contradicted the findings of the ex post facto study conducted by Mika (2015) that assessed the impact of PBL in eighth-grade social studies on students' academic achievement, attendance, and discipline in a north Texas independent school district. The results of the study found that PBL students performed better on the STAAR social studies test and all four of the social studies objectives tested by STAAR. No difference was found between PBL and non-PBL groups regarding attendance and discipline. The sample consisted of 366 students (84 PBL vs. 282 non-PBL). Independent samples *t*-tests and a series of ANOVAs were used to analyze historical data.

Additionally, the current study contradicted a qualitative experimental study conducted by Overholt (2017) that compared the academic achievement of sixth-grade students taught with traditional teaching and those taught with PBL methods. Student assessments were examined to determine how students scored on lower-level thinking questions and higher-level thinking questions as defined by Bloom's taxonomy of learning (Overholt, 2017). The results indicated that students who were taught through traditional methods scored significantly higher on lower-level thinking questions than those taught through PBL. Conversely, students taught through PBL scored significantly higher on higher-level thinking skills questions than those taught through traditional methods.

The present study contradicts the study conducted by Summers and Dickinson (2012) with a randomized longitudinal design which compared the social studies achievement and grade retention rate of students in one school district who attended a high school with either a PBI or traditional approach to instruction. Their findings generally supported the efficacy of the PBI approach for the general student population and indicated that PBI students outperformed peers who learned from a traditional curriculum in social studies in both social studies achievement and CCR preparedness (Summers & Dickinson, 2012). According to Summers and Dickinson the PBI high school had the highest PBI pass rate for all students (99%) as well as for African American (97%), Hispanic (99%), and socioeconomically disadvantaged (98%) subgroups in 2010.

Challenge of PBL

Odell et al. (2019) examined the following three questions: What outcomes occur when PBL is implemented in a low-performing school district? What is the role of PBL in school improvement? What are the challenges to implementing PBL with high fidelity? Odell et al.

cited common areas of need across the district and within academies, and numerous challenges were identified when implementing PBL. Implementing PBL required teachers to reexamine their role in the classroom, and teachers had to become coaches that facilitated knowledge. Another area that merited additional investigation was fidelity as there was a lack of fidelity to the school model as outlined in the blueprint, and there was a lack of fidelity in the implementation of the PBL instructional model (Avery et al., 2010).

The current study contrasted with a qualitative study by deChambeau and Ramlo (2017) which investigated teachers' needs related to developing and implementing authentic, interdisciplinary PBL activities in an urban, public STEM high school. According to deChambeau and Ramlo, anecdotal circles proved to be an effective method for gathering stories from learning coaches that provided specific examples of their experiences in implementing PBL in a STEM high school. The study's findings confirm that integrating resources and linking teaching to realities beyond the classroom are critical factors that may require additional training, administrative support, and action beyond the initial professional development activities provided by the teachers and beyond the mandate of the school structure (deChambeau & Ramlo, 2017).

The study conducted by Duke et al. (2018) contrasted with the current study as the researchers relied on a cluster randomized controlled trial that investigated the impact of PBL with professional development supports on social studies and literacy achievement and motivation of second-grade students from low- socioeconomic status (SES) school districts. The independent variable was PBL participation (PBL vs. non-PBL). Experimental teachers taught four PBL units designed to address nearly all social studies standards and some literacy standards. Comparison group teachers taught social studies students as normal, and the

dependent variables were social studies and literacy achievement and motivation, which included pre- and post-standards-aligned measures of social studies, information reading, and information writing, and a Likert-scale motivation survey about social studies, literacy, and integrated instruction.

In contrast to the current study, Halvorsen et al.'s (2012) results showed that low-SES students made statistically significant gains in social studies and content literacy and post-test showed no statistically significant differences from the students in the high-SES schools, and there was no SES achievement gap on the assessments. Moreover, the current study presented results which opposed the findings conveyed by Duke and Halvorsen (2017) as some versions of PBL were less standards-aligned and did not provide student achievement. However, the version of PBL implemented in the Duke and Halvorsen study provided a higher degree of fidelity to the intended model and did work to improve achievement as compared to traditional learning, which repudiates the current study. Also, Duke and Halvorsen reported that PBL can raise student achievement in high-poverty communities but explained it is imperative to take actions to refine and comprehend the specific circumstances under which PBL does increase achievement.

Boss and Larmer (2018) defined project-based learning as a method of educating students to assist the learners in obtaining knowledge and skills through an extended time frame to explore, investigate, and respond to a genuine, appealing, complicated question, problem, or difficult task. In addition, PBL is associated with a variety of learning outcomes, which include conceptual knowledge, skills to problem solve, and stimulation.

The current study contradicts Parker et al. (2013), who conducted a mixed-methods experiment aimed to achieve deeper understanding in a breadth-oriented, college preparatory course—AP U.S. government and politics. The study was conducted with 289 students in 12

classrooms across four schools and in an “excellence for all” context of expanding enrollments in AP courses. Findings suggested that a course of quasi-repetitive projects can lead to higher scores on the AP test but a floor effect on the assessment of deeper learning.

The findings from the current study are contrary to a study by Wirkala and Kuhn (2011) in reference to the effectiveness of PBL with middle school social studies students; Wirkala and Kuhn determined that students engaged in PBL instruction versus lecture-based instruction performed better on several outcome variables including content knowledge and argumentation. Assessments of comprehension and application of concepts in a new context nine weeks after instruction showed superior mastery of both PBL conditions, relative to the lecture/discussion condition, and equivalent performance in the two PBL conditions.

In opposition to the current study, Wynn and Okie (2017) analyzed the impact of problem-based learning and cognitive scaffolding techniques introduced in their social studies methods course on the perceptions and practices of 12 preservice teachers (PSTs). Wynn and Okie’s findings suggested that PBL methodology, supported by professional modeling and metacognitive training, had a transformative impact on their PSTs in terms of the student outcomes they sought to facilitate, how they perceived their relationship with their students, and their operational understanding of the goals of social studies education offered by the National Council for the Social Studies. Wynn and Okie reported two implications regarding PBL changes, and the research confirmed the importance of the model process in their social studies methods course. Overall, an understanding of the cognitive dynamics of PBL was critical; however, the limitations included the inability to generalize the results to a broader context in the research (Wynn and Okie, 2017).

Implications

This research contributed to the body of research on PBL. Data analysis for the null hypothesis (H_0) found that no statistically significant difference in social studies achievement existed to support one curriculum approach over the other. The findings of the current study support implications for stakeholders in education. Schools should be responsible for determining the best evidence-based and scientifically-validated approach to improve student achievement. Building administrators and central office personnel must address curricular issues; provide professional development, mentor, and coach; and adjust strategies to ensure student success. The results of the study could assist educators in making decisions about the use of PBL in the instructional program. This study adds to the research on the effectiveness of PBL in comparison to a traditional textbook-based instructional approach. This study implies that students instructed using a traditional textbook-based instructional approach can be as successful as students instructed using a PBL instructional approach. Both appear to be viable and effective instructional approaches.

This study suggests that PBL has a negligible effect on enhancing social studies achievement in fifth-grade students. The results of this study were surprising and unanticipated based on the review of literature; however, the study is beneficial because of the knowledge gained with regard to PBL and its effect. The current study further contributes to existing research by adding a quantitative study on the effect of PBL on the social studies achievement of fifth-grade students. This study is in agreement with Wilder (2015), who asserted it is not possible to claim with a high degree of confidence that PBL is more effective in increasing student content knowledge. It also corroborated the findings from Dagyar and Demirel (2015),

which indicated that PBL's effects on student achievement when compared to traditional teaching has not changed according to the field of science in which PBL was applied.

There is no difference between the academic achievements of different educational levels where PBL was applied. Changing the teaching and learning environment in schools and districts in the 21st century is paramount to effectively prepare future leaders and serve the community of learners (Cervantes et al., 2015). Teachers and administrators can better serve students with a renewed mindset to promote innovative strategies that will redesign instruction and assessments by offering real-world problems to solve, collaboration, and professional development Cervantes et al., 2015).

Finally, research on PBL has weaknesses related to lack of experimental studies, changing fidelity of PBL, execution challenges, and absence of validity and reliability of measures (Condliffe et al., 2017). More rigorous research is required to adequately assess the effects of PBL, which are hopeful but not substantiated (Condliffe et al., 2017). In addition, there is much more research related to PBL and major content areas such as technology, STEM, math, language arts, and science than there is for social studies, which influences the research topic regarding whether statewide social studies tests in elementary schools are relevant (Bisland, 2015; Grant, 2002). Importantly, the research examined by Kartal (2020) substantiated the current research findings in regard to the effects of PBL as primary school social studies education essentially evaluated the curricula in general but did not necessarily delve into the specifics of how they are implemented. Therefore, further research is recommended for the practical aspect of primary school social studies curricula in fifth grade as studies should select appropriate methods and techniques.

Limitations

Every study has limitations; the current study has several that must be disclosed. The study used a causal-comparative design, which is less rigorous than experimental designs. The causal-comparative design restricts the ability to draw conclusions based on causation. There was one mild outlier present in each of the distributed groups, and there were unequal sample sizes in distributed groups. Per Warner (2013), “a nonexperimental study usually has weak internal validity; that is, merely observing that two variables are correlated is not sufficient basis for causal inferences” (p. 20). The current study was limited geographically to one state charter school in north Georgia and one public elementary school in central Georgia. Only test scores from fifth-grade students were included in the data analysis and findings can only be used to inform instructional practices in fifth-grade classrooms. Finally, the study did not compare subgroups of students (e.g., gender, race/ethnicity, economically disadvantaged, special education, English language learners). Perhaps such comparisons may have yielded different results.

Recommendations for Future Research

The following are recommendations for further research:

1. It is recommended that a similar study be conducted with equal sample sizes across cells (i.e., an equal number of students instructed using PBL, an equal number of students instructed not using PBL).
2. It is recommended that research is conducted in urban and rural settings.
3. Further research should include qualitative studies utilizing interviews and surveys to acquire teacher and student perspectives on PBL.

4. A mixed-methods study should be considered that includes the perspectives of students and teachers based on instructional modality.
5. The differences in student growth over the course of multiple years should be examined based on instructional modality.
6. This study collected information on gender but did not analyze the data on this designation. Additional research should be conducted on how students of different genders perform in the two instructional modalities.

REFERENCES

- Avery, S., Chambliss, D., Pruitt, R., & Stotts, J. L. (2010). *T-STEM academy design blueprint, rubric, and glossary*. <https://library.net/document/zpv82v0z-science-technology-engineering-mathematics-academies-design-blueprint-glossary.html>
- Barron, B. J. S., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., & Bransford, J. D. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *Journal of the Leadership Sciences*, 7(3/4), 271–311.
<https://doi.org/10.1080/10508406.1998.9672056>
- Bhattacharjee, J. (2015). Constructivist approach to learning: An effective approach of teaching learning. *International Research Journal of Interdisciplinary & Multidisciplinary Studies (IRJIMS)*, 1(6), 65–74.
- Bisland, B. M. (2015). An exploration of the impact of accountability testing on teaching in urban elementary classrooms. *Urban Review: Issues and Ideas in Public Education*, 47(3), 433–465.
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating problem-based learning: Sustaining the doing, supporting the learning. *Educational Psychologists*, 26(3/4), 369–398. <https://doi.org/10.1080/00461520.9653139>
- Boss, S., & Larmer, J. (2018). *Project based teaching: How to create rigorous and engaging learning experiences*. Association for Supervision and Curriculum Development.
- Bransford, J. D., Brown, A. I., & Cocking, R. R. (1999). *How people learn: Brain, mind, experience, and school*. National Academy Press.

- Brisini, J. (2018). *The impact of project-based learning on student learning perspectives and achievement in a social studies classroom* (Publication No. 10841772) [Doctoral dissertation, University of South Carolina]. ProQuest Dissertations and Theses Global.
- Bruner, J. S. (1960). *The process of education: A landmark in educational theory*. Harvard University Press.
- Bruner, J. S. (1986). *Actual minds, possible worlds*. Harvard University Press.
- Bruner, J. S. (1990). *Acts of meaning*. Harvard University Press.
- Cervantes, B., Hemmer, L., & Kouzekanani, K. (2015). The impact of project-based learning on minority student achievement: Implications for school redesign. *Education Leadership Review of Doctoral Research*, 2(2), 50–66.
<https://files.eric.ed.gov/fulltext/EJ1105713.pdf>
- Cintang, N., Setyowati, D. L., & Handayani, S. (2018). The obstacles and strategy of project-based learning implementation in elementary school. *Journal of Education and Learning*, 12(1), 7–15. <https://doi.org/10.11591/edulearn.v12i1.7045>
- Cohen, J. (1988). *Statistical power analysis for the social sciences* (2nd ed.). Erlbaum.
- Condliffe, B., Quint, J., Visher, M. G., Bangser, M. R., Drohojowska, S., Saco, L., & Nelson, E. (2017). *Project-based learning: A literature review*. Manpower Development Research.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.
- Cunningham, J. (2012). *Student achievement*. National Conference of State Legislatures.
<https://www.ncsl.org/documents/educ/CharterSchoolStudentAchievement.pdf>

- Dagyar, M., & Demirel, M. (2015). Effects of problem-based learning on academic achievement: A meta-analysis study. *Education and Science, 40*(181), 139–174.
<https://doi.org/10.15390/EB.2015.4429>
- Davis, J. L. (2011). Contracts, control, and charter schools: The success of charter schools depend on stronger non-profit board oversight to preserve independence and prevent domination by for-profit management companies. *Brigham Young University Education & Law Journal, 201*(1), 1–28.
- deChambeau, A.L., & Ramlo, S. E. (2017). STEM high school teachers' views of implementing PBL: An investigation using anecdote circles. *Interdisciplinary Journal of Problem-Based Learning, 11*(1), 1–12. <https://doi.org/10.7771/1541-5015.1566>
- Dewey, J. (1938). *Experience and education*. Simon & Schuster.
- Dobbs, V. (2008). *Comparing student achievement in the problem-based learning classroom and traditional teaching methods classroom* (Publication No. 3297457) [Doctoral dissertation, Walden University]. ProQuest Dissertations and Theses Global.
- Duke, N. K., & Halvorsen, A. (2017, June 20). New study shows the impact of PBL on student achievement. George Lukas Educational Foundation.
<https://www.edutopia.org/article/new-study-shows-impact-pbl-student-achievement-nell-duke-anne-lise-halvorsen>
- Duke, N. K., Halvorsen, A., & Konstopoulos, S. (2018). *Putting PBL to the test: The impact of project-based learning on second-graders' social studies and literacy learning and motivation in low-SES school settings*. Ann Arbor, MI: University of Michigan.
<https://sites.google.com/a/umich.edu/nkduke/publications/project-place-papers>
- Every Student Succeeds Act of 2015, 20 U.S.C. § 6301 (2015).

- Finkelstein, N., & Hanson, T. (2011). *Effects of problem-based economics on high school economics instruction*. West Ed.
- Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education* (7th ed.). McGraw-Hill.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (6th ed.). Pearson.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2009). *Applying educational research* (6th ed.). Pearson.
- George, D., & Mallery, P. (2008). *SPSS for Windows step by step: A simple study guide and reference* (8th ed.). Pearson.
- Georgia Department of Education. (2018). *Validity and reliability for the 2017–2018 Georgia Milestones Assessment System*. https://www.gadoe.org/Curriculum-and-Instruction-and-Assessment/Assessments/Documents/Milestones/2017-18_Georgia_Milestones_Validity_and_Reliability_Brief.pdf
- Georgia Department of Education. (2019a). *Charter school basics*. <https://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Pages/General-Frequently-Asked-Questions.aspx>
- Georgia Department of Education. (2019b). *Enrollment by race-ethnicity, and gender*. https://oraapp.doe.k12.us/ows-bin/owa/fte_pack_ethnicsex_pub.entry_form
- Georgia Department of Education. (2019c). *Georgia milestones achievement level descriptors*. <https://www.gadoe.org/Curriculum-Instruction-Assessment/Assessment/Pages/Georgia-Milestones-ALD.aspx>

- Georgia Department of Education. (2019d). *Georgia milestones assessment system assessment guide grade 5*. https://www.doe.org/Curriculum-and-InstructionandAssessment/Documents/Milestones/Assessments%20Guides/GM_GR05_Assessment-Guide_8.28.19.pdf
- Georgia Department of Education. (2019e). *Student enrollment by grade level (PK–12)*. https://oraapp.doe.k12.us/ows-bin/owa/fte_pack_enrollment.entry_form
- Germann, P. J. (1988). Development of the attitude toward science in school assessment and its use to investigate the relationship between science achievement and attitude toward science in school. *Journal of Research in Science Teaching*, 25(8), 689–703. <https://doi.org/10.1002/tea.3660250807>
- Grant, M. M. (2002). Getting a grip on project-based learning: Theory, cases and recommendations. *Meridian: A Middle School Computer Technologies Journal*, 5(1), 83.
- Green, S. B., & Salkind, N. J. (2017). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. Pearson.
- Halvorsen, A., Duke, N. K., Brugar, K. A., Block, M. K., Strachan, S. L., Berka, M. B., & Brown, J. M. (2012). Narrowing the achievement gap in second-grade social studies and content area literacy: The promise of a project-based approach. *Theory of Research in Social Education*, 40(3), 198–229. <https://doi.org/10.1080/00933104.2012.705954>
- Hmelo-Silver, C. S. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.23/B:EDPR.0000034022.16470.f3>

- Holm, M. (2011). Project-based instruction: A review of the literature on effectiveness in prekindergarten through 12th grade classrooms. *Insight: Rivière Academic Journal*, 7(2), 1–13.
- Isenberg, J. P., & Jalongo, M. R. (Eds.). (2003). *Major trends and issues in early childhood education: Challenges, controversies, and insights* (2nd ed.). Teachers College Press.
- Johnson, R. B., & Christensen, L. (2017). *Educational research: Quantitative, qualitative, and mixed approaches* (6th ed.). Sage.
- Kartal, A. (2020). An overview of social studies in primary education: A meta synthesis study. *Education and Science*, 45(203), 1–29. <https://doi.org/10.15390/EB/2020.8678>
- Kilpatrick, W. H. (1918). The project method. *Teachers College Record*, 19(4), 319–334.
- King James Bible. (2017). King James Bible Online. <https://www.kingjamesbibleonline.org/>
(Original work published 1769)
- Kingston, S. (2018). Project-based learning and student achievement: What does the research tell us? *PBL Evidence Matters*, 1(1), 1–11. <https://bie.org/x9JN>
- Kliebard, H. M. (1995). *The struggle for the American curriculum, 1893–1958*. Routledge.
- Knoll, M. (1997). The project method: Its vocational education origin and international development. *Journal of Industrial Teacher Education*, 43(3), 59–80.
- Kokosaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277.
<https://doi.org/10.1177/1365480216659733>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

- Larmer, J., Mergendoller, J., & Boss, S. (2015). *Setting the standards for project-based learning: A proven approach to rigorous classroom instruction*. Association for Supervision and Curriculum Development.
- Liu, M., Liu, S., Pan, Z., Zou, W., & Li, C. (2019). Examining science learning and attitude by at-risk students after they used a multimedia-enriched problem-based learning environment. *Interdisciplinary Journal of Problem-Based Learning*, 13(1).
<https://doi.org/10.7771/1541-5015.1752>
- Markham, T. (2012). *Project-based learning: Design and coaching guide*. Heart IQ Press.
- Markham, T., Larmer, J., & Ravitz, J. (2003). *Project based learning: A guide to standards-focused project-based learning for middle and high school teachers* (2nd ed.) Wilsted & Taylor.
- McDowell, M. (2017). *Rigorous PBL by design: Three shifts for developing confident and competent learners*. Corwin Press.
- McKenna, M. C., & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher*, 42(8), 626–639. <https://doi.org/10.1598/RT.43.8.3>
- McRae-Jones, W. J. (2017). *Using inquiry based instructional strategies to increase student achievement in third-grade social studies* (Publication No. 10265338) [Master's thesis, Brenau University]. ProQuest Dissertation and Theses Global.
- Mika, C. A. (2015). *The effectiveness of project-based learning in eighth-grade social studies on academic achievement, attendance, and discipline* (Publication No. 10103794) [Doctoral dissertation, Dallas Baptist University]. ProQuest Dissertations and Theses Global.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook*. Sage.

- Najdowski, C. J., Bottoms, B. L., Stevenson, M. C., & Veilleux, J. C. (2015). A historical review and resource guide to the scholarship of teaching and training in psychology and law and forensic psychology. *Training and Education in Professional Psychology, 9*(3), 217–228. <https://doi.org/10.1037/tep0000095>
- National Center for Education Statistics. (2019). *Common core of data*. U.S. Department of Education, Institute of Education Sciences. https://nces.ed.gov/ccd/schoolsearch/school_detail.asp?ID=130022204007
- Neufeld, V. R., & Barrows, H. S. (1974). The “McMaster philosophy”: An approach to medical education. *Journal of Medical Education, 49*(11), 1040–1050.
- No Child Left Behind Act of 2001, Pub. L. No. 107-110., 115 Stat. § 1425 (2002).
- Odell, M. R. L., Kennedy, T. J., & Stocks, E. (2019). The impact of PBL as a STEM school reform model. *Interdisciplinary Journal of Problem Based Learning, 13*(2), 1–11. <https://doi.org/10.7771/1541-5015.1846>
- Overholt, K. B. (2017). *Academic achievement of sixth-grade students in a social studies classroom implementing traditional vs. project-based learning* (Publication No. 10637216) [Doctoral dissertation, Southeastern University]. ProQuest Dissertation and Theses Global.
- Parker, W. C., Lo, J., & Yeo, A. J. (2013). Beyond breadth-speed-test: Toward deeper knowing and engagement in an Advanced Placement course. *American Educational Research Journal, 50*(6), 1424–1429. <https://doi.org/10.3102/0002831213504237>
- Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.
- Piaget, J. (1966). *The psychology of intelligence*. Littlefield-Adams & Co.

- Piaget, J. (1975). *The equilibrium of cognitive structures: The central problem of intellectual development*. University of Chicago Press.
- Rotberg, I. C., & Glazer, J. L. (Eds.). (2018). *Choosing charters: Better schools or more segregation?* Teachers College Press.
- Rovai, A. P., Baker, J. D., & Ponton, M. K. (2014). *Social science research design and statistics: A practitioner's guide to research methods and IBM SPSS analysis* (2nd ed.). Watertree Press.
- Saldaña, J. (2013). *The coding manual for qualitative researchers*. Sage.
- Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. *International Journal of Problem-Based Learning*, 1(1), 9–20.
<https://doi.org/10.7771/1541-5015.1002>
- Schmidt, H. G. (1983). Problem-based learning: Rationale and description. *Medical Education*, 17, 11–16. <https://doi.org/10.1111/j.1365-2923.1983.tb01086.x>
- Shaw, R. L. (2018). *Using project-based learning to cultivate 21st-century skills in STEM education* (Publication No. 13422541) [Doctoral dissertation, Lamar University-Beaumont]. ProQuest Dissertations and Theses Global.
- Summers, E. J., & Dickinson, G. (2012). A longitudinal investigation of project-based instruction and student achievement in high school social studies. *Interdisciplinary Journal of Problem-Based Learning*, 6(1). <https://doi.org/10.7771/1541-5015-1313>
- Thomas, J. W. (2000). *A review of research on project-based learning*. The Autodesk Foundation.

- Van den Bergh, V., Mortelmans, D., Spooren, P., Van Petergem, P., Gijbels, D., & Vanthournout, G. (2006). New assessment modes within project-based education: The stakeholders. *Studies in Educational Evaluation, 32*(4), 345–368.
<https://doi.org/10.1016/stueduc.2006.10.005>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Vygotsky, L. S. (1986). *Thought and language*. MIT Press.
- Wagner, T. (2008). *Closing the achievement gap: Why even our best schools don't teach the new survival skills our children need – and what we can do about it*. Basic Books.
- Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques* (2nd ed.). Sage.
- Wilder, S. (2015). Impact of problem-based learning on academic achievement in high school: A systematic review. *Educational Review, 67*(4), 414–435.
<https://doi.org/10.1080/00131911.2014.974511>
- Wirkala, C., & Kuhn, D. (2011). Problem-based learning in K–12 education: Is it effective and how does it achieve its effects? *American Educational Research Journal, 48*(5), 1157–1186. <https://doi.org/10.3102/0002831211419491>
- Wynn, C., & Okie, W. (2017). Problem-based learning and the training of secondary social studies teachers: A case study of candidate perceptions during their field experiences. *International Journal for the Scholarship of Teaching and Learning, 11*(2), 1–14.
<https://doi.org/10.20429/ijstol.2017.110216>
- Yockey, R. D. (2018). *SPSS demystified: A simple guide and reference* (3rd ed.). Routledge.

APPENDIX**Institutional Review Board (IRB) Approval****LIBERTY UNIVERSITY**
INSTITUTIONAL REVIEW BOARD

August 5, 2020

VaRonda Brown
Scott Watson

Re: IRB Application - IRB-FY19-20-398 PROJECT BASED LEARNING VERSUS
TRADITIONAL INSTRUCTION: THE EFFECT ON FIFTH GRADE STUDENTS' SOCIAL
STUDIES SCORES

Dear VaRonda Brown, Scott Watson:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study does not classify as human subjects research because:

(1) it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office