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Implementing Meaningful And Sustainable Project Based Learning Pedagogy

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IMPLEMENTING MEANINGFUL AND SUSTAINABLE
PROJECT BASED LEARNING PEDAGOGY

By

Jasmeen Philen

A DISSERTATION

Presented to the Faculty of
The Department of Education at the University of New England
In Partial Fulfillment of the Requirements
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IMPLEMENTING MEANINGFUL AND SUSTAINABLE PROJECT BASED LEARNING PEDAGOGY

Abstract

The traditional model of PK-12 education, with increased emphasis on preparing students for standardized assessments, challenges educators striving to keep students engaged in learning. Project-Based Learning (PBL), a growing teaching methodology, is designed to address the challenge of disengagement by making learning meaningful and more engaging. The purpose of this qualitative case study was to document teachers’ perceptions and understandings of Project Based Learning (PBL) in a K-12 international school in Asia in an effort to address the on-going debates about the effectiveness of its implementation. Conceptually, this case study was framed using significant aspects of the constructivist theory, while briefly referencing other pedagogical theories. In addition, data were collected, reviewed and analyzed from personal interviews, Unit Abstract survey responses, and PBL documents taken from 20 educator participants. The findings and themes of this case study revealed that K-12 educators at a large international school described their experience of implementing PBL as fluctuating in its success and challenges. However, participants clearly identified PBL as engaging for students and a good pedagogy. They also described the implementation of PBL as difficult to enact and a paradigm shift in education. This case study advances intellectual conversations that inform the debate regarding PBL through identifying effective approaches to and challenges of implementing Project-Based Learning. PBL is a compelling pedagogy with potential to lead to greater student achievement.
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CHAPTER ONE: INTRODUCTION

Among the many challenges facing educators is the importance of engaging and equipping students with the necessary skills to be successful in the 21st Century. Although the global economy and technology appears to be changing with the times, our current system of education still prepares today’s students for a world of the past, rather than the possibilities of the future (Hallermann, 2011). In the last 150 years, technology and the global economy have changed significantly, creating new innovations that have not only altered how people communicate with one another, but have presented students with new opportunities unimaginable in previous decades. Despite the advancements in technology, the structure and pedagogy of the current system of education closely resembles an educational system that is 150 years old (Hallermann, 2011, p.17). President Barack Obama noted that the current system of education fails today’s children when they are sent out into the 21st century world, because they are being ushered through the doors of a 20th century model of education (Hallermann, 2011).

The continued use of a traditional model of education for today’s students has presented an additional challenge of disengagement. In an era of high stakes standardized testing, students are often left unsatisfied and disengaged with the process of learning, and policy makers and educators have looked for ways to remedy these problems (Fredricks, 2011). Correspondingly, recent research has revealed that low achievement, student boredom, and high dropout rates have been associated with student disengagement (Fredricks, 2011, p. 1). In addition, research has demonstrated a correlational link between student engagement and student achievement (Fredricks, 2011). For example, when students are engaged in school-based learning there is a positive correlation with student achievement, and when there is a negative correlation with school engagement, research shows that students are much more likely to drop out of school.
Furthermore, Fredrick’s (2011) research estimates that 40-60 percent of students are disengaged from learning; therefore, it is not surprising that student engagement has been the focus of school improvement over the past two decades (Fredricks, 2011).

Educators have looked for creative and meaningful ways to engage students in school-based learning. At the forefront of the professional dialogue is Project-Based Learning (PBL), which is designed to make learning meaningful and engaging. Born out of a progressive education reform, and inspired by John Dewey (1897) and William Kilpatrick (1918), Project-Based Learning is designed to deliver an active, engaging, student centered approach to learning. Project-Based Learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question, problem, or challenge (Buck Institute for Education, 2014). The adoption of the Common Core State Standards within the United States has made Project-Based Learning more popular, as it claims to be the vehicle for driving the skills that are needed for the 21st century. Proponents of Project-Based Learning contend that learning through a project-based approach allows educators to work alongside students to support deeper, high quality and meaningful work. Unlike a traditional model of education where worksheets are the primary tool of instruction, PBL champions students following a piece of work through from beginning to end within the lens of a project.

Overall, in Project-Based Learning (PBL) students are engaged in a common project, with defined outcomes through elements of a project design. Advocates of PBL have emphasized that projects have a longstanding history within the world of education, and argue that Project-Based Learning is a powerful catalyst that helps students become more engaged and master the skills needed to adapt to the ever changing times (Larmer and Mergendoller, 2015; Krajcik,
Every year more and more schools are adopting PBL as an approach to learning. Although thousands of teachers and schools are adopting the PBL model of instruction (Buck Institute for Education, 2014), there are a number of disagreements between proponents and opponents of PBL; such arguments center on the pedagogical approach of whether or not PBL increases student engagement in learning, or increases student achievement on standardized tests. Furthermore, opponents of PBL question whether or not it is truly effective for enhancing student motivation and engagement, building content knowledge, and equipping students with the skills that are needed for the 21st Century.

Particularly, PBL has historically encountered resistance and criticism from studies which demonstrated that students in traditional classrooms did the same or outperformed those in PBL classrooms, specifically in the subject areas where content knowledge was emphasized (Hixon, Ravitz, & Whisman, 2012; Fatade, Mogari, & Arigbabu, 2013). In addition, in such studies it was discovered that the assessments of “learning” were divergent and not comparable. Despite these on-going debates of whether PBL is truly an effective curriculum design, its usefulness, which can vary from school to school, rests on the depth and quality of its implementation. The challenge that Project-Based Learning faces regarding implementation is the idea that it is difficult to plan and ultimately enact. Although there are a lot of factors that impede effective implementation, Condliffe’s (2015) comprehensive review recommended that future research examine the implementation of Project-Based Learning (PBL) in different contexts. Nevertheless, there is little empirical data to address how educators make sense of their experience of implementing Project-Based Learning.
Problem Statement

Due to a broader interest within the last decade to adopt Project-Based Learning as an approach to curriculum design, educators in many settings are now faced with the decision of whether or not to adopt PBL within their schools. Similarly, in some schools there is no choice, at these specific schools it is compulsory for educators to implement units of PBL regardless if they want to adopt PBL. Project-Based Learning is a teaching method where students are engaged in a complex problem or question over an extended period of time to produce a public product. Within this instructional method, students work to inquire and respond to an authentic task that is relevant to their lives while engaging in a process that includes a focus on standards-based content, student voice and choice, reflection, critique and revision. In PBL, teachers act more like a coach instead of the ‘deliverer of knowledge’. PBL’s promise to engage students in relevant messy problems that closely resemble real life and offer satisfying learning activities that have significance beyond the classroom makes PBL appealing to educators. However, Hallermann, (2011) claims that if PBL is implemented for the wrong reasons or if it is done incorrectly, PBL could be a waste of time or even backfire on the educators who are unprepared for its challenges (Hallermann, 2011).

Notably, PBL pedagogy and other student-centered approaches to learning have encountered resistance by the pressures of mandated standardized testing and various school policies that have created an unfriendly environment for PBL. In addition, behaviorists argue for more teacher-centered approaches to learning because of its use of direct instructional methods, which are easily measurable and have demonstrated successful outcomes, presenting another reason why PBL is not widely implemented and has encountered resistance. However, amongst proponents of Project-Based Learning (PBL) the challenge and the effectiveness of PBL
instruction often rely on the depth and quality of how it is implemented (Ulrich, 2012; Condliffe, 2015). Although, the number of implementation studies continues to increase with each passing year, the fact that these studies all address a different PBL approach make it difficult to draw general conclusions about the effectiveness of PBL implementation (Condliffe, 2015). Therefore the challenges of implementation must be addressed before researchers can generalize about its usefulness for preparing students for a world beyond the classroom. Overall, it is clear that determining PBL’s effectiveness lies to some degree with how effectively it is implemented.

**Purpose of the Study**

The purpose of this case study was to discover how K-12 educators at an international school describe their experience of implementing the Essential Project Design Elements of PBL. This study addressed how educators in an international school implement PBL and captured their experience of implementing the eight essential project design elements. The research came from a large private PK-12 school located in Asia where teachers have been using Project-Based Learning for three years. This study focused on capturing and adding to the limited research regarding PBL implementation in private international schools. Nevertheless, among the community there was a need to understand how Project-Based Learning is implemented and the effects of its implementation. In this study participants shared their attitudes, opinions, perceptions of Project-Based Learning (PBL) as well as addressed both the benefits and challenges to PBL implementation. Upon completion of this study, research suggestions and implications for future research were recommended.

To reiterate, the purpose of this study was to document teachers’ perceptions and understandings of PBL, which helps to inform the debate regarding PBL implementation and its effectiveness. Researchers Larmer and Mergendoller, noted that the varied implementation
techniques of PBL makes it difficult to overcome the challenges that are needed to draw
generalized conclusions regarding PBL’s effectiveness (Larmer and Mergendoller, 2015).
Nevertheless, by examining the experiences in which K-12 educators implement PBL, results
from this study helps to add to the field of research. Overall, researchers have revealed that
curricular planning, pressures of time and emphasis on standardized testing are some of the many
reasons educators struggle to effectively implement PBL. Furthermore, by examining how
international school educators describe and understand their experience of PBL implementation
will shed light on the benefits and the challenges of implementing PBL in an international school
setting.

**Research Questions**

Project-Based Learning (PBL) was born out of the work of John Dewey (1897) and his
pedagogy is evident in cycles of progressive education through the 20th century. Over the last 30
years, PBL has gained momentum with the creation of the Buck Institute of Education, creators
of PBL instructional practices for thousands of educators (Buck Institute of Education, 2013).
The following central research question assisted in documenting and analyzing teachers’
experiences that occur while implementing Project-Based Learning (PBL) in an international
setting.

1. How do K-12 educators at a large international school describe their experience of
   implementing the Essential Project Design Elements of PBL?

To reach the goals of the central research question, the following sub questions were explored:

2. How does teacher curriculum philosophy align with the principles of Project-Based
   Learning?
3. How do teacher leaders at a large international school implement essential Project-Based Design Elements?

**Conceptual Framework**

The conceptual framework of Project-Based Learning (PBL) provides a “set of lenses that incorporates complementary theories that captures the different aspects of [the] subject” (Ravitch & Riggons, 2012 p.xii). The conceptual framework helps to explain why topics like PBL are appropriate, rigorous and why they matter (Ravitch & Riggons, 2012). Project-Based learning as an instructional model encompasses significant aspects of the constructivist theory. Constructivism as a theory and pedagogy is focused on the active engagement of learning that is student-centered. With the use of problem-solving strategies the responsibility of learning is placed on the learner. Project-Based Learning is rooted in constructivist approaches to teaching and learning, which is the theory that knowledge is socially constructed and that students demonstrate their knowledge through different ways such as problem solving, critical thinking, and questioning. A key function of constructivist approaches to making meaningful PBL outcomes has originated from several key psychologists, philosophers and educators (Liu, C. & Chen, I.J., 2010). The founding fathers of the constructivist pedagogy emphasized language, thought, zone of proximal development, discovery learning, scaffolding and the social interactions of a child (Dewey, 1897; Piaget, 1938, 1955, & 1959; Vygotsky, 1955). Of these key contributors of the idea of “learning by doing” and cognitive theory are Piaget and Vygotsky. For example, Piaget argued that through cognitive development humans have the capacity to construct new knowledge from their experiences and each experience continues to build upon one another. Hence, knowledge is important when it comes to PBL implementation, because as knowledge builds it is constructed at different stages of development. Even scholars such as
Quigley agrees that social constructivist approaches to curriculum like PBL lead to an instructional model that creates an environment where learning is relevant to the learner (Quigley, 2010). These actions that are relevant to the Project-Based Learner include inquiry, construction of new knowledge, critical thinking, questioning, problem solving and discovering new ways to summarize ideas, all of which form the foundations of PBL. Overall, Project-Based Learning theories and research are rooted in the constructivist approach (Capraro, 2013; Liu and Chen, 2010; Quigley, 2010).

Effective PBL implementation requires the adoption of a constructivist approach to student learning. With this approach teachers are able to strike a balance between student control and teacher control. Teachers also recognize the need for and are comfortable with implementing student-centered pedagogies. In addition, teachers are able to tolerate ambiguity and flexibility in a student-centered environment (Tamim & Grant, 2013). Nevertheless, it is important to keep in mind that as “Ravitz (2003) posits that even when teachers show enthusiasm about the constructivist teaching approach after participating in professional development workshops, they might not find it easy to implement it in their classroom” (Tamim and Grant, 2013). Although research indicates that the adoption of a constructivist approach aides in fostering effective PBL implementation, however successful PBL rest in the depth and quality of an educators’ experience with the implementation of PBL.

**Assumptions, Limitations, Scope, and Delimitations**

**Assumptions**

Although constructive theories formed the beliefs and direction to which this study was designed, it is important to note the assumptions behind this particular study. The following assumptions are present in this study. It was assumed that the study’s sample size of educators at
an international school were representative of the population. It was also assumed that participants would answer truthfully to both the interview and Unit Abstract questions. However, participants may have adjusted their answers to what they thought the researcher wanted to hear due to the relationship and rapport they had with the researcher. Nevertheless, due to the fact that educators agreed to participate in the study under the preservation of confidentiality, anonymity, and the understanding that educators could withdraw from the study at any moment without implications, it was likely that this assumption was not problematic. Lastly, as a qualitative study, it is subjective in nature and relies on subjective interpretation. There was an assumption that the theories that were developed are understood to be reliable and accurate.

Limitations

This qualitative case study was not intended to be replicated because it occurred in its natural setting (Wiersma, 2000). As with all case studies that are qualitative in nature, the research was conducted in a real-life circumstance, and it was extensive, descriptive in nature and “drew on multiple sources of information, such as observations, interviews, documents, and audiovisual materials” (Creswell, 2013, p. 100). Information obtained from these kinds of studies can be limited, since it solely relied on information from a selected number of people. Another limitation was the possibility of bias among teachers who experienced success without the implementation of Project-Based Learning (PBL). Despite the researcher’s efforts to protect the rights of its participants and carefully select, collect and analyze the data, there are some potential limitations to the study. Nevertheless, limitations to this study have been identified.

Scope and Delimitations

This study was delimited to educators at a large PK-12 international school located in Asia. As a case study, the researcher had identifiable characteristics and clear boundaries for
which to be studied. For example, the identifiable characteristics in this study were the individuals that experience Project-Based Learning within the boundaries of the school setting of an international school. The timeline for this research study spanned the course of six months. Although research has shown that PBL is successful with secondary students (Geier, 2008; Schneider, 2002; Thomas, 2014), the scope allowed investigation of all populations in an international school setting, as it included primary and secondary educators. When approval was granted through the IRB, the School Principals, Curriculum Director, and Head of School were informed. Educators received and were given both written and verbal consent to participate in the study. Although, there are many facets when it comes to exploring PBL, the scope of this study was limited to addressing the research question of how K-12 educators at an international school describe and understand their experience of implementing the Essential Project Design Elements of PBL. PBL can be attributed to a number of theories, however the general scope of this research fell within the boundaries of constructivism. Finally, this study was delimited to the choice of the problem itself, as there were other problems related to this topic that could also be addressed; for example, teachers’ attitudes toward implementation, and external factors impeding effective implementation. Although, there is some reference to some other problems facing Project-Based Learning (PBL), for the purpose of this research the scope was limited to the fidelity of K-12 educators’ implementation of project design elements and how they make sense of their experience with implementing PBL.

**Rationale & Significance**

Given the importance of improving student engagement and preparing students to face the challenges of the 21st Century, school leaders both nationally and internationally need to continue to examine effective approaches to learning that will lead to student achievement. This
study advances intellectual conversations to help inform the debate regarding PBL’s effectiveness. By conducting this study, both national and international communities can be informed with more empirical evidence regarding the implementation of PBL, because research has noted that PBL as a teaching method could be implemented effectively or ineffectively (Buck Institute of Education, 2014). Until PBL becomes a well-understood approach to improving student achievement, engagement, and an irrefutable model that prepares students to meet the demands of this changing world, this study will remain significant. The significance of this study reflects a debate that is not settled because these studies have both empirical support and opposition. For instance, a study revealed that when a school was given a national standardized test in mathematics there was no significant difference in student achievement between a PBL school and a non-PBL school on that particular math test. In fact, results demonstrated that both groups of students performed below the national average on the test (Thomas, 2000, p. 15). Needless to say, this example highlighted the need to conduct and gather more empirical evidence. Overall, education is too valuable to waste, and if PBL is not an effective approach to learning, researchers and educators will need to reinvest their time and energy into other approaches that increase student achievement, engagement, and equips students with the skills that will make them competitive in the 21st Century.

**Definition of key terms**

The following terms have been defined for clarity as it relates to the research study. The following terminology has been used through the study; therefore the researcher has defined the following words.

*Authenticity:* a genuine, purposeful, real or original process.
**Behaviorist:** A theory that places the responsibility of learning on the teacher and supports direct instructional methods, which is also referred to as the traditional model of education. With this theory learning is defined as a change in behavior by the learner where reinforcement increases the repetition of behavior and punishment decreases the repetition of behavior (Mitchell, 2011).

**Challenging Problem or Question:** A challenging problem or question that students explore that captures the project task (Hallermann, 2011, p.7).

**Constructivism:** A theory based on the premise that students are involved in the construction of new knowledge from their experiences. This theory believes that learning is an active process, where knowledge is not prescribed rather it is combined with social interaction and reflection, which allows the learner to build upon prior knowledge to create an understanding of ideas and concepts (Tanner, 2012).

**Critique & Revision:** Feedback is given to students to make revisions such as “additions, changes, and omitting” to enhance the quality of the project and/or product (Hallermann, 2011, p. 7).

**Deeper Learning:** is defined as the process when students develop 21st century competencies. This definition of “deeper learning” is consistent with the National Research Council’s (NRC) (Pellegrino & Hilton, 2012) definition.

**Engagement:** “Cognitive engagement is defined as the student’s level of investment in learning; it includes being thoughtful and purposeful in the approach to school tasks and being willing to exert the effort necessary to comprehend complex ideas or master difficult skills” (Fredricks, Blumenfeld, and Paris 2004).” (Fredricks & McColskey, 2011 p. 2).
Effective: For the purpose of this study, effective can be defined as adequate to accomplish a desired result; producing the intended or expected result (Webster, 2014)

Essentialism: Fact based education that focuses on the essential skills

International School: A school that fosters an international education and is often situated in an international environment that may be different from the individual’s home country.

Key Knowledge, Understanding and Success Skills: Knowledge involving the Standards of what students should know and be able to do, as well as key 21st century success skills that include collaboration, critical thinking, problem solving, creativity and innovation, global thinking, technology and communication which are taught and assessed (Hallermann, 2011, p. 7).

Meaningful: full of meaning, significance, purpose, or value; purposeful; (Webster, 2014)

Pedagogy: The act or practice of teaching (Worldbook, 2016).

Perennialist: A pedagogy where emphasis is placed on principles and personal development

Performance Assessment: they “typically require students to complete a complex task, such as a writing assignment, science experiment, speech, presentation, performance, or long-term project, for example. Educators will often use collaboratively developed common assessments, scoring guides, rubrics, and other methods to evaluate whether the work produced by students shows that they have learned what they were expected to learn. Performance assessments may also be called “authentic assessments,” since they are considered by some educators to be more accurate and meaningful evaluations of learning achievement than traditional tests” (Assessment, 2015, para.15).
**Problem Based Learning:** This student-centered approach to learning allows students to collaborate; learn critical thinking strategies and knowledge through the experience of solving an open-ended question.

**Progressivism:** Emphasis on learning by doing with roots in experience

**Projects:** supplementary, long-term educational assignment necessitating personal initiative, undertaken by an individual student or a group of students (Webster, 2014).

**Project-Based Learning:** Project Based Learning is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question, problem, or challenge (Buck Institute for Education, 2014). This may include a single project or a “series of projects that require [students] to use diverse skills—such as researching, writing, interviewing, collaborating, or public speaking—to produce various work products, such as research papers, scientific studies, public-policy proposals, multimedia presentations, video documentaries, art installations, or musical and theatrical performances, for example” (Hidden curriculum, 2014, para. 1).

**Project Oriented:** teaching a number of lessons and having a project at the end (K. Washington).

**Public Product:** Students create product(s) that are public and go “beyond their classmates and teacher” (Hallermann, 2011, p. 7).

**Purposeful:** full of meaning; significant (Webster, 2014).

**Reflection:** Both students and teachers think about and give careful consideration to what and how they are learning.

**Student Voice & Choice:** “Students are allowed to make some choices about the products to be created, how they work, and how they use their time, guided by the teacher and depending
on age level and PBL experience” (Hallermann, 2011, p.7).

*Sustained Inquiry:* Inquiry is sustained through a “rigorous project process where students are asking questions, using resources, researching, and developing answers (Hallermann, 2011, p. 7).

*Traditional Teaching Methods:* Includes lecturing, memorization, teacher-centered, and test-driven instruction.

*Vygotsky’s Social Development Theory:* Vygotsky’s theory promotes the idea that students play an active and social role in learning. Teacher and student roles are shifted, with teachers working alongside their students to facilitate meaning and construct knowledge through their experiences (Learning Theories, 2015).

**Conclusion**

Although proponents tend to sing the praises of Project-Based Learning, there are a number of gaps and omissions within the current research. Case studies, such as the Quigley (2010) and the Hixson, Ravitz, & Whisman (2013), reveal a number of concerns surrounding the effectiveness of Project-Based Learning (PBL) as a pedagogy. Contrarily, some research revealed that students in non-PBL settings performed the same or out performed their peers in PBL settings. Despite current debates from both proponents and critics of PBL, researchers would suggest that more data is warranted and needed. Given the limited evidence on the influence of PBL on student achievement more data will contribute to the overall intellectual conversation on the topic of creating meaningful and sustainable PBL pedagogy.
CHAPTER TWO: LITERATURE REVIEW

The purpose of this literature review is to examine the research on PBL. Moreover, unique to this review is the examination of how schools implement what the Buck Institute for Education (BIE), a leader in PBL pedagogy, identifies as the eight key essential characteristics of PBL: Key Knowledge, Understanding and Success Skills; Challenging Problem or Question; Sustained Inquiry; Critique & Revision; Authenticity; Reflection; Student Voice & Choice; and Public Product. By focusing on these key characteristics, school leaders can effectively gather data to support arguments for different approaches to pedagogy.

This literature review is organized into four main parts; the first part begins with the history and theories that have led to Project-Based Learning. The second part lays out the current definitions of Project-Based Learning with a focus on the Buck Institute for Education’s (BIE) current research and practices regarding PBL. The third part addresses the eight essential elements for creating meaningful PBL defined by BIE. The final part discusses the need for data regarding PBL as a valuable alternative to traditional instruction in K-12 schools. Nevertheless, this literature review will frame the stage for research questions addressing the ways K-12 educators describe and understand their experience of implementing the eight essential elements of PBL.

In an era where high stakes mandates drive educational reform with a strong focus on standardized testing preparation, today’s schooling is preparing students for a world of the past (Hallermann, Larmer, & Mergendoller, 2011). In this “test-prep” environment students are often left unsatisfied with the process of learning; therefore, it is imperative for educators to create meaningful ways to engage students. At the forefront of professional dialogue about ways to engage students is the consideration of Project-Based Learning (PBL), which is designed to
make learning meaningful. Proponents of PBL argue that it “allows teachers to work more closely with active, engaged students doing high-quality, meaningful work, and in many cases to rediscover the joy of learning alongside their students” (Buck Institute for Education, 2014, para. 7). Although thousands of teachers and schools are adopting the PBL approach to learning (Buck Institute for Education, 2014), there are a number of concerns raised by proponents and opponents of PBL. Both sides debate the value of PBL as a pedagogical approach to teaching and learning.

Presently, “Project-based learning, [is] a teaching methodology that utilizes student-centered projects to facilitate student learning…” (Holm, 2011, p. 1). On the surface, PBL appears to have potential for changing with the times, in that its instructional practice reflects the skills and knowledge that are needed in today’s world. While research reveals numerous studies on the various forms of Project-Based Learning as an instructional method, these studies have sparked much debate. Nevertheless, the Buck Institute for Education (BIE), leaders in providing PBL professional development for thousands of teachers, contend that they provide meaning and clarity by identifying eight essential elements: Key Knowledge, Understanding and Success Skills; Challenging Problem or Question; Sustained Inquiry; Critique & Revision; Authenticity; Reflection; Student Voice & Choice; and Public Product for implementing meaningful PBL (Hallermann, S., Larmer, J., & Mergendoller, J., 2011). Despite BIE’s claim that “PBL appears to be an equivalent or slightly better model for producing gains in academic achievement” (Buck Institute for Education, 2014, p. 2), unfortunately, BIE’s empirical data are insufficient when it comes to research emphasizing these eight characteristics. Hence, there is a great need for empirical data and research.
Historical Context of PBL

While PBL as a teaching method emerged in the 1970’s (Thomas, Markham, & Larmer, 2003), the conceptual idea of PBL was developed over a century ago. John Dewey (1897), one of America’s most influential education reformers, emphasized the importance of hands-on student-centered learning. Dewey also highlighted experiential learning through his historical concept of “learning by doing” (1897). Furthermore, the origins of PBL can also be traced back as early as 1918, when William Kilpatrick (1918) focused on student-centered learning and emphasized four key elements for teachers when implementing student-centered practices within this kind of learning: “purposing, planning, executing and judging” (Holm, 2011, p. 1). Theories such as Dewey’s and Kilpatrick’s have led to a variety of methods for student learning such as project based learning, problem based learning, inquiry based learning, experiential learning, and student-centered learning. In addition, earlier teaching methods have emphasized the importance of collaboration, problem solving, and 21st century learning skills.

Although over the past few decades PBL has been seen primarily in elementary, middle and high school classrooms, this practice is commonly used in the medical field. Known as an interdisciplinary concept, PBL was used and is still used today as pre-professional training for those in the medical, science, and mathematical fields. When used in these interdisciplinary fields, especially with medicine, students were involved in the process of learning to critically think and solve complex problems independently. Nevertheless, educational PBL as a teaching methodology differs in its approach, because students gather and develop their own understanding by working collaboratively with their peers.

Although PBL emerged from an historical pedagogy, researchers do not agree on a precise definition for PBL. Despite the lack of consensus on a universal definition, BIE justifies
this deficit, stating that as PBL’s methodology changes with the time, so will its definition (Buck Institute for Education, 2014). As such, the majority of newcomers to this methodology are embracing BIE’s definition of PBL: “BIE defines standards-focused PBL, as a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks” (Hallermann, Larmer, & Mergendoller, 2011, p. 5). In line with these values, PBL has become increasingly popular out of the need for education to adapt to an ever-changing world.

**Key Characteristics of PBL**

Given its historical context, Dewey’s (1897) and Kilpatrick’s (1918) theories have led to a variety of teaching methods and practices for student learning. Such teaching methodologies possess similar key characteristics in that they are student centered, the problems/cases are posed in a specific context for learning, and the teacher’s role changes from sole bearer of knowledge to coach and/or facilitator of learning. Similarly, students are involved in the application of real-world situations through an inquiry-based approach.

**Piaget’s Theory and Constructivism**

Furthermore, these key characteristics are rooted in the idea of constructivism. PBL is supported by the constructivist theory: the idea that individuals construct and build artifacts that are personal and meaningful, which can be shared by others. “Therefore, constructivism means that learning involves constructing, creating, inventing, and developing one’s own knowledge and meaning” (Liu, & Chen, 2010, p. 65). Similarly, the idea of constructivism is readily embraced in education and has called educators to blend knowledge and understanding with experience “…through the introduction of stimuli, and the scaffolding process” (Quigley, 2010, p. 29). Educators who welcome the theoretical framework of constructivism readily accept the
methodology of PBL (Stavredes, 2011). Embedded in such constructivist theories is the fundamental intent to make learning more meaningful to students.

A key function of making meaningful PBL is supported by constructivism and its ideas of teaching and learning, which originated from several key psychologists and educators such as Jerome Bruner, Jean Piaget, and Lev Vygotsky (Liu, & Chen, 2010). For example, Piaget purports that there are stages in which the brain develops and at each stage the student learner constructs meaning from their social environment, hence “teachers can have only a minimal effect on learning” (Mitchell, 2011, p. 1). Grounded in cognitive theory, PBL instruction places the learner in an environment that is relevant to the learner through activities and projects that require inquiry, critical questioning, and synthesizing knowledge in their own words. In this environment the learner constructs new knowledge, demonstrates learning, understanding and meaning as it relates to his/her own experiences, beliefs and attitudes (Quigley, 2010), all of which from the foundations of PBL.

**Gardner’s Multiple Intelligences Theory**

Another theory that is essential to the effective implementation of PBL is Gardner’s (1999) multiple intelligences theory. Gardner’s theory illuminates PBL’s student-centered approach of student voice and choice by emphasizing that students possess different learning styles and intelligences. Gardner’s theory gets at the heart of PBL implementation because his multiple intelligences theory takes into account the differing learners styles, such intelligences creates an environment where it becomes pivotal to design projects (Quigley, 2010). PBL supported by Gardner’s theory allows for the implementation of concrete, semi-abstract, abstract instruction, cooperative group work, wait time for processing information and questions, and scaffolding that takes into account the differing and unique styles of the learner. Nevertheless,
these strategies can only be successful if it is constructed within what Vygotsky’s calls the zone of proximal development.

**Vygotsky’s Theory and the Zone of Proximal Development**

Vygotsky’s theory stated that failure is predicted when educators create PBL experiences that are beyond the scope of the zone of proximal development (ZPD). For instance, “If teachers and students operate beyond their ZPD, failure is likely. Mistakenly, this failure may be blamed upon PBL itself or [may result in] the inability of teachers and students to work within the PBL framework” (Vygotsky, 1978 as cited in Capraro & Morgan 2013, p. 26). Simply put, all participants within the PBL community, leaders, teachers, and students, should work within their zone of proximal development (ZPD) to foster effective implementation. When students are operating within their zone of proximal development through PBL, students become intrinsically motivated, more focused, and they develop a range of abilities, knowledge, and skills (Capraro & Morgan, 2013, p. 26; Tamim & Grant, 2013; Vygotsky, 1978).

**Comparison with Other Theories of PBL**

The acronym PBL is often referred to as Project-Based Learning, however when Howard Barrows and his colleagues at McMaster University, pioneers of problem based learning, think about the term PBL, “Problem Based Learning” comes to mind. Although BIE would argue that Project-Based Learning incorporates the ideas of problem based learning, it is important to note their similarities and differences. The term PBL has been used broadly, often encompassing the term problem based learning. Similar in its approach to implement instructional strategies where students solve realistic problems that ordinary people face everyday, is problem based learning. Problem based learning facilitates learning through a conceptual model that creates problem based scenarios that allow students as well as health care professionals to examine learning and
instructional strategies within the classroom. Downing (2013) contended that problem based learning created outstanding results for educating and training various health care professionals due to its power to ultimately lead to sustained and transferable learning.

Problem based learning is a student-centered approach to learning and is generally situated around a problem statement, allowing for unique learning destinations. Unlike problem based learning, Project-Based Learning is designed to go beyond presenting a problem statement. In contrast to problem based learning, Project-Based Learning uses specific content knowledge and skills to answer meaningful questions and solve realistic problems. In addition, Project-Based Learning maintains that projects are the central focus of their instructional method, which encompasses a variety of subject areas. Furthermore, unlike problem based learning, Project-Based Learning projects emerge from an authentic context (Thomas, 2003, p. ix). Simply put, problem based learning creates problems that are simulated in nature and not authentic.

Overall, advocates of this particular theory would argue that when properly implemented, it is more effective than traditional instruction.

Another theory that underlies PBL is evident in Hung’s (2008) proposed model. In his model he suggested that educators consider these critical elements: defining the content, identifying the context, listing possible problems, describing potential solutions, calibrating the projects, describing the task, and reflecting on the learning (Jonassen & Hung, 2008). Although Hung’s model offers a slightly different approach to implementation, its elements for successful PBL mirror those proposed by the Buck Institute for Education. Hung suggested elements that are critical to project design goes a step further by offering additional elements that he claimed are essential for implementation. Hung’s (2008) model recommended six critical elements to consider for successful PBL implementation, such as the need for necessary knowledge
acquisition, depth of study, effectiveness and efficiency of research methods, logical and effective reasoning, conceptual integration of knowledge, and effective problem-solving strategies (Jonassen & Hung, 2008).

Although all the historical and theoretical concepts of PBL suggest the need for effective implementation strategies, the research points out that results can vary within schools due to the “quality of the project and the level of student engagement” (Thomas, Larmer & Ravitz, 2003, p. 6). There may be many different models of PBL, yet “thousands of educators throughout the United States and in other countries have used [the Buck Institute for Education] handbook, and it has played an important part in the spread of project based teaching strategies” (Thomas, 2003, p. vi).

As a well-regarded resource, the Buck Institute for Education (BIE) offers the most comprehensive guide for the growing number of PBL educators within the United States and across the world. Supported by John Dewey’s 100 year-old concept of “learning by doing,” BIE makes strong claims that “PBL is a rigorous, relevant, and engaging instructional model that supports authentic inquiry and autonomous learning for students” (Buck Institute for Education, 2014, p. 6). In their handbook, BIE discussed the emergence of a method of teaching called Project-Based Learning. BIE’s thorough discussion of the benefits of PBL to how educators can implement PBL within their own classrooms, offers those new or interested in PBL a glimpse of its understanding. Furthermore, BIE’s advocacy for PBL as a preferred method of instruction, distinguishes itself from being “just projects.”

Theorists and philosophers such as Dewey, Kilpatrick, Piaget, Vygotsky, Gardner and Bruner have led to the foundations of what we understand as PBL today. In addition, the constructivist pedagogy is the element for which PBL instruction was created. Although
sometimes mistaken as problem-based learning, the unique and key characteristics of PBL sets it apart from similar methodologies. Institutions such as BIE have laid the groundwork using eight essential project design elements that guide educators in implementing PBL in their own classrooms.

**BIE’s 8 Essential Elements of PBL**

In the literature, *PBL in the elementary grades: Step-by-step guidance, tools and tips for standards-focused K-5 projects* lays out how to successfully implement a PBL unit in the elementary grades. Furthermore, it points to the misconceptions that educators have, thus, the reason why teachers chose to not implement PBL. These authors provided extensive resources for getting educators started and provide a concrete definition of PBL, along with 8 essential elements that define PBL.

The first of its essential elements, *Key Knowledge, Understandings and Success Skills*, are the key knowledge and skills that students have to obtain that is derived from the standards. This key characteristic is what sets BIE apart from earlier methods of PBL. In addition, the *Success Skills* includes *21st Century Skills*, which are the necessary skills that are needed in today’s world. These key *21st* century skills include collaboration, critical thinking, problem solving, creativity and innovation, global thinking, technology and communication. The second essential element includes *Authenticity* where students are engaged in real world context and tasks and the project contains relevance to their lives.

Another key essential element includes the *Sustained Inquiry*, which is the student-centered process of asking questions and seeking answers through research. Often blended with impactful entry events, events that initially hook the students to the project is also another key component of BIE’s PBL, where “students see the need to gain knowledge, understand concepts,
and apply skills in order to answer the *Challenging Question or Problem* and create project products” (Hallermann, Larmer, & Mergendoller, 2011, p. 7).

The fourth essential element, which engages students in their quest for knowledge about a given project, is the open-ended *Challenging Problem or Question* that students seek to answer throughout the course of the project. This question is what drives the tasks that students answer to complete their project.

The fifth essential element is the process of *Reflection*, which is the practice where both students and teachers reflect on the process of learning, quality of work, obstacles and the steps to overcome any challenges.

The student-centered sixth element is student *Voice and Choice*. Used with teacher guidance, students are allowed to have choice with their learning and exploration, as it relates to the driving question.

Another key element that is on-going throughout the course of the unit from beginning to end is the seventh essential element of *Critique & Revision*. Critique and Revision is the process of allowing students time to reflect on feedback and consistently make revisions to their work. Lastly, and also the eighth element of PBL, is the process of displaying and presenting their work as a *Public Product*. *Public Product* is the practice of having an authentic audience and presenting work outside the walls of the classroom, which is a key characteristic of PBL. Presenting work to others is essential, and proponents of BIE’s PBL consider these eight elements essential for effective and meaningful project implementation.

Although PBL has been around for decades, the recent popularity of PBL has led to the development of a variety of project design models. Ultimately, the quality of implementation has also seen variation. Nevertheless, BIE has created a comprehensive research-based design model.
that is essential for effective PBL implementation, which include Key Knowledge, Understanding and Success Skills, Authenticity, Sustained Inquiry, Challenging Question or Problem, Reflection, Voice and Choice, Critique & Revision, and Public Product.

**Claims by Contemporary Researchers**

According to Hallerman (2011) PBL “is valuable because it effectively teaches content knowledge and skills [that] builds deeper understanding of concepts, and makes a school curriculum more engaging and meaningful for students” (p. 8). This claim ignores any flaws in this method of instruction. Simply put, where is the data that supports the claims of its effectiveness within its pages? The research regarding PBL results indicates that PBL is in its development stage and lacks sufficient evidence-based research. For instance, BIE, the main contenders in the field of PBL, argued that there is “not sufficient research to state that PBL is a proven alternative to other forms of instruction” (Buck Institute for Education, 2014, p. 5). This lack of empirical data has led researchers on a quest to search out and find evidence of whether or not PBL is a valuable alternative to other pedagogies.

There are many benefits of implementing PBL in schools (Behizaheh, 2014; Lattimer & Riordan, 2011). Behizaheh (2014) advocated the need for more PBL pedagogy within schools and leaves the reader questioning: why do schools struggle with adopting a PBL approach to learning? Lattimer and Riordan (2011) advocated for the implementation of PBL by examining the successful implementation of PBL in a middle school. The authors described a successful PBL implementation while also pointing out some of the challenges to PBL. In a school where standardized test scores are some of the best in the country, Lattimer and Riordan examined High Tech Middle (HTM) as a model for successful PBL implementation. Lattimer and Riodan’s (2011) research concludes by offering what these authors claim are successful examples of
HTM’s meaningful PBL experience. For example, the data in this research revealed that when PBL is the central focus, it can have a dramatic impact on student achievement. In HTM, students are admitted through a lottery and come from a wide range of social economic backgrounds, yet students from HTM have a 99% college attendance rate and their collective standardized test scores are among the highest in the nation. This case demonstrates that when PBL is implemented effectively and is the central focus at a school, it can have a significant impact on student achievement.

Nevertheless, there are a number of gaps and omissions within the current research. Case studies, such as Quigley (2010) and Hixson, Ravitz, and Whisman (2013), revealed a number of issues surrounding the topic of PBL and results demonstrate that data can be contrary to what was expected. Some research even revealed that students in non-PBL settings performed the same or out performed their peers in PBL settings. For example, for two years (2008 – 2010), the Department of Education in West Virginia partnered with the Buck Institute for Education (BIE) to bring teachers high quality professional development with a focus on Project-Based Learning. The study compared 24 trained PBL teachers with a group of non-PBL teachers, and the results revealed that teachers who used PBL consistently taught 21st century skills more than their matched group. Although achievement gains were compared for both groups, the study revealed that there was no difference in performance on statewide tests. The authors also pointed out that though this study does not demonstrate significant gains by using PBL, it does acknowledge that PBL does not hinder statewide aims since student performance results were similar in nature (Hixson, Ravitz, & Whisman, 2012-2013). Overall, this study offered significant insight on what happens when PBL is implemented on a statewide level, and it also reveals that there are not
always significant gains when implementing PBL. Hence, this finding demonstrates the need for more evidence-based research on this topic.

In a quasi-experiment, Quigley examined the soundness of Project-Based Learning in addressing student achievement. Although forty-four students participated in the study which focused on Math, the results revealed that there was no difference in test performance. Thus, this finding conflicted with the Math results found in Fatade, Mogari and Arigbabu (2013). Their study in Nigeria included 96 student participants, and the results revealed that PBL students outperformed their peers in the control group that was taught using the traditional method. However, in his study, Quigley’s presentation of sound and objective research continues to validate the need for more empirical data specifically when it comes to answering the question of does PBL create a better alternative to learning than traditional ways of learning?

Some studies such as those conducted by Marx et al. (2004), Rivet and Krajcki (2004), and William and Linn (2003) have explained that the research has demonstrated that students in Project-Based Learning classrooms get higher scores than traditional classroom. Other studies such as Nowak (2007) contradict those findings, and suggest that students in PBL settings do not always demonstrate greater achievement as measured by test scores. In his research, Nowak provided insight on conducting a comparative study and using data to determine how students perform. Although unexpected results demonstrated that non-PBL students scored significantly better than PBL students on standardize multiple-choice test, the results showed, that “The PBL students under rigorous fact-based testing did not score as well on these types of tests as their non-PBL counterparts” (Novak, 2007, p. 66). Furthermore, in his research, Novak advocated for “intentionally embedding teacher-direct instruction with PBL’[s] instructional model” (Novak, 2007, p. 66). Novak’s study provided insight on conducting a comparative study and using the
data to determine how students perform. Again, these claims by other researchers leave us with information that is contradictory to results.

Overall, these studies revealed that when teachers practiced poor implementation techniques, challenges with implementation stemmed primarily from the following:

- Failure to take on the student-centered constructivist approach to learning (Pellegrino & Hilton, 2012; Ravitz, 2010).
- Failure to select an appropriate PBL topic (Krajcik, Blummenfeld, Marx, & Soloway, 1994)
- Strictly adhering to and/or covering the curriculum on a fixed schedule (Snyder & Snyder, 2008)
- Failure to develop and foster a collaborative environment
- A lack of skills needed to orchestrate several elements of managing a project
- A lack of clear expectations and with limited assessments (PBL requires a multifaceted assessment, such as performance assessments, portfolios, weekly reports, self-assessments, written journals, etc.) (Tammin & Grant, 2013).

Consequently, the research makes it clear that when educators use poor implementation techniques, PBL is seen as ineffective and considered a waste of time (Hallermann, 2011, p. v). On the other hand, research also reveals that when there are elements of effective implementation such as: Key Knowledge and Understanding & Success Skills, Challenging Problem or Question that drives the focus of the project, Sustained Inquiry, Public Product, Authenticity, Reflection, Voice & Choice, Critique & Revision, the data demonstrates positive results; therefore PBL students outperform their peers and learning becomes engaging and meaningful.
Proponents of PBL argue that the pedagogy engages students, encourages students to develop learning habits that last a lifetime, improves students’ mastery of 21\textsuperscript{st} century skills and students’ motivation to learn. Essentially, proponents claim that it is more effective than traditional methods. Nevertheless, critics argue that the problem lies with PBL’s threat to traditional pedagogy and the ambiguity held by many educators in how they perceive the project approach. Furthermore, balancing curriculum requirements and high stakes tests, time management, and management in general, all hinder the effective implementation of PBL.

**Implications for Further Research in PBL**

There may be external factors prohibiting the successful implementation of future research. In a study about a two-year professional development program focusing on PBL, the authors examined the impact that PBL programs can have on its participants. For example, after participating in the study, the teachers continued to reform their practices. In addition, the article revealed significant implications to consider when conducting such research because although the research showed that PBL can have a significant impact on learning, changes in budgets and standard-driven skills create barriers to the development of a study on PBL (Haney, Wang, Keil, and Zoffel, 2007).

Another possible external factor prohibiting a successful PBL implementation is PBL’s threat to traditional pedagogy as found in Ulrich’s (2012) research. She provides information regarding the emergence of PBL and how it is viewed in the context of a school. Ulrich goes into significant depth and uses numerous examples regarding the opportunities and challenges that educators face when implementing PBL. For example, some opportunities include personalized learning, the use of interactive technology, connections to authentic real life problems, and the belief that students are to be pulled through the curriculum by answering meaningful questions
and engaging in real world connections (Ulrich, 2012) rather than pushed through. Nevertheless, Ulrich points out some of the challenges of successful implementation, which include the difficulty of balancing curriculum requirements. In addition, PBL requires rigorous planning, management, student collaboration, and requires a shift in pedagogy in terms of what some educators traditionally believe about learning.

To conclude, Ulrich challenged teachers to rethink their role by quoting Singapore’s vision “Teach less and learn more”. For in many cases, the opposite of this philosophy is true and presents one of the challenges teachers face with PBL. In addition, the author challenges teachers to step into the world of their students by getting connected with technology, as the project-based approach taps into today’s types of learning and students’ current and future realities.

Ulrich’s straightforward synopsis did what it was intended to do, which was to accurately lay out the benefits and challenges of PBL. Ulrich’s research proved to be reliable, because proponents of PBL continue to refer to these same benefits, and critics of PBL persist to point out these same challenges. Furthermore, Ulrich addressed a multitude of concerns that teachers encounter when implementing PBL, such as the difficulty of trying to balance curriculum requirements and high stakes tests, time management, and management in general with PBL. Ulrich’s research offered new and extensive insight into the challenges of PBL by suggesting that the problem does not only lie with the implementation of PBL, it actually lies with PBL’s threat to traditional pedagogy and the lack of knowledge about how to implement the model.

Educators’ hold a range of perceptions about the project approach. As cited by Ulrich, theorists like Slattery (2006) and Kozol (1975) also contended that problems with implementation lie with adults and parents because they find the technology piece of the implementation of the 21st
century skills overwhelming. Simply put, PBL presents a threat to traditional pedagogy. The ambiguity held by many PBL opponents and how they perceive the project approach creates many challenges.

Foulger, Wetzel & Rathkey (2009) presented a revelatory case study that explored how there may be political factors that account for the lack of effective PBL implementation. For instance, in their research they examine how a teacher (Ms. Rathkey) establishes a successful PBL collaborative classroom with her first-grade students. The authors introduced the concept of “information-oriented sampling, in which an extreme or atypical case is selected because it is a richer source of data for the phenomenon being studied” (Mitchell, 2009, p. 341). Mitchell’s (2009) research revealed that when implemented correctly, PBL can be effective, however, when faced with addressing specific standards, PBL appears to fall short of the goal of reaching cut scores on standardized tests. As a reliable source, this study again demonstrates just how limited PBL research is, due to the increased political pressure for students to acquire specific standard-based skills. In the current political climate, there is a need for further research on this complex topic.

There is a wide degree in variation of implementation of PBL. Hallerman (2011) suggested that "researchers also would say, naturally, that PBL needs more research, because it has been hard to pin down; so much depends on how it is defined, the particular circumstances in a school, and the quality of classroom implementation" (p. 13). In addition, researchers like Vega (2012) correspondingly suggested a slightly different model that examined four components: Carefully Calibrated Project Design, Structured Student Collaboration, Assessments that Support Students’ Success, and a Supportive Network for Teachers’ Professional Development that aids in designing effective PBL. Although Vega (2012) offered
evidence-based strategies for successful PBL, her study reflects the need to reinforce continuous professional development when implementing PBL, which is not present in BIE’s research.

Perhaps researchers can use Callison’s (2006) study as a guideline for which direction to take with PBL. Callison (2006) examined the problems and limitations of PBL, for example, his research offered effective tips on what it takes to have a successful PBL experience. Similarly, Callison offered definitions on the different approaches to teaching PBL. Unlike his peers who have yet to determine if PBL is a better alternative than traditional methods, Callison boldly claimed and defined PBL as requiring the highest learning level. Lastly, Callison’s research offered clever insight on the barriers that teachers face when reporting on the implementation of effective PBL. For example, it highlighted the fact that some teachers may lack access to technology, classroom management skills, and the ability to create and provide meaningful assessments. Thus, PBL practices become ineffective. Nevertheless, Callison’s research justifies the decision to focus on PBL because despite its limitation, some studies have concluded that such PBL efforts are worthwhile and worth the study for empirical research.

Philosophies of pedagogy

Although PBL is a historic pedagogy that goes back to Dewey and Kilpatrick, one cannot understand the motives and goals of education without referencing the significant debates around two major competing pedagogies. The constructivist and behaviorist pedagogical debate has dominated education, with a growing number of educators concerned with the practice and the study of how best to teach. Cunningham, in nine different studies, discovered that while educational establishments are dominated by the constructive pedagogy, constructivist principles diverge greatly from what the public believes education should be, that is, a behaviorist pedagogy (Mitchell, 2011). “Behaviorists point to the proven successes of direct instructional
methods and positive reinforcement for motivation that occur with properly trained instructional personnel using carefully sequenced curricula” (Mitchell, 2011, para.17). Nevertheless, “from schools of education to legal requirements, from curriculum publishers to departments of instruction and their government-run schools, constructivism has evolved since the 1940’s to become the dominant ideology pervading education” (Mitchell, 2011, para.10). Also rooted in constructivism is a pedagogy that goes beyond the delivery of learning or projects, but it is designed to foster the co-construction of knowledge around real world problems. This pedagogy has been rooted in the design of collaborative learning environments where there is a partnership between teachers and students (Reusser, 2001).

Another pedagogy that helps to explain how teachers make sense of their experience of implementing PBL is teacher autonomy. Teacher autonomy refers to the degree in which teachers make decisions about what they teach and how they will teach it (Hidden Curriculum, 2014). Similarly, the demand of external policies such as testing, standards, curriculum and promotional policies play a significant role in the extent to which teachers have the autonomy to implement PBL successfully. Nevertheless, the extent to which K-12 educators possess teacher autonomy has given rise to debates (Hidden curriculum, 2014). For example, “In recent years, teacher autonomy has become a major point of discussion and debate in American public education, largely as a result of educational policies that, some argue, limit the professionalism, authority, responsiveness, creativity, or effectiveness of teachers” (Hidden curriculum, 2014). Although there are significant implications regarding the role of teacher autonomy for PBL, for the purpose of this study educator implementation will be the focus.
Conclusion

The main aim of this literature review was to assess the need for further empirical research on PBL. Current debates from both proponents and critics of PBL would suggest that more research is warranted. Given the limited empirical evidence on PBL, it is hoped that more data will contribute to the overall intellectual conversation on the topic of creating meaningful and sustainable PBL pedagogy. Nevertheless, despite the fact that there have been numerous studies within the subject area of PBL, there is a need for further research. One topic requiring more study is the need for student-centered experiential learning and the importance of ongoing assessments. The next logical step is to examine its effectiveness using the eight essential elements of PBL put forth by the current leaders in the field of PBL: key knowledge & understanding, sustained inquiry, challenging problem or question, critique & revision, authenticity, reflection, voice and choice, and public audience. Within this framework, educators can more fully address and measure the research question of how K-12 educators describe and understand their experience of implementing the 8 essential elements of PBL.
CHAPTER THREE: METHODOLOGY

The purpose of this case study was to examine how K-12 educators at an international school describe and understand their experience of implementing Project-Based Learning (PBL) utilizing the Essential Project Design Elements from the Buck Institute for Education (BIE). PBL is rooted in the constructivist approach, which is the theory that knowledge is socially constructed and that students demonstrate their knowledge through different ways such as problem solving, critical thinking, and questioning. Thus, K-12 educators from an international school in Asia was asked to participate in a case study to describe and identify their understanding and beliefs of PBL implementation. Overall, this case study used qualitative methods within its research design to gather data and address the study’s main research question of how do K-12 educators at an international school describe and understand their experience of implementing the Essential Project Design Elements of PBL.

Setting

The large international school provides an internationally based, non-sectarian, college preparatory, PK-12 curriculum with English as the language of instruction. Currently, it is a private school that caters to the educational needs of over 1,690 students, representing 50 distinct nationalities. An elected twelve-member board consisting of parents governs the school. The Board of Trustees are responsible for developing and approving school policy, overseeing the financial health of the school, setting strategic plans for the future, and recruiting, evaluating, and supporting the Head of School. Established in 1980 to provide a Western-style education to international students, the school strives to meet the demands of the growing and transient international community.
The school offers an academically rigorous, balanced, and engaging learning environment. It also offers a Standards-Based curriculum designed to promote and foster the school’s core values: global mindedness, integrity, respect, balance, service, and creativity. In 1991, it established its first fully accredited program, The International Baccalaureate (IB) Diploma/Certificate Program and was later accredited by three more organizations: the Council of International Schools (CIS), New England Association of Schools and Colleges (NEASC), and NCCT. As a world-class international institution, the school implements Understanding by Design (UbD) as a method for planning, assessing, and reflecting on units. It also uses the 21st Century approach to learning that mirrors the best practices. Project-Based Learning units are embedded in every grade level at the school, which was based on a constructivist philosophy of curriculum, and provides an in-depth study of significant content with the student at the center of learning. PBL units range from two weeks to eight weeks long. Educators at the international school have designed units that include: a driving question, standards assessed, 21st century competencies taught, assessments, student reflection, and products. Since PBL is a key component of the school’s mission and vision, it was necessary to interview a variety of educators in the hopes of understanding how a large international school fosters the implementation of the Essential Project Design Elements amongst its educators.

Participants

Qualitative data from 20 participants was gathered from teachers at each division, as well as from six in-depth interviews with various educators. All participants were selected because of their roles implementing PBL within the school. The participants ranged from veteran to novice teachers, male and female, and encompassed a variety of subject areas (e.g. English Language Arts, Math, Performing Arts, etc.), in hopes of providing the richest and most diverse data.
Moreover, the 20 participants were asked to complete a Unit Design Abstract (APPENDIX C) in order to document the data. From the 20 participants, six teachers were selected to participate in in-depth interviews. During these interviews the participants described and provided documentation on a Project-Based lesson. Each interview was conducted for approximately 35 minutes. Questions focused on how a large international school fosters the implementation of the Essential Project Design Elements amongst its educators (APPENDIX A). The interviews followed a flexible protocol where questions were open-ended and modified in terms of what was added or omitted to each question in order to ensure that ample attention was given to each question or topic. In addition, the sequence of questions was adjusted to accommodate the interviewee as they focused on each pertaining question (Bernard, 2002; Robson, 2002, Thomas, 2014). Furthermore, the interview protocol was piloted and tested prior to data collection.

Volunteer educator participants were selected from a large population of educators from one international school. Participants were a convenience sample, chosen due to their accessibility and availability to partake in the study. Participants were selected at two different stages of the study. At both stages, the selection process of participants was determined by the focus of the research questions of: How do K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL? How do teachers characterize their philosophy of curriculum design? And finally, how do teacher leaders at a large international school implement essential Project-Based Design Elements?

In addition, the selection of participants involved seeking and obtaining permission from participants and gatekeepers at all levels and stages of the study. The selection of educators was also based off of their experience or training with PBL. At stage one of the study, 20 educator participants were asked to complete a “Unit Abstract” (APPENDIX C), which describes their
experience of PBL on the abstract. At stage two, six participants were involve in in-depth interviews lasting approximately 35 minutes following a flexible protocol. Interviewed participants were contacted by email to be introduced to the research topic and to set up appointments for the interviews (APPENDIX E & APPENDIX F). The selection of these six participants was based on the exploration of the research questions. The criteria for selection was as follows:

1. Educators who used PBL for two or more years.
2. Educators who were willing to participate in the study.
3. Educators who attended PBL profession development.
4. Educators who came from diverse backgrounds (Male/Female/Elementary/Middle).

The researcher was able to gain access due to the ability to establish a rapport with both teachers and administrators. Therefore, personal contacts were used to identify educators that met and satisfied the above criteria. Creswell (2012) defines a sample as members of a population, required for the purpose of research and participants as members, who agree to partake in a research study. Participants were selected from a sample size of 193 educators within this international school. Recruitment of volunteer educator participants took place through an email distributed both electronically and via internal school mail. The email (APPENDIX E) explained that the researcher would be conducting a research study to examine how K-12 educators describe and understand their experiences of implementing PBL. If the emailed participants declined from participating in the study another PBL trained participant was selected from the 193-sample size. For the study, all individual teachers were treated the same; in that all 20 participants were asked to complete the Unit Design Abstract which described, documented, and reflected on their understanding and experiences with their prescribed PBL
unit. All 20 participants were notified that there would not be an incentive for their participation (APPENDIX E).

Data

The study was conducted at a large international school containing 193 international educators who were implementing PBL. Three data collection methods were used: interviews, Unit Abstract surveys, and PBL documents/artifacts. Data collection was extensive and drew on multiple methods such as interviews, surveys, artifacts, and documents reviewed from one international school in Asia (Bloomberg & Volpe, 2012). For example, the researcher took notes and audio recordings were collected from the interview data. All interviews were recorded using the computer application software called QuickTime Player. The individual interviews from the educators were stored on the computer then retrieved and transcribed.

The PBL documents and artifacts were taken from the 20 selected educators. Participants were asked to complete a Unit Design Abstract on a PBL unit. Once the Unit Design Abstracts were completed, the researcher was able to follow up with participants to ask additional questions for clarity. The interview participants were also asked to bring in artifacts that supported their unit. The analysis of the artifacts focused on examining and reflecting on their use of the Essential Project Design Elements: Key Knowledge and Understanding & Success Skills, Challenging Problem or Question that drives the focus of the project, Sustained Inquiry, Public Product, Authenticity, Reflection, Voice & Choice, Critique & Revision. However, the collected documents/artifacts varied in the type of information they provided. Nevertheless, these documents aided in verifying the data collected from the interviews. Furthermore, the data was gathered over a course of six months by the researcher following the IRB and Head of School approval.
Analysis

After the collection of data, survey data, notes and recordings were analyzed to determine patterns and consistent responses to capture how educators described and understood their experience of implementing the Essential Project Design Elements. For instance, the researcher compared the data as a whole to each of the variables with the focus on a close analysis of the Unit Design Abstract. Since the interviews were open-ended, the researcher was able to follow a flexible protocol in order to ensure that research questions were addressed (Bernard, 2002; Robson, 2002). Documents were analyzed and carefully reviewed to glean specific thoughts that confirmed or refuted the educator’s pedagogy and its influence on PBL implementation.

Data was analyzed and triangulated through interviews, participant artifacts and document review. After a thorough analysis of the data, the researcher then referred back to prior predictions to form generalizations about the study. Since the researcher had close ties to the school, the researcher needed to ensure that all information obtained was kept free of bias and as objective as possible. Furthermore, because interviews and meetings with participants were transcribed, each of the participants were provided copies of full transcriptions produced from audio recordings. Member checking was utilized as all members had a chance to clarify, add, or omit parts of their transcriptions.

Participant Rights

There were a number of measures taken to maintain anonymity and protect the rights of the participants. Participants were given information about the specific process of the study in a language that was understandable to them. Participants were also given sufficient time to consider their decision to partake in the study. In addition, participants were also informed that they may withdraw from the study at anytime, decline to answer any of the questions asked and
decline to complete any task anytime during the research. Participants were also given a pseudonym for additional protection. The primary ethical concern was the relationship the researcher had with participants. The researcher has close ties to the school; therefore the concerns about bias between both the researcher and the participants were taken into consideration. Although significant measures were taken to protect the identities of all participants, there were some unintended outcomes for participation in the study. In addition, the rigor and the demands of the school may have limited time for the participants who were now tasked to complete additional work. This limitation may have affected the extent to which they responded in their documents and/or artifacts.

Nevertheless, conducting the study produced many impacts and benefits from data collection for stakeholders. For example, the data had the benefit of confirming and/or initiating change practices in terms of how a school implements PBL by taking in account the diverse teaching pedagogies and experiences of its educators. The data also had the benefit of providing an understanding of the relationship between pedagogy and implementation. The study has the potential of influencing school leaders to enact initiatives according to the knowledge and beliefs of their staff and fostering institutional change through Professional Development (PD). Furthermore, assessment of current beliefs can add knowledge for stakeholders to come up with solutions and recommendations for effective PBL implementation despite educational philosophy. With the limited empirical research on PBL, this study addresses the intellectual conversation on the topic of creating meaningful and sustainable PBL pedagogy, and answers the question of how do K-12 educators describe and understand their experience of implementing PBL.
CHAPTER FOUR: RESEARCH FINDINGS

This study sought to capture teachers’ experiences and add to the limited research regarding the implementation of Project-Based Learning (PBL) in private international schools. This chapter describes the findings to the research questions presented in Chapter One and summarizes the responses of the participants within this bounded case study. Through qualitative research, this chapter addresses how Project-Based Learning is implemented by international educators, as well as shares participant attitudes, opinions, and perceptions of Project-Based Learning (PBL). The chapter is organized by the three specific research questions and the findings to each question. The findings will be discussed according to the themes that have emerged from participant responses. Finally, the chapter will conclude by summarizing the findings that appeared collectively from all three questions. The study’s three research questions are as follows:

1. How do K-12 educators at a large international school describe and understand their experience of implementing the Essential Project Design Elements of Project-Based Learning?

2. How does teacher curriculum philosophy align with the principles of Project-Based Learning?

3. How do teacher leaders at a large international school implement essential Project-Based Design Elements?

The results were derived from three resources: a two-page open-ended survey (APPENDIX C) taken from 20 participants who were given pseudonyms, document artifacts of unit plans (APPENDIX H), and six transcribed one-on-one interviews each lasting approximately 35
minutes (APPENDIX G). Overall, the guidelines proposed in the methodology chapter to determine general themes were followed.

Table 1 (below) presents participant profiles. In order to protect his or her identity, each participant was given a pseudonym. The participants were made up of 20 educators, teaching at the same international education institution. There were 10 women and 10 men, who represent various nationalities and come from the following countries: The United States of America, Australia, The United Kingdom, The People’s Republic of China, New Zealand, The Philippines, Canada, and Egypt. While individual participant teaching experience ranges from 3 years to 40 years, the combined years of service at the researched international school ranged from 2 years to 23 years. In terms of curriculum philosophy, nineteen out of twenty—or 95% of participants—identified themselves as embracing Social Constructivism and the Progressivism educational philosophy. In addition, their self-reported training with Project-Based Learning (PBL) ranged from one hour to one hundred hours and the extent of their PBL implementation comprised: 35% beyond compulsory implementation, 50% compulsory implementation, and 15% limited implementation. Compulsory is defined as implementing at least one PBL unit per academic year, beyond compulsory implementation includes educators implementing two or more PBL units per academic year and limited implementation represents no implementation or a project-oriented unit. One of the 20 participants, with the pseudonym of Kelly Washington, describes project-oriented as teaching a number of lessons and having a project at the end.
## Table 1

**Participant Profiles**

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Gender</th>
<th>Division/ Subject Area</th>
<th>Years Teaching</th>
<th>Educational Philosophy</th>
<th>Estimated PBL Training</th>
<th>Extent of PBL Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry Jones</td>
<td>M</td>
<td>Chinese</td>
<td>4</td>
<td>All</td>
<td>100 &quot;hard to calculate&quot;</td>
<td>Beyond compulsory</td>
</tr>
<tr>
<td>Frank Hoffman</td>
<td>M</td>
<td>MS Humanities</td>
<td>12</td>
<td>Progressive constructivism</td>
<td>72 hours</td>
<td>Beyond compulsory</td>
</tr>
<tr>
<td>Kelly Washington</td>
<td>F</td>
<td>7th &amp; 8th Math Facilitator</td>
<td>32</td>
<td>Progressive constructivism</td>
<td>40</td>
<td>Beyond compulsory - &quot;We have written all integrated PBL units&quot;</td>
</tr>
<tr>
<td>Jason Allen</td>
<td>M</td>
<td>Grade 5</td>
<td>8</td>
<td>Progressive constructivism</td>
<td>40</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Jane Morgan</td>
<td>F</td>
<td>5th Grade Homeroom</td>
<td>40</td>
<td>Social constructivism</td>
<td>35 hours</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Christina Cooper</td>
<td>F</td>
<td>Performing Arts</td>
<td>28</td>
<td>Social constructivism, progressive, essentialism</td>
<td>30 hours (3 day workshop)</td>
<td>N/A - Structures &amp; schedules impede beyond compulsory PBL week (aka: week without walls)</td>
</tr>
<tr>
<td>Ella Anderson</td>
<td>F</td>
<td>HS English</td>
<td>21</td>
<td>Progressive constructivism</td>
<td>24 hours</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Maya Martin</td>
<td>F</td>
<td>2nd Grade Homeroom</td>
<td>5.5</td>
<td>Social constructivism &amp; Progressivism</td>
<td>20 hours</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Odis Franklin</td>
<td>M</td>
<td>IB Geography</td>
<td>6</td>
<td>Social constructivism &amp; Progressivism</td>
<td>20 hours</td>
<td>Beyond compulsory - &quot;My Geography course is almost entirely project-based</td>
</tr>
<tr>
<td>Cooper Townsend</td>
<td>M</td>
<td>HS/Science</td>
<td>17</td>
<td>Social constructivism &amp; Progressivism</td>
<td>20</td>
<td>Compulsory</td>
</tr>
<tr>
<td>Name</td>
<td>Gender</td>
<td>Grade</td>
<td>Subject</td>
<td>Design Elements</td>
<td>Hours</td>
<td>Type</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------</td>
<td>--------------------</td>
<td>------------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Charles Henry</td>
<td>M</td>
<td>8th &amp; 9th English</td>
<td>Progressive &amp; Reconstructionism</td>
<td>18-20 hours</td>
<td>Compulsory</td>
<td></td>
</tr>
<tr>
<td>Michael Stevenson</td>
<td>M</td>
<td>6 Grade Humanities</td>
<td>Social constructivism, Perennialist &amp; Progressivism</td>
<td>12 hours</td>
<td>Beyond compulsory</td>
<td></td>
</tr>
<tr>
<td>Hillary Nordberg</td>
<td>F</td>
<td>MS Drama</td>
<td>Social constructivism &amp; Perennials</td>
<td>12 hours</td>
<td>Beyond compulsory</td>
<td></td>
</tr>
<tr>
<td>Valerie Young</td>
<td>F</td>
<td>9-12 Chinese</td>
<td>Essentialism</td>
<td>6 hours</td>
<td>Compulsory</td>
<td></td>
</tr>
<tr>
<td>Justin Lincoln</td>
<td>M</td>
<td>Grade 5</td>
<td>Social constructivism &amp; Progressivism</td>
<td>5-7 hours</td>
<td>Compulsory</td>
<td></td>
</tr>
<tr>
<td>William Knight</td>
<td>M</td>
<td>HS Science</td>
<td>Progressive</td>
<td>3 hours</td>
<td>Beyond compulsory</td>
<td></td>
</tr>
<tr>
<td>Amber Smith</td>
<td>F</td>
<td>HS Math/IB Math</td>
<td>Progressive</td>
<td>2 hours</td>
<td>Limited</td>
<td></td>
</tr>
<tr>
<td>Luke Hughes</td>
<td>M</td>
<td>Chemistry HL/Math</td>
<td>All</td>
<td>1 hour</td>
<td>&quot;I haven't had much experience implementing it, really&quot;</td>
<td></td>
</tr>
<tr>
<td>Stella Ford</td>
<td>F</td>
<td>2nd Grade Homeroom</td>
<td>Progressivism</td>
<td>1 hour</td>
<td>Compulsory</td>
<td></td>
</tr>
<tr>
<td>Shawn Wilson</td>
<td>M</td>
<td>ES Science Integration Specialist</td>
<td>Social constructivism &amp; Progressivism</td>
<td>N/A</td>
<td>Compulsory</td>
<td></td>
</tr>
</tbody>
</table>

Research Question 1

How do K-12 educators at a large international school describe and understand their experience of implementing the Essential Project Design Elements of Project-Based Learning?

Finding 1

Upon collecting data from surveys, interviews, and documented units it was determined that research question one should be divided and addressed in two parts: (1.) How do K-12
educators at a large international school understand their experience of implementing the Essential Project Design Elements of PBL? (2.) How do K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL?

By examining the surveys, transcripts, and audio recordings of the one-on-one interviews, the quotations and phrases that best characterized each participant’s experience were chosen. Part one of the participant understanding of PBL implementation can be illustrated in five themes; thus, educators at a large international school understand PBL implementation as: (a.) Inquiry-Based (b.) Facilitates 21st Century Skills and Authenticity (c.) Engaging (d.) Creates a vehicle for driving learning (f.) Good pedagogy. Table 2 illustrates these five themes.

Table 2

<table>
<thead>
<tr>
<th>Major Theme:</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry-Based</td>
<td>Synonymous with inquiry-based or a frame-to-inquiry</td>
</tr>
<tr>
<td>Facilitates 21st Century Skills and Authenticity</td>
<td>Preparation for the future and aligns with the challenges of the real world</td>
</tr>
<tr>
<td>Engaging</td>
<td>Students are engaged or involved in a PBL unit or project</td>
</tr>
<tr>
<td>Creates a vehicle for driving learning</td>
<td>Vehicle for driving learning</td>
</tr>
<tr>
<td>Good Pedagogy</td>
<td>Alignment with educator’s core philosophy</td>
</tr>
</tbody>
</table>

Theme 1: PBL implementation is understood to be inquiry-based.

The first theme that emerged throughout the surveys and the one-on-one interviews was the idea that participants understood “PBL [to be] synonymous with inquiry-based learning” (J.
When describing the characteristics of the PBL elements used by participants, 45% identified the implementation of inquiry as a key characteristic used in facilitating PBL. In addition, participant Maya Martin supported the idea of inquiry-based learning when she defined PBL in her interview as an approach or way to frame inquiry (M. Martin).

**Theme 2: PBL implementation is understood to facilitate 21st Century Skills and Authenticity.**

The second theme emphasized the need to prepare students for a world of the future by equipping students with authentic ways to demonstrate and acquire 21st century skills such as problem solving, critical thinking and global thinking. As seen with the data, educators understand that PBL draws on the skills that are needed for the 21st century. For example, participant Kelly Washington noted that PBL integrates technology and pulls in the research skills, [standards], while "also doing… collaboration, creativity, technology, and ... communication," (K. Washington). Jason Allen further supported Washington’s understanding of PBL as a chance to align with the challenges of the real world and be authentic. Allen states:

> It values skill development over and above knowledge retention [and] … it’s all to prepare them for life. And I think it's equally important to prepare people to solve conflicts, to collaborate with others, to problem-solve, to reflect, and be self-aware. … It is an educational model that allows for a wide scope of educational results and focuses more on skills…. [to create] positively contributing members of a 21st century global society, in which they can thrive and flourish with the challenges and opportunities that are present now and the challenges and opportunities that we are not yet aware of. [In addition,] it is a chance for the learning to move forward. For learning, that happens in schools and in other areas of life to align with the challenges of the real world in the 21st
In reference to facilitating development of 21st century skills and authenticity, participants also understood PBL to be a guide to identifying problems within the global world. For example, teachers guide students in working toward solutions where both students and teachers discover that sometimes these solutions may take them in different directions. Therefore, noting that their experience may be different from their peers. William Knight characterized this idea when he explained to the researcher his thoughts about PBL.

Project-Based Learning is, you give them an overall theme, and the students basically pick up and run with it in whichever direction that they find they're going in. Or whichever direction they would like to go in. That means that you're going to have 20 students not doing the same thing and not getting the same experience. They are going to get different experiences. (W. Knight)

Simply put, educators understand that PBL is a teaching methodology that prepares students for future solutions where the results may differ according to the authentic task.

**Theme 3: PBL implementation is understood to promote engagement.**

Schools implement what the Buck Institute for Education (BIE), a leader in PBL pedagogy, identifies as the eight key essential characteristics of PBL: *Key Knowledge, Understanding and Success Skills; Challenging Problem or Question; Sustained Inquiry; Critique & Revision; Authenticity; Reflection; Student Voice & Choice; and Public Product.* Nevertheless, these eight essential elements explore ways that educators have sought out opportunities to engage students. Although engagement is not one of the eight essential design elements of PBL, a theme that continued to be expressed by participants and how they understood PBL, is that it promoted student engagement in learning, Martin noted that, in her
PBL units, her students were completely engaged. She further noted that through this engagement, students demonstrated the understanding that she, as the teacher, was trying to achieve.

**Theme 4: PBL implementation is understood to be a vehicle for driving learning.**

As presented in the literature review, PBL is supported by the constructivist theory: the idea that individuals construct and build artifacts, which are personal and meaningful and can be shared with others. Overall, this construction of knowledge is a vehicle for driving learning, which can be understood as creating and developing one’s knowledge (K. Washington). Participant Frank Hoffman emphasized this theme when he stated, “It's just a method of using projects to drive learning, I would say. Project-driven learning” (F. Hoffman). Washington also supports this theme in that “PBL gives the [students] more voice and choice, [and] as a result they become responsible, confident, independent, and more competent drivers of their own education. So that sense of independence and self-direction is a huge opportunity [for students in PBL settings]” (K. Washington).

**Theme 5: PBL implementation is understood to be good pedagogy**

The final theme illustrates how PBL implementation is connected to the participants’ personal philosophy and what participants understood to be good pedagogy. The connection to the participants’ personal philosophy is referenced here, but the details will be further discussed and addressed in the findings to research question two. Nevertheless, participant Knight discusses PBL and its links to the school’s current science and engineering standards. For example, as Knight mentions that PBL is a lot of the engineering and science philosophy, which can be identified in the Next Generation Science Standards (NGSS) and what others have understood to be good pedagogy. Martin also justifies this point by stating, "PBL just seems to
be, to me, tied in to what good teaching is ...and that's what good pedagogy is” (M. Martin).

Part two of research question one relates to how the participants describe their success and challenges of PBL implementation. The following table illustrates themes of how participants describe their success in question number seven of the interview (APPENDIX A) and question number six of the open-ended survey (APPENDIX C). Themes of how educators describe their challenges will be discussed further in the chapter.

Table 3

Themes in educators’ description of success with PBL

<table>
<thead>
<tr>
<th>Major Theme Found in Success</th>
<th>Elements</th>
</tr>
</thead>
</table>
| Student Engagement          | • Allows students to engage in the real world outside of school  
                             | • Students are engaged in projects  
                             | • Students and teachers find projects fun |
| Trans-disciplinary skills and knowledge | • “For the most part the learning shows a deep conceptual understanding and development of enduring, trans-disciplinary knowledge and skills which the students feel confident in being able to transfer to a wide variety of situations” (J. Allen) |
| Assessment Data             | • According to a participant, in classrooms where PBL was beyond compulsory (as seen within this case study), external assessment data demonstrated that students have outperformed peers in non-PBL settings |
| Parent Feedback             | • Parent surveys demonstrate satisfaction with PBL projects and parents are more engaged in the skills. “Parent satisfaction rate through surveys”  
                             | • Sending younger siblings to PBL settings over more traditional settings |

Success in implementation of PBL

K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL with both success and challenges. In discussion of
PBL implementation success (Table 3), participants indicated that (1.) Student Engagement, (2.) Trans-disciplinary skills and knowledge (3.) External Assessment Data, and (4.) Parent feedback were self-identified and noted as indicators of participant success.

**Student Engagement**

The first success mentioned by more than half of the interviewed participants included the repeated theme of student engagement, which was also discussed previously (Table 2) in the participants’ understanding of PBL implementation. Kelly Washington, a participant that has been teaching for 32 years, describes her implementation of PBL as fun for both the teacher and student. "They like it and they're engaged, and it's fun to teach and to watch them learn, especially when you get to the exhibitions and you feel how excited they are and how passionate they are about what they did" (K. Washington). Washington then continues, “And then, it's just fun, which I think is a good thing" (K. Washington). Allen further emphasizes this point by stating, “Once you have a group of trained students and you have them working in the inquiry-based process [of PBL], it then becomes an easier, more joyful job as a teacher…[because] once the projects are off the ground, it’s a fun job to get involved in” (J. Allen). Similarly, Valarie Young, a language teacher, described her success with students engaged in their projects by stating that,

> The authenticity of the project was challenging and engaging for students. They enjoyed the whole process and the experiences they had for learning both [the] Chinese language and Chinese culture. I think it was a comprehensive and inspiring learning experience for students. (V. Young)

**Trans-disciplinary skills and knowledge**

Participants also describe their success of delivering PBL experiences through trans-
disciplinary skills. These skills include problem solving, critical and analytic thinking, collaboration, and innovation. Participants like Allen noticed that the skills that students acquire through their PBL experience, they are able to apply and transfer those skills in a variety of disciplines. “For the most part the learning shows a deep conceptual understanding and development of enduring, trans-disciplinary knowledge and skills which the students feel confident in being able to transfer to a wide variety of situations” (J. Allen). Similarly, participants like Hoffman believe that, “... Projects are a perfect structure in doing that” (F. Hoffman). For example, Hoffman asserts that…

The implications that [trans-disciplinary skills] have for students in being able to guide them in helping them to identify problems... whether that's within their school, ...their community, [or] whether that's in the whole global world. [Students are] ... able to find those problems and ...understand those problems and really work on the solutions...I believe that having a structure of Project-Based Learning basically allows for these opportunities and allows teachers to engage kids in the real world outside of school. And then the implications for what problems we are able to find, and what problems we are able to solve are just enormous. (F. Hoffman)

**Assessment Data**

In the classes where PBL has been implemented beyond the compulsory expectation particularly within the academy located at the research site where teachers have been given the freedom of structure in schedules and space, participants described success as displayed in external assessments. For instance, Washington stated that with two years of MAP (Measures of Academic Progress) data behind them, "MAP data show[s] that we're doing as well or better than the regular classrooms" (K. Washington). Washington’s description of her experience with
implementing PBL is contrary to the findings mentioned in the literature review on the study of the Department of Education in West Virginia, where they noted that students in non-PBL settings performed the same or outperformed their peers in PBL settings.

**Parent Feedback**

In the final theme of success, participants indicate that flexibility and positive student and parent feedback from surveys at the end of project units demonstrated success. “I find the success to be with parents as well. Parents are more engaged in the skills that students acquire” (K. Washington). Another example where parents have given implicit positive feedback is illustrated where some families are enrolling and sending younger siblings to the PBL academy within the school as opposed to the regular program that is offered by the school.

Although the above themes have been indicated and expressed by participants, some noted that success with PBL fluctuates. For instance, Hoffman declared that,

… What I've found is, the more you try to complicate a project, the more chances it's not going to succeed. And by that I mean the more you try to infuse into your project, the more you try to add on - extra assessments and extra standards…, extra things you're going to teach the kids, that really aren't necessarily organic and naturally a part of the project - that's where you find it not doing so well. (F. Hoffman)

Still, this is one of the challenges that educators face when they describe their experience of implementing PBL.

Nevertheless, K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL with both success and challenges. In discussion of PBL implementation, participants indicated that (1.) Balancing Curriculum and Covering Standards, (2.) Support, (3.) Time, and (4.) Engagement with the Paradigm Shift were
self-identified and noted as indicators of participants’ challenges. Table 4 represents the challenges that participants faced when describing the implementation of PBL.

Table 4

*Themes in educators’ description of challenges with PBL*

<table>
<thead>
<tr>
<th>Themes in Challenges</th>
<th>Sub-Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balancing Curriculum</strong></td>
<td>1. Teachers and schools are asked to/adopting more programs (teacher autonomy)</td>
</tr>
<tr>
<td></td>
<td>2. Changes to standards/curriculum</td>
</tr>
<tr>
<td><strong>Support</strong></td>
<td>1. Training and Solid Understanding PBL</td>
</tr>
<tr>
<td></td>
<td>2. Team vs. Individual Adoption of PBL</td>
</tr>
<tr>
<td></td>
<td>3. Administrator Support</td>
</tr>
<tr>
<td></td>
<td>4. Parent Support</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>1. Planning</td>
</tr>
<tr>
<td></td>
<td>2. Reflection</td>
</tr>
<tr>
<td></td>
<td>3. “Not enough time… to engage students in meaningful inquiry”.</td>
</tr>
<tr>
<td><strong>Engagement with the Paradigm Shift</strong></td>
<td>1. Parents</td>
</tr>
<tr>
<td></td>
<td>2. Teachers</td>
</tr>
</tbody>
</table>

**Challenges in implementation of PBL**

In Chapter One, Hallermann (2011), a leader in PBL pedagogy, stated that if PBL is implemented for the wrong reasons or if it is done incorrectly, PBL could be a waste of time or even backfire on the educators whom are unprepared for its challenges. In this section, educators at an international school describe the challenges that they experience when implementing PBL. The majority of participants discussed the pressures of time, balancing the curriculum, the need for support through teacher training, structures and physical space, administrators, and parents and engagement with the paradigm shift as challenges they face in their experience with the implementation of PBL.

**Balancing Curriculum**

The first challenge educators experience when implementing PBL is the task of balancing the curriculum. At the research site educators are faced with the tasks of covering the curriculum
standards adopted by the school or district as well as implement and foster the principles and elements of PBL project design. The challenge, as indicated by participants, lies in the idea that not every standard that is required can fit within the framework of a project. Therefore, the educator is faced with the task of striking a balance with the curriculum and creating an authentic PBL experience for students. “If you're going to go to Project-Based Learning, get rid of a curriculum,… [then]…what you get out of PBL is the curiosity and exploration and trying without any constraints” (W. Knight). An additional challenge noted by Maya Martin, an elementary teacher, is the challenge to horizontally and vertically align content, therefore, the challenges she reports with the implementation of PBL are:

We're being asked to do more and more programs at school and if you've got set programs and you're expected to be doing set lessons, which are not integrated, then it's a huge conflict with PBL…. The biggest challenge with this school is, there's been so many changes to the curriculum and changes of one subject area at a time. As you know with PBL, basically it's an integrated project. So when one standard changes, it kind of affects what the whole project is and the whole design, so we keep putting a lot of effort into designing and resigning projects. And then the goals keep changing every year and so then that makes anything that you've done worthless. (M. Martin)

Knight further adds to Martin’s argument by stating that,

Trying to keep it towards a curriculum is the hardest part, and where to fit in content where it's relevant, that takes experience. We've only been doing it for two years, and we haven't nailed the course down. It's continually changing and evolving. (W. Knight)

He added that another dilemma for teachers implementing PBL is preparing students for content-based exams, specifically external content-based exams within the IB and AP programs in the
high school. Thus, participants discuss that implementing PBL becomes a challenge in subject areas or courses where these exams are emphasized.

**Support**

Participants like Frank Hoffman described the need for support as a challenge. Hoffman indicates that there is a three-prong challenge with PBL, “Administrators saying do PBL [but to do this, the vision from the top has to be clear], standardization to receive high marks on a test, and training” (F. Hoffman). The following sub-sections address the challenges and the need of support in the form of administrators, training and structure.

**Administrators**

More than fifty percent of the participants identified school administrators as a challenge that impedes the implementation of PBL. For example, Hoffman, Washington, and Allen all contend that, “Schools have not caught on to … [PBL], because it comes down to school leadership” (F. Hoffman). Likewise, Washington affirmed the need for “support from administration to bring in outside consultants and experts, [and the ability to] have field trips can be limiting factors if you don't have that support from your admin[istrators]” (K. Washington). Furthermore, Washington continues by stating that “…Flexible space, an administration that supports you, parent understanding and support” can aid in the implementation of PBL. Another way that participants emphasize support with the implementation of PBL is by working with support teams, because as Washington states, "Teachers who are trying to do PBL all by themselves, I think that's challenging. It's hard to have kids have a lot of voice and choice when you're by yourself in a classroom" (K. Washington). Participants further discussed the challenge and the need for accountability from school leaders to take place because participants note that schools can benefit by “holding educators accountable with [the creation of] a good driving
question in a good compelling project” (J. Allen). Therefore, without support and accountability, participants note that PBL is difficult to plan and enact.

**Training**

Another challenge for support that educator participants emphasized was the need for more PBL training also known as Professional Development (PD), which were highlighted by Young, Martin, and Hoffman: “PBL is not easy to adopt” (V. Young).

[Teachers] need more PD, but it needs to be considered about how they're given PD. .... I think people have been exposed to [PD] and had the one-offs PDs on it given by people at school. But after three years of that, it's still clearly not sinking in for some people and it's still not actually being embedded into their practice. Our current model of PD so far doesn't seem to be taking off. (M. Martin)

Nevertheless, participants like Hoffman have come up with an explanation for why the current model of PD does not seem to be taking off when he states that, “Training is key, but the problem with a lot of PD's …there's no central strategy for delivery” (F. Hoffman). Overall, educators like Young are interested in more training and learning more about PBL, “I’m pretty interested in PBL, but I do not feel I have been learning that much yet about PBL, and I want to know how schools like our school are doing PBL for the best learning for our students” (V. Young).

**Space, structures and resources**

Lastly, participants indicate that the need for support in the areas of space, structures and resources have become a challenge when implementing PBL. As defined in Chapter One, PBL is a “teaching methodology that utilizes student-centered projects to facilitate student learning…” (Holm, 2011, p.1). This utilization of student-centered projects have also called upon school
leaders to rethink their schedules, space, and resources. For example, PBL classrooms require flexibility in space for collaborative meetings, conferencing as well as individual work. In addition, these structures often require furniture that can be moved and rearranged, tables for collaboration, ample technology, and structural scheduling that is interdisciplinary and mimics the real world. These kinds of support become the challenge as noted by Washington, “creating space and structures that work [such as flexible scheduling and groupings or teaming with a group of educators] is a challenge” (K. Washington).

**Time**

Time is a challenge that impacts PBL implementation. For instance, participants such as Allen and Martin note that there is “Not enough time… to engage students in meaningful inquiry”. By time, these participants mean time to plan individually, time to plan with others, and then time to reflect upon it (M. Martin). Knight further adds to Allen and Martin’s point by stating, “But you don't see that time that's been put into it and that's the hard thing….” (W. Knight) in reference to exemplary PBL units or schools where PBL appears to be implemented successfully. Another challenge herein is with the amount of time in the day to allow for flexibility with the schedule. For example, Washington notes creating “flexibility in the schedule is a big thing … [and within the academy at the school] we reinvent and recreate our schedule according to what we're doing, rather than make what we're doing fit the schedule” (K. Washington). Although Washington and her team, have been given the opportunity to create flexible schedules within the PBL academy, they too realize the challenge that others particularly outside of the academy face when they do not have the time or the means to create flexible schedules.
Engagement with the Paradigm Shift

The fourth and final challenge with implementing PBL is the challenge of what Allen describes as the “Paradigm Shift”. “Engagement with the Paradigm Shift” is to get parents, teachers, and policy makers to rethink how education has shifted and is currently valued in the 21st century.

Allen expresses this challenge by noting that, however, there are barriers in place in terms of the curriculum, in terms of parental expectations of education, and different philosophies of education coming from all levels at the school, that mean[s] that a lot of what I do is embedded in traditional methods and where possible we do work towards PBL. (J. Allen)

Allen continues to share his thoughts about the paradigm shift,

So the challenges are this paradigm shift [for] parents, it’s different from what parents have experienced in their education… It’s different from how a lot of teachers have been trained or what teachers are used to teaching [or] in the manner they’re used to teaching. [The challenge is] to get people to believe that it’s valuable and it works, and to get these teachers, and parents of students to be able to engage in the process positively, successfully. (J. Allen)

Knight furthers Allen’s point when he discusses how parents’ view of education hinders the ability to fully implement PBL in schools.

Parents don't see-- the great things about school is everybody's been to it, so they have their own opinions and parents think that schools should be like what they did. It was good enough for them, it's good enough for their kids. (W. Knight).

Parent expectations is a key challenge that impacts implementation and is noted in schools where
Another challenge rests not only with parents, but also as Martin mentions, with teachers. Participant Martin discusses how teachers must buy-in by saying, "Unless you [teachers] have that solid understanding, then you can't bring it into the classroom. Because even if [teachers] design units based around PBL, I can hear or see that people aren't teaching it in that way," (M. Martin). In addition, the shift from a “Teacher Centered” form of education to a “Student Centered” form of education for example, as Washington expresses is "Letting [students] have more control, letting go of always knowing where you're going next is sometimes a challenge” (K. Washington”). Lastly, the challenge with the paradigm shift as noted by participants, is getting buy-in from schools. Hoffman notes, “[Schools] They're just not ready for reshifting schedules, reorganizing all their curriculum, starting pilot programs, like deciding they're going to have a big exhibition day, I think schools are ready for baby steps” (F. Hoffman). Lastly, despite the challenges of buy-in, the participants still note the benefits. “The benefits of project-based learning is that it moves away from making exam scores, and rankings, and points the end goal and the purpose of our education. Project-based or inquiry learning changes our goal of education” (J. Allen).

**Research Question 2**

**How does teacher curriculum philosophy align with the principles of Project-Based Learning?**

**Findings 2**

Although, teachers are known to hold some divergent fundamental principles about what they believe education should be, PBL aligns with 95% of participants’ curriculum philosophy in that they identify as social constructivist which focuses on building knowledge through social
interactions with others and progressivism which emphasizes learning by doing with roots in experience. For example, Washington notes that it aligns because teachers have come to see the importance of student engagement and the need for 21st century skills. Hoffman furthers this point,

But the biggest reason for me why it aligns is because, I think it's the way in which we learn. It aligns basically with [what] I think the way kids and people learn best. I think people learn best when there is a clear objective. It's not necessarily tied to a test, but actually tied to a real-world outcome… (F. Hoffman)

Martin also furthers Hoffman and Washington’s points when she states,

I think it definitely [aligns with my curriculum philosophy] because I believe that education is really all about preparing students for life and what's there to come. And we don't even know what is to come, and so it's not just about giving them content. But it's really about building skills and ... giving them the skills they need to be able to solve problems and learn. (M. Martin)

PBL aligns with Martin’s view because according to Martin she states,

I learned about inquiry from the get-go from my first training and then I learnt about PBL fairly early on in my teaching career, while I was still kind of developing my identity as a teacher. It's merged into my overall teaching philosophy because they're both developing at the same time. (M. Martin)

Allen also notes, I’ve naturally assimilated myself to it. It seems to somehow implicitly make sense to me… and it feels to me like … quite a strong movement towards this. To coin the term paradigm shift in education. It definitely aligns with the way I think, although, I’m very aware of the difficulties in it, particularly in moving forward. And I
don’t think it’s something that can ever just happen overnight. We can look at it like a
spectrum we’re working towards. … But I certainly believe the skills that I developed
through the PBL tasks and inquiry-based learning tasks are something that has stayed
with me [in my teaching]. (J. Allen)

Young, a language teacher also notes,

I think it’s closely aligned with PBL because we value the authenticity and the experience
of learning for students when they are learning this language's culture. And it will also
encourage them to think and to ask questions, which is more like the inquiry part, to do
their learning. Also, if they are living in a new community with a new language, a new
culture, they need to solve [a] lot of problems. They need to do the problem solving, and
have that skill to solve the problems so that's, I think, in general line with this PBL. (V.
Young)

Table 5

Teacher self-identified curriculum philosophy and PBL alignment percentage

<table>
<thead>
<tr>
<th>Curriculum Philosophy</th>
<th>Participant self-identified percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Constructivism: Focuses on building</td>
<td>45%</td>
</tr>
<tr>
<td>knowledge through social interactions with others</td>
<td></td>
</tr>
<tr>
<td>Behaviorism: Focuses on environmental factors that</td>
<td>0%</td>
</tr>
<tr>
<td>influence the reinforcement or punishment of behaviors</td>
<td></td>
</tr>
<tr>
<td>Perennalist: Emphasis on principles and personal</td>
<td>2%</td>
</tr>
<tr>
<td>development</td>
<td></td>
</tr>
<tr>
<td>Essentialism: Fact based education that focuses on the</td>
<td>2%</td>
</tr>
<tr>
<td>essential skills</td>
<td></td>
</tr>
<tr>
<td>Progressivism: Emphasis on learning by doing with</td>
<td>50%</td>
</tr>
<tr>
<td>roots in experience</td>
<td></td>
</tr>
<tr>
<td>Other: Reconstructionism</td>
<td>1%</td>
</tr>
</tbody>
</table>
Research Question 3

How do teacher leaders at a large international school implement essential Project-Based Design Elements?

Findings 3

The following findings describe how teacher leaders implement the PBL design elements of Key Knowledge, Inquiry, Challenging Problem, Reflection, Voice & Choice, Critique & Revision, and Public Product at a large international school. Teacher leaders are described as teachers who have taken on leadership roles and other professional responsibilities. Teacher leaders describe team planning, seeking feedback through surveys, incorporating PBL design elements, allowing time, continuing professional development, and making PBL the central focus in schools are how they seek to implement PBL.

Table 6

Themes in teacher leaders’ description of how they implement PBL design elements

<table>
<thead>
<tr>
<th>Major Themes Self Identified by Teacher Leaders</th>
<th>Elements</th>
</tr>
</thead>
</table>
| **Team Planning**                             | • Collaborating with Colleagues  
|                                               | • Sharing current practices of PBL with others  
|                                               | • Designating time to plan  |
| **Seeking Feedback Through Surveys**          | • Seeking the input of all stakeholders (students, parents and teachers)  |
| **Incorporating PBL Design Elements**         | • Incorporating the recommended BIE design elements of Key Knowledge, Inquiry, Challenging Problem, Reflection, Voice & Choice, Critique & Revision, and Public Product in PBL  |
| **Allowing Time**                             | • Providing time for reflection and practice  |
| **Continuing Professional Development**       | • Continuous follow up and follow through with PBL training and learning for all  |
| **Making PBL a Central Focus**                | • All initiatives and training happen through the lens of PBL. For example: If a school looks at assessment, it examines assessment practices through the lens of PBL, etc.  |
The teacher leaders describe planning as a team as one of the ways that they implement PBL. For example, Young states in her interview the importance of planning and “Shar[ing] what we are currently doing with PBL, and I think that this is … a very practical way of learning from each other” (V. Young). Washington further discusses the process of working and planning as a team: "we work as a team to create a variety of activities and opportunities for the kids"[and]"...when we design the units, [and] we try to pull in elements or aspects that are really relevant to our kids" (K. Washington). " [For instance, we] Do a lot research... [and] spend a lot of time at the beginning, ... looking at the grade level standards", therefore examining the best [way] to deliver them” (K. Washington). In addition to planning, teacher leaders, like Washington and Young also understand the importance of striking a balance with the curriculum content in places where PBL units do not fit. Washington and her team allow for time within the schedule for stand-alone blocks for those units that do not naturally fit. This is illustrated when she states that educators have to have the willingness to trail and toss often, "Resisting the urge to try to make everything fit, because you can't force them" (K. Washington). Similarly, Young implements PBL in existing units where there is a nice fit. Therefore, Young notes that her team will not look into incorporating PBL in units where implementing PBL presents a challenge because it is not an easy fit. (V. Young).

In addition, teacher leaders describe incorporating elements of the Buck Institute for Education’s (BIE) PBL design elements within their units as a way to apply PBL. For example, elements of voice & choice, reflection, driving question, and inquiry were mentioned as elements of PBL that teachers implement with ease. Participants, such as Martin and Allen, noted that these elements are easy to implement and they are what teachers note as “just good pedagogy” (M. Martin). Participants also note that when applicable they try to incorporate elements that do
not come so natural like authenticity, therefore nurturing the understanding that you "can't get all the standards into project based units in a way that makes sense," (K. Washington).

Taking the time to continuously develop oneself professionally is another way that teacher leaders implement PBL,

So I focus on challenging myself to come up with ways to engage students in inquiry. I've focused on training students to be able to engage in the inquiry process and build the skills. I've at times tried to share [my] practice. And, personally, I do read a lot to do with the inquiry-based learning, [and] Project-Based Learning to try and improve myself [with] … continued professional development, over and over again. (J. Allen)

Finally, participants like Hoffman describe how they implement PBL as making it a focus in schools.

If a school is determined that Project-Based Learning is going to be its big focus, I don't think it can be one of 10, or 15 focuses. To be honest, I think if a school's going to go Project-Based Learning, they've got to say that's going to be our major focus and our PD's whether it's differentiation, whether it's testing, assessments or standards based grading, we are going to look at how do we do that in a Project-Based Learning environment. But in terms of the work I do now, in terms of implementation, is I believe much more far-reaching in terms of the effects that Project-Based Learning can have on kids. Because basically, I lead workshops with teachers. … So I would say on the implementation side, I think it's-- it serves a far-- I feel like I serve a far greater purpose, in helping to implement Project-Based Learning in different schools, by really equipping teachers to really feel confident and comfortable in delivering and guiding these experiences for their students. (F. Hoffman)
Summary of Research Findings

This chapter presented responses of the 20 participants, established themes and summarized the key findings to three research questions presented throughout the study. Overall, this chapter used open-ended surveys, one-on-one interviews, and documented unit plans as data to summarize the findings. Although the study found that K-12 educators at a large international school described their experience of implementing PBL as fluctuating in its success and challenges, participants understood their implementation of PBL to be fun, engaging, good pedagogy, and a paradigm shift in education. When analyzing how does teacher curriculum philosophy align with the principles of PBL, the data revealed that 95% of participants identified social constructivism and progressivism as their curriculum philosophy and stated that PBL aligns with their curriculum philosophy in that knowledge is socially constructed, learning is experienced and student centered. Nevertheless, this chapter answered the three research questions of PBL implementation and discussed how educators' curriculum philosophy aligns with the principles of PBL. The next chapter will summarize the entire study, interpret the findings, present recommendations and implications for future research and draw conclusions.
CHAPTER FIVE: CONCLUSION

This qualitative case study documents teachers’ perceptions and understandings of Project Based Learning (PBL) in a K-12 international school in Asia. This chapter presents an overview of the study, interprets the findings from the data presented in Chapter Four, discusses the implications and offers recommendations for future research.

Review of the Research Study

The continued use of a traditional model of education for today’s students has presented an additional challenge of disengagement. In an era of high stakes standardized testing, students are often left unsatisfied and disengaged with the process of learning, and policy makers and educators have looked for ways to remedy these problems (Fredricks, 2011). Project-Based Learning (PBL), a growing teaching methodology, is designed to make learning meaningful and engaging. Through PBL students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question or problem (Buck Institute for Education, 2014). Despite the benefits of PBL, proponents and opponents of PBL cannot seem to agree on the effectiveness of its implementation.

Purpose, Significance and Design of the Study

The purpose of this qualitative study was to describe K-12 educators’ experience with PBL at a large international school, understand the extent in which teacher curriculum philosophy align with the principles of Project-Based Learning and examine how teacher leaders at a large international school implement essential Project-Based Design Elements. In this study educator participants shared their attitudes, opinions, perceptions of Project-Based Learning (PBL) as well as addressed both the success’ and challenges to PBL implementation in an effort to bring additional clarity to this wide spread debate regarding the effectiveness of Project-Based
Learning. Overall, this study added to the understanding of how Project-Based Learning is implemented and the effects of its implementation and it further added to the limited research regarding PBL implementation in private international schools.

**Research Questions**

The research study highlights findings from the three research questions below.

1. How do K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL?

2. How does teacher curriculum philosophy align with the principles of Project-Based Learning?

3. How do teacher leaders at a large international school implement essential Project-Based Design Elements?

The design of this qualitative case study was extensive and drew on multiple methods such as interviews, *Unit Abstract* surveys, artifacts, and documents from 20 educator participants in one international school in Asia containing 193 international educators who were implementing PBL (Bloomberg & Volpe, 2012). The conceptual foundations of this topic are also important when considering the connections and implications of the findings and recommendations.

**Conceptual Framework**

The conceptual framework that informed this study included constructivism, specifically theories that supported the social constructivist curriculum philosophy. The literature review discussed how Project-Based Learning is rooted in the theory of constructivist approaches to teaching and learning, where knowledge is socially constructed and students demonstrate their knowledge through different ways such as problem solving, critical thinking, and questioning. In addition, this concept helped to explain why topics like PBL are appropriate, rigorous and matter
(Ravitch & Riggons, 2012). The conceptual framework demonstrated that effective PBL implementation requires the adoption of a constructivist approach to student learning. With this approach teachers are able to strike a balance between student control and teacher control. Teachers are also comfortable with implementing student-centered pedagogies. In addition, teachers are able to tolerate ambiguity and flexibility in a student-centered environment (Tamim & Grant, 2013). Although, research indicated that the adoption of a constructivist approach aides in fostering effective PBL implementation, however in this study, successful experiences with PBL rest in the depth and quality of an educators’ experience with the implementation of PBL.

**Discussion of Findings**

To provide an in-depth analysis, conclusions regarding all research questions were drawn. The data in this study suggested that *K-12 educators at a large international school describe their experience of implementing the Essential Project Design Elements of PBL in five themes as:* (a.) Inquiry-Based (b.) Facilitates 21st Century Skills and Authenticity (c.) Engaging (d.) Creates a vehicle for driving learning and (f.) Good pedagogy.

The data also revealed both the successes and challenges K-12 educators at a large international school experienced when implementing the Essential Project Design Elements of PBL. It was concluded that (1.) Student Engagement, (2.) Trans-disciplinary skills and knowledge (3.) External Assessment Data, and (4.) Parent feedback were self-identified and noted as indicators of participant success. In terms of challenges, the majority of participants discussed the pressures of time, balancing the curriculum, the need for support through teacher training, structures and physical space, administrators, parents and engagement with the paradigm shift as challenges they face in their experience with the implementation of PBL. The
challenges experienced by participants at this site were also supported by the research discussed in the literature review regarding poor implementation practices. These practices include:

- Strictly adhering to and/or covering the curriculum on a fixed schedule (Snyder & Snyder, 2008)
- Failure to develop and foster a collaborative environment
- A lack of skills needed to orchestrate several elements of managing a project
- A lack of clear expectations and limited assessments (PBL requires a multifaceted assessment, such as performance assessments, portfolios, weekly reports, self-assessments, written journals, etc.) (Tammin & Grant, 2013).

Consequently, the research and data at this site made it clear that when educators use poor implementation techniques and or practices, PBL is seen as a challenge for educators to apply within their classrooms and ultimately difficult to enact (Hallermann, 2011, p. v).

Surprisingly, despite these challenges ninety-five percent of educators within this study identified with the parallel philosophy of social constructivist and progressivism, in which their philosophy fell in line with the principles of PBL. In addition, the overall positive reactions to PBL and the strong connection with educator’s curriculum beliefs supports the strong connections of Vygotsky and Piaget’s theory of social construction mentioned in Chapter Two of the literature review. According to the data it is suggested that an educator’s curriculum philosophy as a social constructivist and progressivist helps to shape their openness to the adaptation of PBL.

Furthermore, teacher leaders described team planning, seeking feedback through surveys, integrating standards that make for an easier transition to PBL, incorporating PBL design
elements, allowing time, continuing professional development, and making PBL the central focus in schools as how they seek to implement PBL at this large international school.

**Implications for Actions**

Although this study looked specifically at one international school, the experiences in this school relates to the larger body of literature, knowledge and practice in the field of education and can assist other schools wishing to implement PBL. Based on the findings from this research and the literature review in Chapter Two, schools should consider the following:

- A central strategy for the delivery of PBL is essential
- Successful practices of the implementation of PBL can be seen in circumstances where PBL has been implemented with fidelity
- Standards are reviewed through the lens of PBL
- The documentation of gaps in PBL implementation should be identified and examined
- PBL is beneficial in situations where teachers are supported by a team, given the time, freedom and space to implement a project
- In-depth professional development and continuous follow-up on PBL is vital for the prevention of poor implementation with PBL
- The development of a school-wide philosophy of social constructivism for student centered learning
- Model and seek out new strategies that pull students in their appropriate direction
- Act with courage and conviction to bring about the collective promise of education that creates a more equable future for all children.
Overall, these implications for successful PBL involve the use of transformative practices and learning. These practices ask questions about the purpose of school, in an effort to challenge educators to actively prepare students for the 21st Century.

**Recommendations for Further Study**

The goals of this study were to add to the knowledge of the ongoing debate regarding the implementation of PBL, address the research question of how do K-12 educators at a large international school describe and understand their experience of implementing PBL, and recommend the continued advancement of PBL research. The following presents recommendations for the ways that this study can be improved upon and offers a discussion on how future studies might contribute to the field.

- Study the fidelity of implementation
- Observe the procedures of PBL that may lead to various interpretations of PBL or foster ambiguity
- Examine what happens when schools hold educators accountable to PBL
- Follow up on the challenges that were mentioned by participants presented in Chapter Four
- Solicit educators’ insights to support successful PBL implementation
- Consider effective and successful models of PBL implementation and how PBL can become a central focus in schools
- Evaluate educators’ experience with PBL by asking participants to place themselves along a continuum of PBL
Focus to a larger extent on the key characteristics and design elements of PBL as a methodology in all data sets (e.g. interviews, surveys, and documents) to effectively gather data.

**Conclusion**

Although engagement still remains a challenge for PBL and non-PBL schools, schools that seek to effectively implement PBL are one step closer to fostering the skills that are needed to compete in the 21st Century in order to prepare students for the possibilities of the future. In this study, some participants might have seen themselves as progressive, but that self-characterization may not align with what they actually do in the teaching setting. For example, the course or discipline seemed to limit teachers’ capacity to implement PBL. Despite the outcomes of PBL implementation, educators must do what they can to challenge the 150-year-old system and create conditions under which all students can learn and benefit. It can also be concluded that although site participants that struggled with implementation still expressed a positive view of PBL, and that in practice it is difficult to implement due to the external factors that sometimes go beyond the educator’s control. These factors include balancing the curriculum, training, structures and engagement with the paradigm shift. Simply put, for individual educators to implement PBL it takes a team and not just a vision. The differences between this study and previous studies are that most studies were correlational studies that measured student performance in PBL and Non-PBL settings. By conducting this study, both the national and international communities are informed with more empirical evidence regarding the implementation of PBL. This research revealed that when implemented correctly, PBL can be effective and engaging, however, when faced with the challenges of balancing a curriculum and the lack of PBL support, PBL appears to fall short of the goal. Overall, educators and school
leaders need to remember that the ultimate goal of education is to lead to sustained-transferable learning, and this is what progressive teaching methodologies like PBL are designed to do.
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APPENDIX A: EDUCATOR INTERVIEW QUESTIONS

Please remind participants that names and answers to questions will not be identified.

1. What is PBL?
2. How many projects have you built using the PBL pedagogy?
3. Does your philosophy align with the principles of Project-Based Learning? Why or why not?
4. Can you as a learner reflect on times when you have been exposed to PBL as a student (ES, MS, HS)?
   a. 3a. What do you recall from that experience that you are using to design your units?
5. How do you apply PBL within your classroom?
6. What efforts have you made to implement PBL?
   6a. (If necessary) How do you foster the implementation of PBL?
7. How do you describe your success of implementing PBL?
   7a. What are the greatest opportunities for learning with PBL?
8. What are some of the challenges you face with implementation?
9. What could potentially hinder your ability to implement PBL?
10. To what extent is there a need for more training or professional development (PD)?
11. Why do you believe schools struggle with adopting a PBL approach to learning?
12. Is there anything that you would like to add or comment on in reference to your thoughts about PBL?
### APPENDIX B: EDUCATOR INTERVIEW QUESTIONS & RESEARCH

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is PBL?</td>
<td>“Project-Based learning has gained a greater foothold in the classroom as researchers have documented what teachers have long understood. Students become more engaged in learning when they have a chance to dig into complex, challenging, and sometimes even messy problems that closely resemble real life” (Intel. 2007 p.1).</td>
</tr>
<tr>
<td>How many projects have you built using the PBL Pedagogy?</td>
<td>“In constructivist classrooms, learners don’t passively repeat the information delivered from teacher. They demonstrate their learning and understanding through different means such as developing critical questions, and summarizing ideas by their own words,” (Liu, C. &amp; Chen, I.J., 2010, p.65).</td>
</tr>
<tr>
<td>Can you as a learner reflect on times when you have been exposed to PBL as a student (ES, MS, HS)?</td>
<td>PBL emphasized that projects have a longstanding history within the world of education ((Hallermann, 2011).</td>
</tr>
<tr>
<td>What do you recall from that experience that you are using to design your units?</td>
<td>“...PBL allows teacher to work more closely with student, acting more like a coach instead of the ‘deliverer of knowledge’.” (Hallermann, 2011, p. 16).</td>
</tr>
<tr>
<td>How do you apply PBL within your classroom?</td>
<td>“Constructivism is a theory about how we learn and the thinking process, rather than about how a student can memorize and recite a quantity of information.” (Liu, C. &amp; Chen, I.J., 2010, p.65).</td>
</tr>
<tr>
<td>What efforts have you made to implement PBL?</td>
<td>“Commonly embracing aspects of the socio-constructivist learning theories to Piaget, Bruner and Vygotsky, the project approach is a comprehensive instructional effort which consists in the individually, small or larger groups in-depth extended investigation of a topic or problem, worthy of the student’s interests, energy, and time” (Ulrich, 2012, p.397).</td>
</tr>
</tbody>
</table>
| (If necessary) How do you foster the implementation of PBL?             | “Learning that occurs in the context of problem
Implementing PBL?

Solving is more likely to be retained and applied. Such learning is also seen as being more flexible than the inert knowledge that is acquired as a result of more traditional didactic teaching methods (Boaler, 1998b, Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990)” (Thomas, 2000, p.8).

What are some of the challenges you face with implementation?

“Very little is known about the challenges experienced by teachers in developing and enacting PBL on their own. Existing research on implementation challenges is useful for identifying the kinds of training and support teachers need when using packaged or published materials, but these findings may not generalize to or fully capture the challenges of teacher-initiated PBL.” (Thomas, 2000, p.40).

“What are the greatest opportunities for learning with PBL?

“Teachers who bring project-based learning into the classroom may have to adopt new instructional strategies to achieve success,” (Intel. 2007 p.2).

“What could potentially hinder your ability to implement PBL

“Because if it’s not done right, or it’s done for the wrong reasons…PBL will either be a waste of time or, worse yet, backfire on a teacher unprepared for its challenges,” (Hallermann, 2011, p. v).

“To what extent is there a need for more Professional Development (PD)?

“PBL is valuable because it effectively teaches content knowledge and skills, builds deeper understanding of concepts, and makes a school curriculum more engaging and meaningful for student,” (Hallermann, 2011, p. 8).

“PBL is one of the bests ways to prepare students for the demands of life, citizenship, and work in today’s world,” (Hallermann, 2011, p. 8).

“PBL does require advance preparation, but it gets easier the more you do it, especially if you can run the same project year after year,” (Hallermann, 2011, p. 11).

“The pedagogic framework should fit with … [PBL’s] dynamic complexity, where learning could potentially occur anytime, anywhere. It [is] threatening to traditional pedagogical framework grounded on rigorous planning and
Why do you believe schools struggle with adopting a PBL approach to learning?

“Predictable connections between learning objectives, curriculum inputs and pedagogy” (Ulrich, 2012, p.396)

“But the reality is that many schools have not adopted curriculum design models and instructional methodologies that cultivate these skills. PBL is one of the best ways to be sure these skills are explicitly taught, because well-designed projects require them,” (Hallermann, 2011, p. 9).
APPENDIX C: UNIT DESIGN ABSTRACT

Artifacts: Advance Organizer (AO)

Unit Design Survey

Name/ Pseudonym:
Grade Level/Subject:
Number of Students:
Years of Teaching Experience:
Amount of PBL training or professional development (approximate by hours):

1. Please reflect upon your experience with implementing Project-Based Learning (PBL). Briefly discuss the topic of the PBL Unit.

2. Please mark the philosophy you closely identify with:

   - Social Constructivism: Focuses on building knowledge through social interactions with others
   - Behaviorism: Focuses on environmental factors that influence the reinforcement or punishment of behaviors
   - Perennialist: Emphasis on principles and personal development
   - Essentialism: Fact based education that focuses on the essential skills
   - Progressivism: Emphasis on learning by doing with roots in experience
   - Other: ____________________________

3. How does your philosophy align with the principles of Project-Based Learning?
4. Does the project demonstrate students’ understanding of concepts, knowledge and skills?
   4a. If so, what are they?

5. What elements are effective for PBL?

6. How do you describe your success with implementing PBL?

7. What are some of the challenges you face with implementation?
Research Proposal

University of New England Doctoral Program in Educational Leadership

This proposal serves as the request to conduct research in the xxx School per Administrative Regulation 6162.8.

Name of Researcher

My name is Jasmeen Philen and I am a graduate student at in the doctorate program of Educational Leadership at the University of New England.

I am conducting a research study designed to analyze and understand how educators at a large international school describe their experience of implementing the Essential Project Design Elements of Project-Based Learning (PBL).

Method of Study

The method of study I will use includes a qualitative methodology, which involves collecting data and conducting interviews with international educators who implement PBL within their classrooms. There will be no student involvement in this research project.

Benefits to the school

Though there are no direct benefits to you or the school for participating in this research, it is my hope that the findings of my study will provide insight that will help your school and other school districts to improve the development and implementation of PBL in order to ensure coherence among programs and practices linked to the school-wide goals.

Proposed Project Period

The research proposed research period is from May 20, 2016 through October 20, 2016.

Participation

All participants will be asked to sign an informed consent to participate. All participants will be informed of the purpose of the research and I will be responsible to obtain consent from each participant. Participants will be informed that their participation is completely voluntary. Participants can choose to answer only the questions with which they feel comfortable and can discontinue participation at any time. Some of the data may be used
for future research purposes consistent with the original purpose stated in the consent document. The final data will be stored for a period of not longer than two years after which it will be destroyed.

There is a risk of loss of privacy. However, no names or any other identifying information will appear in any published reports of the research. The research material will be kept in a secure location, and only I will have access to the data. At the conclusion of the study, all audiotapes of interviews will be deleted and any other identifying information from the transcripts will be removed.

Certification

This letter is to certify that information obtained from research will not include names of interviewees, schools, districts, student names or personal information.

Warm Regards,

Jasmeen Philen
Dear XXX,

I hope this email finds you well. My name is Jasmeen Philen, and I am seeking participants for a dissertation study in a doctorate program of Educational Leadership at the University of New England.

I am conducting a research study designed to analyze and understand how educators at a large international school describe their experience of implementing the Essential Project Design Elements of Project-Based Learning (PBL).

In this study I will use a qualitative methodology, which involves collecting data and conducting 20-25 minute interviews with international educators who implement PBL within their classrooms.

As a participant you will be asked to sign an informed consent to participate. Your participation is completely voluntary. You can choose to answer only the questions with which you feel comfortable and can discontinue participation at any time. Please note, some of the data may be used for future research purposes consistent with the original purpose stated in the consent document. The final data will be stored for a period of not longer than two years after which it will be destroyed.

Again, if you agree to be involved in this study please know that…

· You and the school will not be identified (pseudonyms will be given to all participants)
· You can withdraw at any point in the study
· You will be asked to sign a consent form
· You will be given copies of the final paper and our transcribed interviews

Finally, please let me know if you would like to participate in the study?

Thank you so much for your consideration and I look forward to hearing from you!

Warmly,
Jasmeen Philen
APPENDIX F: PARTICIPANT INFORMED CONSENT FORM

University of New England
PARTICIPANT INFORMED CONSENT FORM

Title: Implementing Meaningful and Sustainable Project Based Learning Pedagogy

Investigator: Jasmeen Philen of the University of New England
Telephone number: +86-186-1083-0253

You will be asked to participate in a research study. Please take your time to read the information below and feel free to ask any questions before signing this document.

Introduction: My name is Jasmeen Philen and I am a graduate student in the doctorate program of Educational Leadership at the University of New England.

Purpose: The purpose of this research study is to analyze and understand how educators at a large international school describe their experience of implementing the Essential Project Design Elements of Project-Based Learning (PBL).

Procedures: By agreeing to participate in this study, you will be asked to sign this informed consent form to acknowledge that you understand and agree to participate in this study. The data will be collected in two parts. In the first part, you will be asked to complete an open-ended seven question “Unit Design Survey”. After review, your eligibility will be determined for inclusion in part two, which includes 20-25 minute interviews with international educators who implement PBL within their classrooms.

Risks to Participation: There is some risk of loss of privacy. However, no names or any other identifying information will appear in any published reports of the research. The research material will be kept in a secure location, and only I will have access to the data. At the conclusion of the study, all audiotapes of interviews will be deleted and any other identifying information from the transcripts will be removed.

Benefits to Participants: Though there are no direct benefits to you or the school for participating in this research, it is my hope that the findings of this study will provide insight that will help your school and other school districts to improve the development and implementation of PBL in order to ensure coherence among programs and practices linked to the school-wide goals.

Alternatives to Participation: Please note that participation in the study is completely voluntary and you may choose to answer only the questions with which you feel comfortable answering.

Right to Withdraw from Study: Participants can choose to discontinue participation at any time.
Confidentiality of Research Records: All participants will be given pseudonyms, and the research material will be kept in a secure location. Only the researcher (Jasmeen Philen) will have access to the data. At the conclusion of the study, all audiotapes of interviews will be deleted and any other identifying information from the transcripts will be removed.

Questions/Concerns: If you have any questions or concerns, please feel free to contact the researcher (Jasmeen Philen) directly at jphilen@isb.bj.edu.cn. Additionally, you may contact the researcher’s dissertation chair (Dr. Michelle Collay) with any additional questions at mcollay@une.edu.

If you have any questions or concerns about your rights as a research subject, you may call Olgun Guvench, M.D. Ph.D., Chair of the UNE Institutional Review Board at (207) 221-4171 or irb@une.edu.

Consent: I agree to participate in this study. The research study and the procedures that will be conducted have been explained to me and understood. My participation in this study is completely voluntary and I may choose to answer only the questions with which I feel comfortable and I can discontinue/withdraw participation at any time.

- I understand that I will be given a copy of this consent form.

Signature of Subject:
__________________________________________________________

Date: ______________________________

Signature of the Person Obtaining Consent:
__________________________________________________________

Date: ______________________________
APPENDIX G SAMPLE TRANSCRIBED INTERVIEW

Interview Transcription

Time of Interview: 9:55 am

Date: September 1, 2016

Place: XXX Office

Interviewer: Jasmeen Philen

Interviewee: Kelly Washington

JP: So, we can begin. First of all, thank you so much for agreeing to be interviewed. I have a total of 13 questions, and then the final question has to do with any follow-ups, or anything you would like to add after the interview. So, what does PBL mean to you?

KW: We started talking about PBL here a couple years ago. And we used the Buck Institute definition that says it is basically you start with a theme, a big driving question. The goal is to create a project, and there are some stages in between that you facilitate the kids through, that if it's a well-designed project, they have to learn the things you want them to learn in order to be able to complete the project. And as much as possible, you want that project to be based in a real context, or a compelling, or challenging, interesting context that's really going to get the kids engaged. So yeah, it's having a really good question that leads to a really good product, but having a lot of freedom in the middle, where kids can have some voice and choice, to get to that end stage.

JP: Thank you. How many projects would you say that you built using PBL or the pedagogy of PBL?

KW: We did three project based units in math eight, when I was still teaching just math, that were very much math-focused. I've worked with the team, we've got eight different projects - four that the grade seven's do, and four that the grade eight's do. Each project lasts a full quarter. And the difference is the Features Academy projects are multidisciplinary. That's been really interesting, because every project has its humanities standards, math standards, science standards, and they get very complex. They're co-taught, co-planned, but they're very, very fun.
JP: That's great. So you enjoy them?

KW: I'm loving it, yeah. But it's harder to manage in some ways. It takes a lot more time to plan and organize. But if you do it right, it comes out great. And the kids really do love it.

JP: Would you say that your philosophy - and I know on the survey, you mentioned your philosophy - would you say that it aligns with some of the PBL principles? If so, why or why not?

KW: Yeah, I think it does. I think I've changed over the years as a teacher, and the longer I've taught, the more I've come to see how important kids' interested engagement is. Because you can get kids, they can memorize stuff and learn stuff, but they do it because they're obedient, not because they're passionate. And that's not who we want them to be when they grow up, is one thing. And then the other thing is, if you let the kids be more engaged, have more voice and choice, then you can bring in those L21 skills. You can let them be creative. You can let them have opportunities to communicate, and you let them see the real applications of what they're learning, and the purpose of learning it. It makes it more meaningful to them, so that in the long run they remember a lot more. They're not storing facts. They're storing dispositions towards learning, problem-solving, thinking, reasoning, communicating that will help them for the rest of their lives.

JP: Very nice. This goes back to your own history as growing up, and dealing with projects. Can you reflect on a time that-- or any times, where you've been exposed to PBL principles, as a learner yourself, or concepts? Or is this something completely new?

KW: I think when I was a kid in school, we did a lot of project-oriented learning where, "Here's your project, build a model," or, "Make a poster," but it wasn't true PBL. In college, I think is the first time in some of my education courses where you got to design units, or create stations for students to meet-- that was more project-based, because everybody had the challenge of, "How are we going to teach this topic?" or skill. But they didn't call it that back then. [chuckles] Though I think that's what it was. And I always loved those, because have a lot of freedom, a lot of creativity, a lot of choice, but within the boundaries of you have to be fulfilling the briefs. So, if you were a doing poetry unit, what are you going to do that helps kids learn it? What's the station going to be? You have to make sure they're getting those standards, and skills you want to get them. You do have structure and outcomes that are required, but you have a lot of freedom to get to those.

JP: Bringing it back here, how do you take maybe what you've
learned, and what you've experienced, and what you know now, and implement PBL into your own classroom?

KW: In [our] … model we started planning as a great seven, eight team, and identified big themes we wanted to hit in both seven and eight. So, for example, seventh grade's first quarter, the theme is Identity. And then, based on that theme we created a unit, or a project. The project for Identity, the driving question is, "How do we know who we are? What makes up our identity?" And then from there, we work as a team to create a variety of activities and opportunities for kids. The ideal outcome for them is a book, a personal identity book. They're making iBooks online, and they'll do a book launch in the library at the end of the quarter. And so, in between, they are doing all kinds of activities designed to help them understand. Like in social studies, they're looking at what are aspects of culture, and what are the things that identify my culture?

KW: We're also looking-- because of our context, we're looking at the ideas of TCK's and different types of TCK's (third culture kids), and CCK's, cross cultural kids, because we have a lot of them. So, when we design the units, we try to pull in elements or aspects that are really relevant to our kids. And they're learning how to do some essay writing and some poetry writing about themselves and their cultures. The math component and science components, they're learning how to conduct surveys, gather data, analyze data, what's a random sample, what's a representative sample. Then each kid generates their own questions, so you want to know what's normal for you compared to other kids. "Am I normal? Do I spend the average amount of time on homework? Do I sleep as much? Do I..." Whatever they want to know about. They generate their own surveys, conduct them, analyze the data, graph them, that will go into their books.

KW: And then they're learning scientific process. They'll each generate their own individual experiments. One of the kids is looking at different types of pillows and how it affects his sleep. One of them is looking at different running shoes, and whether it makes him faster. Depending on their own personal interests, they're generating their own experiments. We co-teach some lessons on data gathering, data analysis, so they get all those skills in pursuit of being able to represent their own individuality, and their own identity. You start from the theme, create a project and activities and opportunities within that. And it's been really good. Then the team meets regularly, we meet within the grade level teams all the time, and are constantly evaluating and adjusting, "That worked great, let's do it again next year," or, "Let's tweak it, let's throw it away because it wasn't really relevant." Or, "It's good but it's not
structured enough." [laughter] We survey the kids frequently to find out how they're feeling about it, and make adjustments there too. I think that really helps, because they're really good at letting us know when we're getting too complicated or overloading them, because it's easy to overload in this kind of a situation.

KW: [laughter]

KW: We all have 29 ideas, we want to do all at once. We have all the different themes throughout the year and a project for each theme. As the kids move through seventh grade, they complete the units. Then in eighth grade, several of the themes are revisited in a different way. So, for example, grade seven does a big project that looks at food and sustainability. And then in eighth grade, the focus in the sustainability project is on other resources, natural resources other than food. So, it's the same theme but explored from a different angle.

JP: And you've sort of hit on the next question, but if you want to add a little more to it. What efforts-- you talked already about you're constantly serving the kids, you're meeting regularly. But if there's anything that you would like to add in terms of efforts that you've made personally to implement PBL?

KW: Well, especially when I first started, I spent a lot of time looking at resources. The Buck Institute has a great bank of good, project-based units. And then, they have a lot of links to other resources. I did a lot of shopping around there. I was in a-- what do they call those little groups they had us do two years ago, [chuckles] like a professional?

JP: TTT or?

KW: No. It was a group that kind of--


KW: It was a professional learning, PLC.

JP: Oh, PLC.

KW: PLC. I led a PLC on PBL, and we kind of did that. And I did a Buck Institute workshop in Shanghai. So, I really just kind of tried to educate myself more so I could understand it. I find I still spend a lot of time up front, at the beginning of the unit. I think we all spend a lot of time looking at a range of-- you do a lot of research into what are some of the possible ways we could do this? Because we also spend a lot of time at the beginning, looking at the grade level standards, and looking at if these are our standards, what themes and units would deliver them as best we can?
KW: We don't cover all the standards for science. We just said, "We can't do it all. We'd rather do less and do it well." We don't cover all of the standards for humanities, especially the social studies. But we do try to hit most of the English, language, arts and all the math, because the kids have to be able to-- when they leave here, they have to be able to slide back in somewhere else. So, that's one of the things we do here. Because we can't get all the standards into project-based units in a way that makes sense, we do have a stand alone block for reading writing workshop, and a stand alone block for math. And those skills that don't fit naturally into the projects are taught in those outside blocks. Because that's the other thing is, you've got to resist the urge to try to make it all fit, you can't force them. The kids figure that out, two seconds in it just doesn't feel right [chuckles].

KW: You try to teach it like, what does this have to do with what our project is about? But, yeah, just a lot of research and understanding what it is, looking at what some options are, and then being really willing to trial and toss. And being willing to say, "Well, that didn't work. It's okay." And that's the scary part because teachers always feel pressured for time. When you're doing these projects they do take more time and you feel like, “I'm not ‘covering’ as much as I used to. Is that okay?" So, letting go of that I have to cover the facts and standards mentality is also something that you really have to be intentional about. You've got to face it, accept it, and own it and say, "I'm okay with that." That was probably the hardest thing for all of us at the beginning of last year coming into FA, and there are two new people this year that are still making that sort of mental adjustment of, "These projects are great, but I'm not going to cover everything, and that's okay. It's okay." We have two years of map data behind us now and we actually do-- it's not enough really to say for sure, but our map data shows that we're doing as well or better than the regular classrooms. So that's got to mean something, [chuckles] I hope.

JP: For sure.

KW: It could be a fluke because it's only two years of data, but so far so good.

JP: Wow, yeah. it's funny how you go--

KW: Oh, I'm anticipating your questions. I didn't need that list. [chuckles] You're reading my mind.

JP: No, just in terms of you've described a lot of success especially the two years with the map data, and then just being able to have that flexibility and that mindset to let go. Is there anything that you would like to add just in terms of success that you've
experienced with implementing PBI as a whole?

KW: Just that you see the difference in the kids. They like it and they're engaged, and it's fun to teach and to watch them learn, especially when you get to the exhibitions and you see how excited they are and how passionate they are about what they did. And then, we also survey students and parents at the end of every project. Our feedback from those surveys has been very, very positive, so that's a success. We do seek advice and get advice, but the overall response has been very positive.

KW: Another indicator we feel is a sign of success is the fact that this year in our grade seven group, four of our kids who went through seventh and eighth grade have now siblings in the grade sevens. So, that's a sign that you're doing something right because the families are sending the younger siblings up, so I take that as a success marker. Yeah, and then it's still early. Our first group that finished eighth grade is now in ninth grade. It will be interesting to see. We'll track them over the next few years, how do they do. But they seem happy. They seem like they're settling in well. They come back to visit all the time and they'll walk by and wave. [chuckles] In fact, we just found out this morning one of our kids who did Math eight last year got bumped up to geometry. She's skipping algebra.

JP: Really?

KW: Who give her the exam - Diana.


KW: She did the extended math eight with me last year, and she basically bumped out of algebra. One of our girls won one of the student council elections slots so that's a good leadership indicator. Overall, definitely it seems to be succeeding pretty well, I think.

JP: That's a lot of success.

KW: Yeah, yeah.

JP: Just in terms of what do you think are some of the greatest opportunities for a PBL or with PBL? Are there other opportunities, can you see here?

KW: I think in any one of the project-based, even if you are doing just in the stand-alone classroom, it's drawing in all those 21 skills because we really focus on that a lot. I think those are becoming more and more critical, integrating technology. Like eighth grade's doing the space race unit now. The big question is what drives innovation, and they are looking at it through the lens of the space
race. We've gamified it so kids are in different countries--

KW: --and their product is going to be to design a Land Rover and create a mission for it. You are pulling in to all of the research skills, scientific notation, blah, blah, blah, history, writing reports. But you're also doing the collaboration, the creativity, the technology, and in the end, the communication, because they're going to pitch their missions to a panel and be evaluated on. And then in the end, also they have to sum up what's the answer to the question. So, that's a really good one. I think giving the kids voice and choice is another huge thing about PBL, if you really build it in, and we work hard to do that in our units.

KW: When you give them voice and choice, they are more engaged. They have to be more responsible. They have to take more responsibility. And sometimes, you're nudging them along, and some kids need more help than others. But for the kids who are ready for it, I think it's just so motivating to them. They love it. And yeah, I feel like it probably helps them in the long run too, become more confident, more competent. You want them to be independent and competent, confident learners and drivers of their own education, right? Because honestly, more and more, by the time these kids go to college, most of them will be designing their own programs. I think that there are more and more universities now offering that kind of a thing, where you don't just go in and say, "I'm going to be in this major." You go in and say, "I want to combine this, with this, and this."

JP: Right.

KW: And our kids will have that leg up of having already been engaged in that kind of process and saying, "Oh yeah. I get what this is. I know how this works," instead of kind of going, "What, wait. You're not going to tell me what to do next?"

JP: Yeah.

KW: So, that sense of independence and self-direction is a huge opportunity. And then, it's just fun, [chuckles] which I think is a good thing.

JP: [?] [chuckles] You mentioned the success, the opportunities. What are some of the challenges that you face with project-based learning, when implementing it?

KW: The first challenge I think, is really understanding what it is and staying true to that vision, because it's so tempting to go back to
project-oriented, or I'm going to teach these five lessons and then give you a project at the end kind of thing, that most of us are used to. So, really making yourself accountable, having a really good driving question in a really good compelling project. It's hard sometimes to get those. I think once you get started and you've done a few, you get better at it. It really helps to have a team, I think. Because they keep you on track, but it also gives you flexibility in the way you work with kids. You can do flexible groups, flexible arrangements of who needs what. If you're teaching on your own, teachers who are trying to do PBL all by themselves, I think that's challenging. It's hard to have kids have a lot of voice and choice when you're by yourself in the classroom. Creating structures that make that work is a challenge. Then of course, just letting the kids have more control, letting go of always knowing where you're going next [laughter] is sometimes challenging.

JP: What do you think could potentially - I think you already mentioned this - but what do you think would potentially hinder your ability to implement PBL? You mentioned that some of the--you have a great team, but maybe with regards to other teachers?

KW: I think some of the things that help us that probably hinder others who might be trying this is, if you're doing it by yourself it's hard. Having space, flexible space, it really helps. Having an admin that supports what you're doing has got to be critical, because you are kind of taking the risk. Parents who support and understand what you're doing, because the kids are not going to come home with a textbook and a set of problems to solve. It's very non-standard to what they were, it's not comparable to what they were raised doing. So, sometimes you have that challenge to face.

KW: And then, the time is always an issue. For regular classrooms that are on a block schedule, like I know when I did the PBL in the math, Lucas and I would do the geometry PBL's, where they'd have all kinds of materials and stuff out, and they'd be trying to build and boom, time to go, time to clean up. Whereas in here we can say, "Okay. We're doing a build. We need a two hour block." We do that. We reinvent and recreate our schedule according to what we're doing, rather than make what we're doing fit the schedule. So, having flexibility in your schedule, which I think is easier in elementary as well. But in middle and high, it's very challenging. So, like the high school model of FA, in order to get that ability, the kids go day A, C, and E, and they're in FA all day. And then, day B, D, and F, they do their math, their language, and their electives. The teachers have that full block where they can schedule whatever needs to happen, they are responsible for the
humanities, the English Social Studies Science, but they have that full day. So, that's a way to open up the schedule. Opening up flexibility in the schedule is a big thing, I think.

**KW:** Another challenge, we have lots of opportunities for outside consultants, field trips, connections in the communities, those are great opportunities, but they also can be limiting factors if you don't have that support from your admin. I think you can do better richer projects when you can bring in experts or get out of the building.

**JP:** Would you say that, or to what if there is a need for PD or training on project based learning. Could a teacher just walk in and inspect?

**KW:** Yeah, you would have to have the training. They did a little bit of training here few years ago with the curriculum coordinator, and then quite a few of the teachers that were here got to go to the Buck Institute training. I think when they're hiring how, they're also looking for people who have that background and experience. But I don't think its something you can walk into without some knowledge and or a team that supports you so that you know what-- Like if you were bringing a new person into a team, and the team knows what they're doing and they can train them, that's a good model. But, if you're doing stand alone PBL in the classroom and you're bringing in a teacher who's never done it, it's going to be hard [chuckles].

**JP:** So you need to have some experience there, and they need to be trained [crosstalk]

**KW:** Yeah, they need some training or some background experience. And they need to buy into the philosophy too, right? Because it is a different philosophy and there are people out there who say, "No, I don't agree with this, I think that it's not a good way to teach kids." So, you have to make sure that you've got people who agree with that approach.

**JP:** Final question, why do you believe schools struggle with adopting PDL, or why do you believe-- or do they struggle with adopting the PBL approach to learning?

**KW:** I think some choose not to, just because it is the training issues, the resource issues, the schedule issues. It's hard to implement I think, on a larger scale. It's not a new approach, but it's new enough that it's not that widespread yet. So, I think it's starting to come into specialized schools or schools that are actively perusing it, right? But I think a lot of public school systems, it isn't there yet, just because it's hard to implement on a large scale with a locked down schedule on individual teachers, and a very dictated
set of standards. You don't have that freedom to create a project that makes sense within the time frames and the standard dictates.

JP: Thank you, XXX.

KW: You're welcome.
APPENDIX H: SAMPLE UNIT PLANS

Grade 7 Unit 1: What makes up our identity?

<table>
<thead>
<tr>
<th>Unit #</th>
<th>ISBFA-014219</th>
<th>Duration</th>
<th>Dates:</th>
<th>08-16-2015 - 10-24-2015</th>
</tr>
</thead>
</table>

**Team:** XXX  
**Grades:** 7  
**KLAs:** C3 Framework for Social Studies State Standards, Chinese, English Language Arts, Mathematics, Next Generation Science: Middle School Engineering Design, Next Generation Science: Middle School Life Science

**Unit Focus**

This unit revolves around identity and how we develop and define our own identities. These include our cultural and national connections, social groups, beliefs, personality traits, and personal preferences. The main question driving the unit will be: What makes our identity? We will discuss the concept of third culture and the influence of this on our identity from several first-person narratives and anthropological studies on this concept. In Science, students will use the scientific method to research, conduct, and experiment and answer a student driven inquiry question according to their personal preferences. In math students will develop surveys in order to compare their populations through graphs and tables. In Chinese, students will look at how they build identity within the context of their home here in XXX. The culminating product will be an Identity Book created using "iBook's Author" to give a summative overview of each student's identity. These will be exhibited to other students in order to help them better formulate and understand their own identities.

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**STAGE 1: DESIRED RESULTS – KEY UNDERSTANDINGS**

<table>
<thead>
<tr>
<th>SOCIAL STUDIES</th>
<th>UNDERSTANDINGS</th>
<th>MEANING</th>
<th>ESSENTIAL QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications of Social Studies: Students will apply their skills, knowledge and understandings of human, historical and physical contexts to develop solutions to real-world dilemmas and opportunities.</td>
<td>1. Identify what makes up our identity.</td>
<td>What is third culture and how does that influence our identity?</td>
<td></td>
</tr>
<tr>
<td>Students will apply their skills, knowledge and understandings of human contexts to develop perspectives on their personal and collective identity.</td>
<td>2. Define the concept of identity.</td>
<td>How does culture influence our identity?</td>
<td></td>
</tr>
<tr>
<td>Students will use scientific approaches and methodologies to investigate phenomena, claims, and information.</td>
<td>3. Analyze data and findings.</td>
<td>How can we tell if something is living or non-living?</td>
<td></td>
</tr>
<tr>
<td>Communicating Understanding: Students will express appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and attending to precision and conceptual understanding when making mathematical statements.</td>
<td>4. Synthesize information.</td>
<td>How can a model help us identify and explain the functions of an object?</td>
<td></td>
</tr>
</tbody>
</table>

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**ACQUISITION OF KNOWLEDGE AND SKILL**

<table>
<thead>
<tr>
<th>KNOWLEDGE</th>
<th>SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>To recognize the relationship between dependent and independent variables.</td>
<td>How to write a testable question.</td>
</tr>
<tr>
<td>To identify control for variables that might affect an experiment.</td>
<td>MS-ESS-1-4: How to construct and conduct a scientific investigation of phenomena.</td>
</tr>
</tbody>
</table>

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*Note: The above table outlines key understandings, meanings, and essential questions related to the development of students' identities within the context of their cultural, historical, and physical environments.*
• CCSS.ELA-Literacy.W.7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

• CCSS.ELA-Literacy.W.7.8 Write arguments to support claims with clear reasons and relevant evidence.

• CCSS.ELA-Literacy.W.7.9 Cite multiple sources to develop claims and/or support questions or events using effective techniques, relevant descriptive details, and well-structured event sequences.

• CCSS.ELA-Literacy.W.7.3 Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.

• CCSS.ELA-Literacy.W.7.3 Use precise words and phrases, relevant descriptive details, and sensory language to capture the sound and convey experiences and events.

• CCSS.ELA-Literacy.SL.7.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

• CCSS.ELA-Literacy.SL.7.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

Mathematics

• CCSS.Math.Practice MP.2 Reason abstractly and quantitatively.

• CCSS.Math.Practice MP.4 Model with mathematics.

• CCSS.Math.Practice MP.5 Use appropriate tools strategically.

• 705115 The Number System

• 7.15 The Number System

• CCSS.Math.Content.NS.A.1 Apply and extend previous understandings of operations with fractions.

• CCSS.Math.Content.NS.A.2 Apply and extend previous understandings of multiplication and division of fractions to divide by a fraction and multiply and divide with rational numbers.

• CCSS.Math.Content.NS.A.3 Solve real-world and mathematical problems involving the four operations with