TEACHER SELF-EFFICACY IN A PROJECT-BASED LEARNING (PBL) CLASSROOM

by

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Abstract

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Preparing students, in the K-12 pipeline and in higher education institutions, will require new skills, soft skills, to ensure success in a 21st century workforce (Wagner, 2008). Soft skills, defined as being able to communicate effectively, to collaborate with others, to think creatively, and to have strong ethics, are challenging for teachers to address in a traditional classroom setting.

While traditional instruction systems focus primarily on quantifiable results, project-based learning (PBL) is a proven instructional delivery system in which teachers facilitate instruction to assist in the acquisition of soft skills. Through the lens of teacher self-efficacy, a tenet of academic optimism (Beard, Hoy, & Woolfolk Hoy, 2010), the purpose of this qualitative study was to examine and describe how teacher self-efficacy assisted in the successful implementation of PBL and the acquisition of 21st century skills.

Specifically, this study focused on investigating teacher self-efficacy of six respondents who implemented project-based learning at an intermediate school in the southwestern part of the United States. The research revealed several factors influenced self-efficacy in the PBL classroom. The factors included the course content, the classroom setting, teachers' self-efficacy, and the formation of peer relationships.

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Chapter 1

Design of the Study

Improving student achievement has been a major theme for educational research due to the contention that education is a driving force behind successful organizations, communities, and nations (Hewitt, 2008). Major countries, like China, England, and the United States, have placed emphasis on improving education quality with the pursuit of academic achievement (Luyten, Sheerens, Visscher, Maslowski, Witiziers, & Steen, 2005). Current sentiment holds American students are ill-prepared to compete in a 21st century global economy (Darling-Hammond, 2006; Wagner, 2008). Recent high school and college graduates do not have the skills employers seek within potential employee candidates (Wagner, 2008).

Plageman (2011) projects that 90% of the fastest growing jobs in the United States will require education beyond high school. The interconnectedness of countries and the new demands of globalization require students to embody the new skill set. According to Peter D. Hart Research Associates (2006), 76% of employers believe recent graduates require greater collaboration skills, 73% of employers believe recent graduates require more effective written communication skills, and 70% of employers believe recent graduates must develop greater information literacy skills. Unfortunately, high school and college graduates do not have the skills employers seek within potential employee candidates (Wagner, 2008).

According to Wagner (2008), only about a third of U.S. high school students are ready for college, with the rates being much lower for minorities and for those who live in poverty. Business and political leaders are demanding better prepared college graduates who have the ability to think critically, problem solve effectively, and exhibit essential leadership skills (Wagner, 2008).

Twenty-first century skills, herein defined as competency in academics, the ability to think innovatively, the ability to collaborate with others, and the drive to be responsible global citizen, are needed to ensure students gain economic and social success in the age of globalization (Laguardia & Pearl, 2009; Wagner, 2008; Zhao, 2010). Many schools are still organized around 20th century learning model in which academic content is taught and measured in quantifiable, standardized assessments (Schlecthy, 1997). In many schools of the 20th century, instructional delivery consists of teacher lecture and discussion, assessment usually at the basic comprehension level, and aligning students with the appropriate track to transition them to the appropriate line of work (Hogan, 1982).

According to Zhao (2008), the new skills students need for success, like working collaboratively with others, thinking creatively, being competent in core skills, and being responsible global citizens, will require teachers to educate students in a different manner. It is hard to measure the effectiveness of these new, soft skills, through mandated state assessments. According to McNeil (1996), measurable outcomes may be the least significant way to measure learning.

As the global world changes at a rapid pace, research indicates project-based learning (PBL) prepares students for success through the acquisition and application of 21st Century skills (Bell, 2010). According to The Buck Institute for Education, PBL is an instructional method engaging students in learning knowledge and skills through an extended inquiry process designed around authentic questions and carefully designed tasks (Markham, Mergendloller, Larmer & Ravitz, 2003). PBL is a model that organizes learning around projects in which challenging questions require students to investigate and problem-solve an authentic concern, while the teacher serves as a facilitator of learning (Jones, Rasmussen, & Moffitt, 1997).

PBL is also a student-centered approach where students illustrate their discoveries by creating projects to share with audiences (Bell, 2010). PBL is different from the traditional, teacher-centered approach, as students engage to acquire knowledge and skills through an extended inquiry process. Within this model of learning, students usually work in small groups to complete an academic challenge. The challenge can be in the form of investigation and research on a particular topic, which integrates concepts from a number of disciplines or fields (Bell, 2010; Lam, Cheng, & Ma, 2009). PBL is a student-driven style of learning; it serves as the basis of the curriculum, rather than as a supplement (Bell, 2010). It is grounded in the constructivist learning theory that posits knowledge is a personal experience by which meaning is created and derived from the learner (Thanosoulas, 2001). The constructivist learner has the ability to formulate questions through inquiry-based instruction and discovery learning (Bruner, 1973). Project-based learning is also partly founded in instructional approaches originating from Dewey (1938) who argued for the importance of practical experience in learning.

As teachers attempt to implement a new innovation, like PBL, they sometimes face a steep learning curve and encounter struggles that may hinder successful implementation (Thomas, 2000). A significant body of research indicates the willingness to invest in new practices is based upon the person's interest in the innovation, a desire to engage students, a motive to help them achieve, and a positive sense of efficacy (Fullan, 2007). According to Fullan (2007), the teachers' motivation to adopt an innovation is highly personal and determines the successful implementation of the innovation. As teachers discover they lack knowledge and skills in the PBL methodology, many revert back to more familiar and comfortable practices (Lam, Cheng, & Choy, 2010). It is important that the PBL teacher has sense of efficacy, or a belief, that they can persist through the rigors and difficulties of implementing PBL.

According to Beard, Hoy, and Hoy (2009) academic optimism influences academic achievement through awareness of teachers' sense of efficacy, trust in students and parents, and focus on creating a positive and challenging environment for students can increase student achievement, even when controlling for students who come from areas with high poverty (Hoy, Hoy & Kurz, 2008). The first among these must be efficacy, for without efficacy, or a sense that one is capable of accomplishing the tasks at hand, trust and academic emphasis cannot be accomplished.

Society needs better-prepared high school and college graduates for the 21st century global market (Wagner, 2008). To accomplish the goal of preparing students for 21st century success, the need for research evaluating the impact of teacher self-efficacy, a tenet of academic optimism, and how it influenced success in a project-based learning classroom benefits students, researchers, and practitioners in preparing students for success in the 21st century.

Statement of the Problem

Twenty-first century skills require students to be academically competent; but, also require students be able to collaborate with others, think creatively and innovatively, and be responsible, global citizens (Wagner, 2008). The acquisition of all these skills will require teachers to use other instructional modalities besides the traditional model, as measurement through mandated state assessments, alone, will not indicate student mastery of 21st century skills (Markham, 2003; Wagner, 2008; Zhao, 2008). To accomplish this goal, institutions have designed curriculum and instructional strategies to help facilitate the acquisition of new sets of soft skills, which include collaboration, creative thinking, communication, and global citizenship (Schwalm & Tylek, 2012). Project based learning is one dominant strategy designed to facilitate this skill acquisition (Bell, 2010; Markham, 2003; Thomas, 2000). But, despite the

implementation of project based learning and research supporting its effectiveness (Thomas, 2000; West & Simmons, 2012), we still have students leaving high school and college ill-prepared with the skills needed for the 21st century workforce.

Hoy, Tarter, and Woolfolk Hoy (2006) would explain the lack of success in skill acquisition, in terms of the under development of an academically optimistic school setting. Their research on academic optimism focuses on creating and supporting faculty who work with students and parents, regardless of socioeconomic status, and help students achieve academically (Hoy, Tarter, & Woolfolk Hoy, 2006). The three components of academic optimism include collective efficacy, academic emphasis, and faculty trust (Hoy et al., 2006). Collective efficacy, the first of the essential components of academic optimism, is the belief by teachers that they can change the status quo and move students toward success. Without the belief that success is possible, emphasizing academics and trusting parents are ineffective.

Several studies have viewed the effects of academic optimism on elementary reading (Bevel & Mitchell, 2012), high school mathematics with high poverty (Hoy, Tarter, & Hoy, 2006), middle school student achievement (Mishoe, 2012), and student achievement in urban, elementary school (Smith & Hoy, 2007). None have viewed the impact of teacher self-efficacy on student acquisition of 21st century skills in a project-based classroom.

Purpose of the Study

The purpose of this study was to understand the ways in which teacher self-efficacy, a tenet of academic optimism, impacted instruction in a project-based classroom. The following research questions guided this study:

1. What do teachers do in a project-based learning classroom? Why? How?
2. How does teacher self-efficacy inform project-based learning PBL instruction?

3. How useful is self-efficacy in understanding the project-based learning (PBL) classroom?
4. What other realities about project-based learning (PBL) are revealed by the data?

Orienting Theoretical Framework

Academic optimism could be explained as the compilation of 40 years of research for school characteristics that have a significant influence on student achievement while controlling for the effects of socioeconomic status (SES;Hoy, 2012). Academic optimism is not the same as just being an optimistic person who teaches students, rather it is the teachers' optimism about teaching and learning in their own school, which also is a malleable characteristic of schools and teachers (Woolfolk Hoy, 2012). Educational scholars identified three school variables that are consistently related to student achievement after controlling for SES. They include teacher efficacy, faculty trust in students and parents, and academic emphasis (Hoy, Tarter, & Woolfolk Hoy, 2006a).

The construct, academic optimism, is relatively new and emerges from research on positive psychology, optimism, social capital, and collective school properties which make a difference in achievement for all students (Beard, Hoy, & Woolfolk Hoy, 2010). Several studies have linked academic optimism to student achievement in mathematics (Hoy, Hoy, & Tarter, 2006), reading (Smith & Hoy, 2007), and in schools with high poverty and diverse demographics (Hoy et al., 2006; Woolfolk Hoy, 2012). However, a paucity of research exists on viewing academic optimism and, teacher self-efficacy, on the effectiveness of project-based learning.

Academic optimism is a set of beliefs held by staff which posits that collective efficacy of staff, faculty trust, and academic emphasis create a positive academic environment; thus, positively influencing school achievement while controlling for socioeconomic status (SES),

prior student achievement, and urbanicity (Hoy, Tarter, & Woolfolk Hoy, 2006). According to Hoy, Hoy, and Kurz (2008), academic optimism is an important individual teacher characteristic, as efficacy, trust, and academic emphasis have parallel meanings at the individual teacher level. An academically optimistic classroom teacher emphasizes opportunities, embodies resilience, and practices altruism (Hoy, Hoy, & Kurz, 2008).

Academic optimism, at the individual level, is a teacher's belief that they can make a difference in the academic performance of students by emphasizing academics and learning, by trusting students and parents to be active participants, and by believing in their own capacity to overcome difficulties and to be resilient in difficult situations (Hoy, Hoy, & Kurz, 2008; Hoy, Tarter, & Woolfolk Hoy, 2006). Academic optimism at the individual level consists of a teachers' sense of efficacy, teachers' trust in students and parents, and academic emphasis (Hoy, Hoy, & Kurz, 2008).

Teacher self-efficacy in schools "is the judgment of teachers that the faculty as a whole can organize and execute the actions required to have positive effects on students" (Goddard, Hoy, & WoolfolkHoy, 2004, p.4). The foundation of efficacy comes from Bandura's (1997) social cognitive theory. The theory posits people do not passively react to their environment, rather, they strive to control the circumstances around their life and act intentionally, which is called human agency (Bandura, 1997). Among the mechanisms of human agency, self-efficacy is the most important, because unless people believe they can produce desired effects and stall undesired ones, they have little reason to act (Bandura, 2000).

Self-efficacy plays a key role in human functioning as it impacts one's goals and aspirations, outcome expectations, and perception of impediments and opportunities in the social environment (Bandura, 2000). According to Bandura (2000), efficacy beliefs influence whether

people think strategically or erratically, optimistically or pessimistically, it impacts their resilience to adversity, and it guides the courses of action they choose to pursue. The mechanism of human agency works in an emergent and interactive way. Bandura believes self-efficacy beliefs can be described as "future oriented judgments about capabilities to organize and accomplish courses of actions needed to produce the results desired for specific situations" (Bandura, 1997, p.271). The self-efficacy belief regulates human functioning through motivational, affective, and decision-making processes. Individuals with high self-efficacy are more likely to seek challenges, to use skills more effectively, to set higher goals, and to place greater effort in completing a difficult task (Bandura, 1997).

For the purposes of this study, a focus was placed on individual teacher self-efficacy and how it impacted instruction in a project-based learning classroom. Teacher self-efficacy is vital in ensuring collective efficacy. If a teacher fails to possess individual efficacy, then collective efficacy is difficult to attain within the organization. Teachers' sense of self-efficacy is defined as a teacher's "judgment of his or her capability to bring about desired outcomes of student engagement and learning, even among those students who may be unmotivated" (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 202).

Methodology

A qualitative case study method was used to gather greater understanding of the ways in which teachers' self-efficacy, a tenet of academic optimism, impacted student acquisition of 21st century skills in a project-based classroom. According to Creswell (2007), great strength exists in the use of the qualitative method to answer questions about real life situations, as it represents a legitimate mode of social and human science exploration. A case study is a descriptive, exploratory analysis of a person, group, or event which is used to explore. This study was best

suited for the qualitative method and a case study as it focused on how teacher self-efficacy assisted in the acquisition of 21st century skills in a project-based classroom.

Creswell (2007) indicates qualitative data is well-suited for locating the meanings of people, places, events, processes, and the structure of their lives. Specifically, this study did explore the reasons project-based learning is used in the classroom, how project-based learning is implemented in the classroom, and how teacher self-efficacy impacted the daily practices of those who implemented project-based learning.

Research Criteria

To ensure the veracity of the data collected, triangulation was used to cross verify the more than two sources to increase the credibility and trustworthiness of the results (Denzin & Lincoln, 2011). To ensure the trustworthiness of the study, I gathered thick, rich data by taking copious notes on what I heard and thought. I transcribed the interview data verbatim and provided each participant with access to their own transcription. I used member checking by asking each participant to review the findings and to confirm for accuracy. Transcription aided in preventing reports that show personal bias towards the field experiences (Bogdan & Biklen, 1998).

To ensure the credibility, confirmability, transferability, and the dependability of the study, prolonged engagement in the field allowed for compilation of evidence to formulate a compelling whole (Denzin & Lincoln, 2011). According to Lincoln and Guba (1985), the findings must be credible based on the data from the study, which I achieved by providing rich, thick description based on my data collection. Dependability was achieved by my providing consistent, rich detail of the context and setting. I audio recorded each interview with a digital voice recorder and typed field notes. Member checks confirmed any mistakes made during

transcription. Confirmability was established by examining the extent to which the research will be objective and bias free. I completed this by utilizing a peer review and advisor review, which provided me an opportunity to practice reflexivity to ensure no personal biases were included in the study.

The triangulation of data (interview/drawing, document analysis, and observation) provided a confluence of evidence to provide confidence in the researcher's observations, interpretations, and conclusions (Eisner, 1991). Although qualitative research is not generalizable, the triangulation of data, through document analysis, observation, and interviews provided sufficient description to transfer to other studies (Creswell, 2007).

Significance of the Study

This study contributes to the advancement of theory, research, and practice. Detail is provided on each in the sections below.

Theory

Most studies of academic optimism observed the phenomenon quantitatively through student achievement in high poverty areas. For example, several studies quantitatively addressed the construct of academic optimism and its impact on minority student achievement in schools with high poverty and its impact on diverse, urban elementary, middle, and high schools (Hoy, Tarter, & Woolfolk, 2004; Hoy, Tarter, & Woolfolk, 2006; Mishoe, 2012; Smith & Hoy, 2007). This study expanded the theoretical conversation on academic optimism, specifically individual teacher efficacy, and how teacher efficacy promoted student acquisition of 21st century skills through project-based learning.

The foundation of efficacy comes from Bandura's social cognitive theory (Bandura, 1997). While many studies have viewed self-efficacy in various lenses, like collective efficacy

(Hoy, Tarter, & Woolfolk Hoy, 2006) or at a individual level (Hoy, Hoy, & Kurz, 2008), this study added knowledge about self-efficacy as it relates to social cognitive theory.

Research

Educational research continues to focus on preparing students for economic and social success, which is at the forefront of K-16 topics. In preparing current students in the K-16 setting for economic and social success in the 21st century global workforce, instructors will need to implement new instructional strategies to ensure students are equipped for success (Schlecthy,2005; Wagner, 2010). As a campus principal, I am very interested in structures, like project-based learning, which fosters a environment for students to acquire new skills, soft skills, which will allow them to have the necessary tools for success in the 21st century. I believe teacher self-efficacy can impact student achievement. Many studies have been conducted on the construct of academic optimism and its impact on student achievement; however, a paucity of qualitative research has looked at teacher self-efficacy, a tenet of academic optimism, and how it might promote student acquisition of 21st century skills through project based learning.

Practice

As schools and universities evolve their instructional practices to prepare students for a 21st century global society, administrators need strategies and tools to help facilitate instructors' instructional practices to ensure students in the K-16 setting attain the 21st century skills needed for economic and social success. Administrators might use this study to guide them in professional development offerings to assist instructors in providing instructional practices that promote 21st century learning. Specific observations about the perceptions of instructors might provide administrators with ideas on specific structures to implement within their institution to

assist in coaching instructors to be effective in promoting 21st century learning, in both the K-16 setting.

Summary

The workforce of the 21st century requires appropriate academic preparation to ensure economic and social success in global economy. Employers are looking for employees who embody academic competency; but, they also seek applicants who embody soft skills, like the ability to collaborate with others, think creatively, and be responsible global citizens (Wagner, 2008). Project-based learning is an instructional modality that provides students with the soft skills needed in the 21st century (Bell, 2010). The impact of instructors, in the K-16 setting, on student achievement is paramount. For instructors who implement project-based learning, it is important to understand how teacher self-efficacy, a tenet of academic optimism, impacted student acquisition of 21st century skills in the PBL classroom.

Reporting

The remaining chapters will include a review of relevant literature, methodology report, presentation of findings, analysis, a discussion of implications of the study and a conclusion.

Chapter II consists of a review of the literature and provides detail as to the importance of the study. The new skills needed for 21st century success, the tenets of project-based learning, and the tenet of individual teacher efficacy and how it might impact student achievement of 21st century skills will be discussed. Chapter III includes the methodology; Chapter IV provides the presentation of data; Chapter V provides analysis of the data, while Chapter VI offers the conclusions and recommendations for future research.

Chapter 2

Literature Review

The review of the literature was designed to establish knowledge about implementation issues related to project-based learning (PBL). The review examines the demand of employers for better qualified candidates, the need for 21st century skills in today's workforce, the framework of PBL including how PBL works, and, the factors that affected teachers' decisions to implement PBL. This section also includes the conceptual framework of academic optimism and how teacher self-efficacy impacts successful implementation of PBL. The Concerns Based Approach Model, specifically the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool are described as to how they assisted in the operationalization of teacher self-efficacy.

Employer Demands of Students

In recent years, business leaders have made demands on American public schools to equip students with skills for success in a competitive global society (Darling-Hammond, 2003; Fisher, 2007; Smith & Hoy, 2007). Major countries have placed emphasis on improving education quality with the pursuit of academic achievement becoming a common vision for education reform (Luyten, Sheerens, Visscher, Maslowski, Witiziers, & Steen, 2005). Current sentiment holds American students are ill prepared to compete in a 21st century global economy (Darling-Hammond, 2003; Fisher, 2007; Wagner, 2008). According to Peter D. Hart Research Associates (2005), 76% of employers believe recent graduates require greater collaboration skills, 73% of employers believe recent graduates require more effective and written communication skills, and 70% of employers believe recent graduates must develop greater information literacy skills.

A growing recognition, both by business leaders and educators, acknowledges the changing demands of the workplace that stem from the evolution of technology (Drucker, 1999; Wagner, 2008). For many years, business leaders have voiced concerns regarding college graduates adequate preparedness for the workforce (Wagner, 2008). The responsibility for the decline of adequately prepared candidates for employment has been placed on universities, who often point to public schools, for lack of student preparation for higher education studies (Casner-Lotto & Barrington, 2006). In fact, 75% of employers place the responsibility of under-qualified job applicants on K-12 schools, while 68% of employers feel higher education institutions are to blame for deficient applicants (Casner-Lotto et. al., 2006). Based upon the data, it is apparent that business leaders are seeking assistance from educators in preparing skilled workers for the job industry.

Employers indicate applicants entering the workforce lack basic skills; furthermore, they also lack the ability to collaborate, to think critically, to communicate effectively, and to have a sense of professional responsibility (Casner-Lotto & Barrington, 2006). According to the *Workforce Readiness Report Card* (2006), a survey of more than 400 employers were asked to identify the readiness of applicants by utilizing the criteria of applicants as either excellent, adequate, or deficient. The findings indicated 45% of the applicants were rated adequate, while 40% of high school students were considered deficient; and, only 0.2% of students were rated as excellent in preparation for work (Casner-Lotto & Barrington, 2006). Within the applied skills portion of the survey, employers found 80% of the applicants deficient in written communication, 70% were deficient in professionalism, and 69% were deficient in critical thinking or problem solving (Lotto et. al., 2006). With regards to college preparation of students for work readiness in a 21st century work environment, nearly 33% of college students did not

possess necessary critical thinking or communication skills (Wagner, 2008). Marriot (2006) asserts that our nation's long-term ability to succeed in exporting to the growing global marketplace hinges on the ability of today's students, and it is imperative to articulate the need and take actions to prepare students for the workforce.

21st Century Skills

Twenty-first century skills are a necessity for US students, as students compete with a new global economy (Wagner, 2008). The *Workforce Readiness Report Card* (2006) defined readiness for work as applicants who possess basic knowledge skills in reading comprehension, writing, math, science, government, and humanities; but, it also indicated applicants needed to possess critical thinking skills, effective communication skills, and have the ability to collaborate with others. The challenge ahead for educators is to provide students with the necessary skills to be successful in the 21st century global society.

Although educators, policy-makers, and business leaders' have identified the need for a better-prepared 21st century workforce, many classroom practices focus on rote learning and basic comprehension which fails to adequately prepare students for success in the workforce (Partnership for 21st Century Skills; Darling-Hammond, 2008; Wagner, 2008). Many schools are still organized around 20th Century learning models, in which academic content is taught and measured in quantifiable, standardized assessments (Schlechty, 1997). The need for 21st century skills, herein defined as competency in academics, the ability to think innovatively, the ability to collaborate with others, and the drive to be a responsible global citizen, are skills needed to ensure student economic and social success in the age of globalization (Laguardia & Pearl, 2009; Schlecthy, 1997; Wagner, 2008; Zhao, 2010).

These new skills, often referred to as soft-skills, do emphasize academics; however, it also requires that students be able to collaborate with others, think creatively and communicate effectively, and have a sense of global citizenship (Partnership for 21st Century Skills; Wagner, 2008). To assist in acquisition of these new skills, a shift from teacher-centered instruction to a learner-centered platform would better serve students (Darling-Hammond, 2008). A growing body of research indicates that instructional delivery which emphasizes inquiry, application, production, and problem-solving assist in the acquisition of 21st century skills (Darling-Hammond, 2008). Project-based learning is an example of an inquiry-based approach (Ravitz, 2010).

Project-Based Learning

Project-based learning emphasizes learning in context and has a long history in the education community. Dewey (1925) described a vision for education in which schools would mirror the larger society and classrooms would be laboratories for real-life inquiry and problem solving. Kilpatrick (1918) articulated a pedagogy called the problem-method, which causes students to solve real-life problems in a work context. The foundation of project-based learning (PBL) is profoundly grounded in the constructivist learning theory. Several noted constructivist theorists, like John Dewey, Jerome Bruner, Lev Vygotsky, and John Bransford deem knowledge is a personal experience by which meaning is created and derived from the learner (Thanosoulas, 2001). Dewey (1925) acknowledged the constructivist learner wrestles with the problem to find his own solution, while Bruner (1973) affirmed learning involves students creating hypotheses from conclusions about their knowledge. The PBL learning model allows for students to formulate questions through inquiry based instruction and discovery learning.

Project-based learning (PBL) allows students to work in collaborative groups that fosters the completion of complex tasks, designed around challenging questions (Jones, Rasmussen, & Moffitt, 1997). The culminating activity of the projects is viewed as a demonstration of knowledge to an authentic audience (Jones, Rasmussen, & Moffitt, 1997). During the PBL process, the teacher serves as the facilitator that prompts students thinking with appropriate questions and ensures state standards are being mastered through a variety of assessment tools.

According to the Buck Institute of Education (2008), project-based learning provides students the opportunity to become more actively engaged and acquire knowledge through rigorous projects through the use of technology. Additionally, students use collaboration, communication, and critical thinking skills while completing the inquiry-based projects (Ravitz, 2008). The project-based learning model allows students to demonstrate learning through application, thus, better preparing students for the 21st century workforce (Ravitz, 2009). While project-based learning (PBL) is aligned with 21st century skills, it also shows potential for providing a vehicle for academic success (Peneul, Means, & Simkins, 2000).

According to Peneul, Means, and Simkins (2000), project-based learning (PBL) is at least as effective as traditional methods for facilitating knowledge acknowledge and is more effective for promoting critical thinking and problem-solving skills. A Bertelsman study tracked two groups of students, one in a traditional classroom and one immersed in a PBL environment (Crockett, Jukes, & Churches, 2011). At the end of the year, both groups were given a standardized test and both groups received approximately the same number of passing scores (Crockett etal., 2011) One year later, both groups were given the same test again. Students in the traditional learning environment were able to recall 15% of the tested skills and knowledge,

while students in PBL were able to recall 70% of the tested skills and knowledge (Crockett et al., 2011).

The project-based learning format, an interdisciplinary approach, consists of eight essentials: an essential or driving question, students' need to know, inquiry, student voice, 21st century skills including communication and collaboration, feedback, a publicly presented project, and a challenging curriculum. Usually, teachers start the PBL process by generating student interest with a learning expedition or multimedia presentation, then guide students through the learning process, without step-by-step instructions. Students collaborate to design projects, which have state standards tied to the project requirements, and make revisions and design their presentation to an authentic audience (Ravitz, 2008).

Several models of project-based learning have been developed by different entities, like the Cognition and Technology Group at Vanderbilt, and the Buck Institute (Arends, 2009). For example, the Buck Institute for Education has developed workshops, handbooks, and coaching services to assist instructors in the facilitation of project-based learning (Ravitz, 2008). I-Engage, a Texas institution, has developed a framework for implementation of project-based learning (PBL), which includes workshops, coaching services, and other instructional strategies to assist in the implementation of project-based learning (PBL).

How PBL Works and Factors Affecting Implementation

The Engage model is comprised of five different learning protocols. The first protocol is launch, which requires team formation, the development of a team name, the establishment of team goals, the determination of roles for each team member, and the protocol used to resolve conflict among team members (Engage, 2013). Students select from five roles, the project manager, the materials manager, the techie, the time-keeper, and the workshop manager. The

project-manager ensures each team-member has tasks to complete and guides daily task completion; whereas, the time manager reminds the team of time constraints which impact successful completion of daily tasks. The materials managers assists the team with any supplies needed to complete the task, while the techie responsibility includes assisting with any technology needs, and the workshop manager is responsible for informing students of workshops which might assist the team to successfully master needed state standards embedded within the project (Engage, 2013). Students change roles on a daily basis, which allows the student to experience different roles, while completing the same project.

The launch phase is vital as team members, which usually consist of either three or five-member teams, establish team norms and team goals; but, it also introduces students to their challenge brief, which contains the driving question, which serves to drive student inquiry which embeds state standards in the project (Engage, 2013). The challenge brief presents students with a real-life problem to solve and contains the project-standards, which correlate to state standards in social studies, English, math, or science (Engage, 2013).

The second phase, the plan phase, is critical as students identify what terms and concepts they know; while, they also identify the terms and concepts they are unsure about (Engage, 2013). The challenge brief contains project requirements containing the essential knowledge and skills as mandated by the state for math, science, social studies, or English (Engage, 2013). Individually, students read the challenge brief to identify the words/concepts they know and identify the words/concepts they do not know (Engage, 2013). Students identify words or concepts in which they think they understand as "knows"; while, students identify words or concepts in which they do not understands as "need to knows". Students share their "know" and "need to know" with their group members, as a certain group member might be able to assist in

acquiring information about a need to know. Then, teachers facilitate student learning by reviewing the challenge brief with students to identify words or concepts they do know, or understand about the challenge brief requirements, and identify any words or concepts they do not understand (Engage, 2013). It is vital the teacher prompt students on certain "need to knows" to ensure essential state standards are included on the list (Engage, 2013). After the teachers compose the entire class' knows and need to knows, the teacher composes a large list of knows and need to knows ensuring state standards are included on the list. The project manager guides students by dividing research questions that need to be researched by each individual (Engage, 2013).

The research/work phase encompasses the largest amount of time, sometimes up to seven days, as students individually research their questions, collaborate with other members about their findings, and begin deliberation on the medium utilized to share with an authentic audience (Engage, 2013). The teacher serves as the facilitator to guide student learning, rather than just providing information in a direct instruction platform. The teacher monitors student progress by monitoring a daily morning huddle, a time in which each group discusses their progress on their team to-do list and on their individual to-do list (Engage, 2013). As the teacher serves as facilitator during the learning process, they are still responsible for ensuring students master state standards in math, reading, science, and social studies.

Based upon the students' discussion with the teacher, the teacher can determine which state standards need to be assessed at more depth and complexity. The teacher develops progress checks, such as quizzes, do-it-yourself workshops, or formal assessments, to ensure students master the state standards. If certain students do not meet the state standards, the teacher creates a workshop for those students to re-teach and re-assess student mastery (Engage, 2013). The

teacher facilitates remediation which might call for a small group re-teach workshop; however, the remediation does not entirely involve direct teach instruction. The workshop might provide a brief-teach piece, an opportunity for the student to practice the taught skill, and a brief assessment piece to check for understanding (Engage, 2013). In some instances, a workshop might include learning a new technology device, in which one person from each team will receive the knowledge and inform their team of the new information. Another strategy would allow for the teacher to have different stations, which require students' complete different activities to re-teach certain standards, to small student groups.

During the research portion of project-based learning (PBL), students determine the most appropriate method to find answers to their questions by using technology, textbooks, or ancillary materials from the library (Engage, 2013). As the teachers serve as facilitators, they do not dictate the research strategy to be used in finding answer to research questions, rather they provide a variety of resources one could use to answer questions. During the course of the day, the teachers use various assessment tools to check for student understanding knowledge in various ways.

Formative assessments are purposefully designed activities informing the teacher of student acquisition of the state standards, but also should be designed to inform students about their own learning (Ravitz, 2010). Multiple cycles of formative assessments need to be conducted through the learning process, in which students receive feedback in the form of self-evaluation, teacher review, or peer review (Engage, 2013). Rather than the teacher correcting students' work, the teacher provides feedback to point the students in areas to revise their approach to problem solving.

Serving as the facilitator, the teacher uses a variety of instructional tools, which might include a research summary of student work, an exit-ticket which checks for understanding by the students answering of a question, or a two-question assessment item (Engage, 2013). Also, a team huddle is held to determine the needs of the team, the findings from each individual, and team members determine what goals need to be accomplished for the next day. Multiple cycles of formative assessment demonstrate the iterative, process-oriented nature of learning (Ravitz, 2010). Instead of students receiving large chunks of new information in advance of the project, students receive information in increments and must have feedback at various points over the course of the project (Engage, 2013).

The critique phase occurs when students present the culmination of their groups work to their fellow peers and teacher for feedback (Engage, 2013). The critique phase allows for students to present their findings to their peers and teacher and is used as a review of the presentational facts. The process is iterative in nature allowing for the refinement of the final product (Engage, 2013). The critique phase allows for students to fine-tune their presentations and to ensure appropriate standards are in place for their presentation, which is the fifth protocol, to an authentic audience of educators, business leaders, or other school leaders.

The last phase, share, allows group members to present their findings to an authentic audience, which might include city officials, school officials, or experts in a certain field. The share portion allows group members to provide a solution to a complex problem with the use of interactive technology. Share could involve a presentation; however, it could also encompass other modes of delivery, as the group determines the most appropriate method to convey information.

The project-based learning (PBL) process used at the site of the study employs protocols from Engage. The institution provides training to administrators and to teachers about the PBL process. The trainings consist of intense summer trainings where teachers view state standards and create PBL experiences, including assessment of standards and anticipated workshops for students (Engage, 2013). The trainings allow teachers to create authentic challenges that include driving questions, instructional resources, progress checks, formal assessments, do-it-yourself worksheets, and workshops (Engage, 2013). Instead of teachers using direct instruction for delivery, students construct their own learning through research questions aligned to state standards (Engage, 2013). To ensure students have mastered the standards, teachers assess through progress checks, which might include a multiple choice quiz or could include the teacher informally checking for mastery, by asking students questions.

The challenge for educators is to provide students with 21st century skills. Business leaders and politicians are demanding stronger prepared college graduates to compete in a global economy (Schlechty, 1997; Wagner, 2008). These same leaders are seeking critical thinkers and problem solvers, responsible leaders, and academically competent candidates for employment (Schlecthy, 1997; Wagner, 2008). While several bodies of research indicate instructional modalities, like project-based learning, allow teachers to facilitate student acquisition of 21st century skills; however, some students who receive instruction through the project-based learning modality fail to experience academic success or fail to successfully attain the needed 21st century skills (Bell, 2010; Hoy, Tarter, & Woolfolk Hoy, 2006).

The project-based learning teacher plays a vital role in the students' successful acquisition of 21st century skills (Blumenfield, Soloway, Marx, Krajcik, Guzdial & Palincsar, 1991). According to Darling-Hammond (2010), teachers' academic background, preparation for

teaching, certification status and other experiences significantly impact students' achievement level. In one study, findings indicated students taught by effective teachers finished in the 96th and 83rd percentiles on a fifth grade math tests; whereas, students taught by ineffective teachers finished at the 44th and 29th percentiles (Sanders & Rivers, 1996). In the project-based learning (PBL) classroom, the teacher must be able to adapt to a new instructional modality. Because implementation of PBL, like other constructivist learner-centered approaches, is complex and associated with largely unfamiliar methods of planning, facilitation, and assessment, it presents challenges at the personal, school, and district levels (Ravitz, 2010). The learner-centered constructivist pedagogy is a major paradigm shift in teaching and learning; therefore, it requires significant changes in practices at the school and classroom levels (Ravitz, 2010). The teacher plays an important role in impacting student achievement and with new innovations being implemented with fidelity (Darling-Hammond, 2009).

While project-based learning (PBL) has shown promise as an effective teaching instructional delivery system, simply doing projects does not ensure student acquisition of 21st century skills (Darling-Hammond, 2008). The content knowledge of the teacher is critical for student success; however, other qualities, like enthusiasm, creativity, humor, and positive disposition contribute to the effective facilitation of PBL instruction (Blumenfeld, Soloway, Marx, Kracjcik, Guzdial, & Palincsar, 1991). Teachers hold the key to successful implementation of project-based learning, as they must invest time and energy required for planning and learning (Blumenfeld et al., 1991). Project-based learning teachers are critical in the implementation of the innovation; however, they often encounter struggles hindering their ability or desire to continue with implementation (Ravitz, 2010). If all project-based learning (PBL) instructors have been exposed to the same professional development offerings, have

similar instructional resources, and work with students' from similar demographics, why are some teachers are more effective in facilitating student acquisition of 21st century skills through project-based learning (PBL).

Academic Optimism

Hoy, Tarter, and Hoy (2006) would explain that an academically optimistic school environment influences teachers' belief of effectively implementing project-based learning (PBL) which impacts the acquisition of 21st century skills. Academic optimism is a latent construct related to student achievement. Hoy, Tarter, and Hoy (2006) explored school characteristics that improved student achievement despite the status of the schools socioeconomic status (SES). Through mainly quantitative studies, academic optimism has been established to predict student achievement in urban schools (Smith & Hoy, 2007), to predict student achievement in urban elementary reading (Bevel & Mitchell, 2012), and to predict student achievement in urban elementary schools for math (Goddard, Sweetland, & Hoy, 2000). Academic optimism provides a lens to view teacher self-efficacy and how it impacts the teachers' successful implementation of project-based learning so students' acquire 21st century skills.

According to Hoy, Tarter, and Woolfolk-Hoy (2006), academic optimism is the combination of academic emphasis, collective efficacy, and faculty trust in students and parents. Hoy's research looks at school traits which impact student achievement and the effect of academic emphasis, collective efficacy, and faculty trust, in students and parents, to create a environment which promotes student achievement. In other words, academic optimism sets the tone, or presents a climate of high academic achievement for students, fosters a positive tone by

staff that exhibits a belief that problems can be collectively solved, and embodies trust between teachers and students; but, also between parents and the school (Hoy et al., 2006).

Academic optimism could be explained as the compilation of 40 years of research for school characteristics that have a significant influence on student achievement while controlling for the effects of socioeconomic status (SES) (Hoy, 2012). Educational scholars identified three school variables that are consistently related to student achievement after controlling for SES which include academic emphasis, faculty trust in students and parents, and collective teacher efficacy (Hoy, Tarter, & Woolfolk Hoy, 2006a).

Academic optimism evolved from work on positive psychology, which examines human experience in terms of hope and fulfillment (Hoy, Tarter, and Woolfolk Hoy, 2006a). The theoretical foundations of academic optimism are based upon Albert Bandura's social cognitive and self-efficacy theories, James Coleman's social capital theory, Wayne Hoy's work on culture and climate, and Martin Seligman's study of learned optimism (Hoy et.al., 2006). Academic optimism is a collective set of beliefs held by staff which posits collective efficacy of staff, faculty trust, and academic emphasis create a positive academic environment, which positively influences school achievement while controlling for socioeconomic status (SES), prior student achievement, and urbanicity (Hoy, Tarter, Woolfolk Hoy, 2006).

Woolfolk Hoy, Hoy, and Kurz (2008) determined that academic optimism is an individual teacher characteristic; whereas, before said study, academic optimism was measured in a collective measure at the organizational level. Academic optimism occurs at the individual teacher level and impacts the collective efficacy of the staff. The individual teacher characteristic research formed a set of seven hypotheses to explore the construct of teacher academic optimism and how teacher belief in the potential of all students impacts student

achievement (Woolfolk Hoy et. al., 2008). The seven hypotheses formed at the teacher level include: academic emphasis, faculty trust in students and parents, and collective efficacy, the teacher sense of self efficacy, the context of the classroom which includes the number of students from low socioeconomic status, number of students requiring accommodations, the humanistic classroom management belief of the teacher; the student-centered teacher beliefs of the teacher, and the individual citizenship behavior of the teacher (Woolffolk Hoy et. al., 2008).

Academic Emphasis

Academic emphasis has been defined as a schools quest for academic excellence (Goddard, Hoy, & Woolfolk Hoy, 2000). Academic emphasis and academic press are used interchangeably to refer to teachers' beliefs about academic success (Tschannen-Moran & Hoy, 2007). Academic emphasis reflects on how the school values academic success and how the efforts of the staff will improve student learning and academic achievement (Goddard, Hoy, & Woolfolk Hoy, 2000). Academic emphasis also involves teachers' setting high achievable goals for students and believing the students have the abilities to succeed; while, ensuring the learning environment is serious and order emphasizing and respect academic success (Goddard, 2001). Academic emphasis should expand the time students spend in success and active engagement in academic tasks that relate positively to student learning (Woolfolk, 2007). Hoy, Tarter, and Woolfolk Hoy (2006) identified academic emphasis as a collective property that directly related to student achievement after controlling for socioeconomic status (SES). In one study, a hierarchical linear-model was used while controlling for SES, school size, student race, and gender found that academic emphasis as an important element in explaining achievement in both mathematics and reading (Goddard, Sweetland, and Hoy, 2000). Alig-Milecarek and Hoy (2005) considered the influence of the instructional leadership of the principal and the academic

emphasis of the school and found academic emphasis was significant in explaining student achievement, even in schools with high poverty.

Collective Efficacy

According to Goddard (2001), collective efficacy refers to the perceptions of teachers that the efforts of the faculty, as a whole, will have a positive effect on students. Collective efficacy is the perceived capabilities of the group as a whole to ensure all students, even those from low socioeconomic backgrounds, achieve at high academic levels (Goddard, 2001). The collective efficacy of a school has a reciprocal and cyclical relationship with teacher efficacy, as each have an effect on the other and ultimately on student achievement (Tschannen- Moran, & Hoy, 1998).

Goddard, Hoy, and Woolfolk Hoy (2000) found collective efficacy is an important predictor for differences in student achievement, as teachers, administrators, and support staff make choices about reform and exhibit agency through these choices and the actions taken to accomplish these choices. Researchers found positive associations between student achievement and the self-efficacy of teachers, the self- efficacy of students, and the teachers' collective efficacy beliefs (Goddard, Hoy, & Woolfolk Hoy, 2000). Bandura (1993) found staffs' with high collective efficacy flourished academically, whereas those staffs' with faculty members who had serious doubts about their collective efficacy declined in academic performance or showed little academic progress. Hoy, Sweetland, and Smith (2002) identified collective efficacy as a key variable in explaining student achievement; and, collective efficacy is more important that either socioeconomic status (SES) or academic emphasis. In one body of research, the findings indicated norms supporting academic achievement and collective efficacy

are critically important in motivating achievement among both teachers and students (Hoy et. al., 2002).

Faculty Trust in Students and Parents

Faculty trust in parents and students is a collective school characteristic in the same fashion as collective efficacy and academic emphasis. Trust is one's vulnerability to another in terms the other will act in one's best interest (Hoy, Tarter, & Woolfolk Hoy, 2006). Faculty trust in students and parents can be defined as "faculty's willingness to be vulnerable to another party based on the confidence that the latter party is benevolent, reliable, competent, honest, and open" (Tschannen-Moran & Hoy, 1999). According to Tschannen-Moran & Hoy (1999), the six facets of trust are willingness to vulnerability, benevolence, reliability, competence, honesty, and openness.

The willingness to risk vulnerability is a crucial condition for trust, as people do not have to trust anyone to whom they are not vulnerable (Tshannen-Moran & Hoy, 1999). One tenet important to this facet is vulnerability, which is a reliance on the actions of others and a belief that those actions will not be detrimental, but favorable to the party which is vulnerable. The second tenet, benevolence is the idea that one's well- being will be protected by the trusted party. Competence is the ability of a person to complete expected tasks within the performance of their responsibilities. One critical prerequisite of trust is honesty. Also, it is important that the words and actions of staff members be aligned with their integrity. Openness is the degree to which a person is willing to share and openly be vulnerable to others. The research of Tschannen-Moran & Hoy (1990) claims the previous six tenets are vital components to ensure faculty trust in students and parents were evidenced in the learning environment.

Bandura and Teacher Self-Efficacy

Although collective efficacy is an important tenet of academic optimism, it is very critical each teacher has a high sense of self-efficacy; because, academic emphasis and trust have little relevance if the teacher does not believe they can be successful in the implementation of a new innovation. According to Bandura (1997), self-efficacy belief regulates human functioning through motivational, affective, and decision-making processes. Individuals with high self-efficacy are more likely to seek challenges, use skills more effectively, set higher goals, and place greater effort in completing a difficult task (Bandura, 1997). Fullan (2007) claims self-efficacy is a result of several factors, including personality, previous experiences, level of self-actualization, and stage of career. When the teacher does not believe that a high level of performance will bring about the desired results, they have low outcome expectations for student success, then the new innovation, PBL, will not be implemented successfully (Bandura, 1997).

The construct of teacher self-efficacy is a relevant factor to implementing project-based learning (PBL) instruction (Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998). Teachers who do not believe in their ability to teach students with disabilities or from low socioeconomic-status will have difficulties in successfully ensuring students learn at high levels (Tschannen-Moran, et al., 1998). According to Tschannen-Moran et al., (1998), teachers who have a high sense of self-efficacy will be able to effectively ensure all students learn at high levels, regardless of socioeconomic status or other variables. Teacher self-efficacy and collective efficacy are known predictors of student achievement (Goddard, 2002).

The construct of teacher self-efficacy is founded on Bandura's social cognitive theory (Tschannen-Moran et al., 1998). Teacher efficacy is defined as "the extent to which the teacher believes he or she has the capacity to affect student performance" (Tshannen-Moran et al., 1998,

p. 37). The concept of teacher efficacy was first studied by RAND researchers in 1976 with the research of Rotter's (1966) social learning theory as the foundation for the construct. The RAND Corporation is a non-profit institution that helps improve policy and decision-making through research and analysis and focuses on issues like health, education, national security, international affairs, law, and business (Grissmer, Flanagan, Kawata, & Williamson, 2000). After World War II, Project RAND was implemented to promoting scientific, educational, and charitable purposes of the public welfare and security of the United States (Grissmer et. al., 2000).

The RAND researchers wanted to define the importance of teacher beliefs and how those beliefs might control reinforcement of their actions (Tschannen-Moran, et. al., 1998). The RAND researchers produced a survey to measure teachers' locus of control, the teachers' belief of whether student achievement lay within themselves or with the environment (Tschannen-Moran, et. al., 1998). The construct of teacher efficacy was determined by summing the scores of the survey and the results indicated a strong correlation between the teachers' belief of their ability to impact the most difficult students and increased reading achievement scores among low socioeconomic, minority students (Tshannen-Moran, et. al., 1998).

Teacher efficacy is a multidimensional construct. The groundwork for the construct is based on a study which viewed effective teachers and the outcome of their work (Brophy & Everston, 1980). In their Texas Teacher Effectiveness Study, Brophy and Everston (1980) discovered teachers successful in producing student learning gains tended to have higher expectations for students, they took personal responsibility for student learning, and they viewed students with learning difficulties as obstacles to overcome with appropriate teaching methods, rather than indicators that students could not learn. Brophy and Everston's (1980) research

revealed a link between teacher behavior and student outcomes, with teachers who possess higher self-efficacy produce greater results in their teaching methodology, in comparison, for teachers with lower self-efficacy lesser results are yielded in their teaching methodology.

Bandura's (1977) social cognitive theory and his construct of self-efficacy defined perceived self-efficacy as the beliefs in one's capabilities to organize and execute a course of action to produce an outcome. Self-efficacy beliefs influence thought and emotions allow individuals to expend and sustain substantial effort in the pursuit of their goals (Bandura, 2002). Self-efficacy beliefs guide individuals to persevere toward the goal, despite adversity and setbacks. Ultimately, self-efficacy beliefs guide individuals to exercise control over events that affect their lives (Bandura, 1997).

Self-efficacy is a distinct construct from other conceptions of self, such as self-concept, self-worth, and self-esteem (Bandura, 1997). Self-efficacy is a judgment about the capability to complete a task, or reach a goal; however, it is not evaluative, but rather a driving force (Bandura, 1997). For example, a person might be fully aware of their capabilities of drawing, knowing a second language, or cooking; however, they have desire to learn about these skills which has no effect on their self-esteem (Bandura, 1997). Self-efficacy differs from self-esteem and self-concept, as self-efficacy is task specific and based upon what people believe they are capable of doing in a particular situation in the future (Hoy, 2004). Woolfolk Hoy (2004) contends the tendency to confuse self-efficacy with self-concept or self-esteem, as self-esteem is concerned with one's self-work and self-concepts is a more global construct developed through the comparison of self to others. Self-efficacy represents an individual's belief in his or her ability to organize and execute action required to produce attainments (Bandura, 1997).

Bandura (1997) defines self-efficacy as the ability "to exercise control over one's own thought processes and affective states, and to the self-regulation of goal-directed pursuits and impulsive and addictive behavior, to the exercise of control over social environments" (p. 3). Teachers with a strong sense of self-efficacy would increase student learning through actions to make accommodations, like assistive technology, or by determining a certain instructional activity to ensure a standard is mastered for an individual student. The teacher would exert needed energy to ensure student success and would find needed resources to ensure student success in the curriculum content (Bandura, 1997). Tschannen-Moran et al. (1998) explain that self-efficacy has to do with self-perceptions of competence rather than actual level of competence. As a result of their confidence in their ability to improve student performance for all students, teachers with high self-efficacy embody a belief that they can teach students from low socioeconomic backgrounds.

According to Bandura (1997), mastery experiences are most influential in determining efficacy, as the more mastery experiences that one works through, the higher their self-efficacy. Teachers' self-efficacy is affected by positive or negative experiences. Vicarious experiences allows for teachers to learn through appropriate modeling. Possessing a sense of teacher self-efficacy is important in the project-based learning classroom, as the teacher in the project-based learning environment must establish certain structures which include: defining learning-appropriate goals for students, providing scaffolding for students to ensure mastery of state standards, ensuring multiple opportunities exist for formative assessment, providing revisions as appropriate within the project-based learning environment, and developing social structures that promote participation and a sense of agency (Barron, 1998).

Research indicates the willingness to invest in new practices is derived from the individual's interest in the innovation, a desire to engage student and help them achieve, and a positive sense of self-efficacy (Fullan, 2001; Hall & Hord, 2001). Based on more than a decade of research, Hall and Hord (2001) conclude teachers' motivation to adopt an innovation is highly personal and that several motivational factors influence a teacher's decision to put efforts into a new innovation, which include student success, the perceived value and costs of the new innovation, and the teacher's sense of self-efficacy. The teacher's willingness to change instructional practices is key to the success of engaging students in deep, meaningful learning that supports the development of twenty-first century skills through the implementation of PBL (Hall & Hord, 2001). Feldman (2000) emphasizes the importance of teachers' desires for a change in the instructional platform, as they have the power to implement classroom reform; also, Gess-Newsome, Southerland, Johnson, and Woodbury (2003) argue individual change is the foundation of systemic change. Teachers' have direct influence on happenings in the classroom.

Willower, Eidell, and Hoy (1967) conceptualized teachers' beliefs about classroom change along a continuum with custodial beliefs at one end and humanistic beliefs at the other end of the continuum. Custodial teachers are defined as individuals who view students as irresponsible and undisciplined who must be controlled through punitive sanctions; whereas, a humanistic teacher views the classroom as a place to foster interpersonal relationships (Woolfolk Hoy, Hoy, & Kurz, 2008). Humanistic teachers' are individuals marked by optimism, openness, flexibility, and understanding. Humanistic teacher instructional and academic choices tend to resemble their beliefs about how children learn; therefore, they employ teaching strategies consistent with the creation of child-centered classrooms, which tend to be less traditional (Hoy,

2005). Humanistic teacher's citizenship behavior refers to a teacher's willingness to go the extra mile to ensure students succeed in all of their endeavors. In reality, the humanistic teacher is altruistic in behavior, courteous, and committed to the value of helping others as a civic responsibility (Hoy, 2001). Woolfolk Hoy, Hoy, and Kurz, (2008) posit that teachers who believe in the potential of all students, make management and instructional decisions aligned with these expectations, and are committed to the success of their students will be more academically optimistic.

Concerns Based Adoption Model

Based upon the research of Hall and Hord (1987), the Concerns Based Adoption Model (CBAM) evolved to measure, describe, and explain the process of change experienced by teachers involved in attempts to implementation of new instructional practices. Fullan (1986) indicates CBAM was developed during the heyday of the innovation-focused approach to educational change to improve teaching and student learning which occurred in high frequency through the 1980's and 1990's. CBAM was developed at the University of Texas Research and Development Center for Teacher Education during the mid 1980's (Anderson, 1997). The theoretical foundation behind CBAM entails several assumptions about curriculum and instructional change which include: change is a process, not an event, change is accomplished by individuals, change is a highly personal experience, change involves developmental growth in feelings and skills, and change can be facilitated by interventions directed toward the individuals (Hall & Hord, 1987). While CBAM was developed mainly through the study of teacher response to external changes in curriculum and instruction, the model is essentially descriptive and predictive, not prescriptive, of teacher attitudes and behaviors in the process of learning to use new classroom practices (Hord & Roussin, 2013). CBAM is comprised of three diagnostic

tools which measure individuals use of the new innovation. I used two components of the CBAM, the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool which allowed me to identify how each respondent felt about and to operationalize how well they used project-based learning. The third component of CBAM is the Innovation Configuration Map

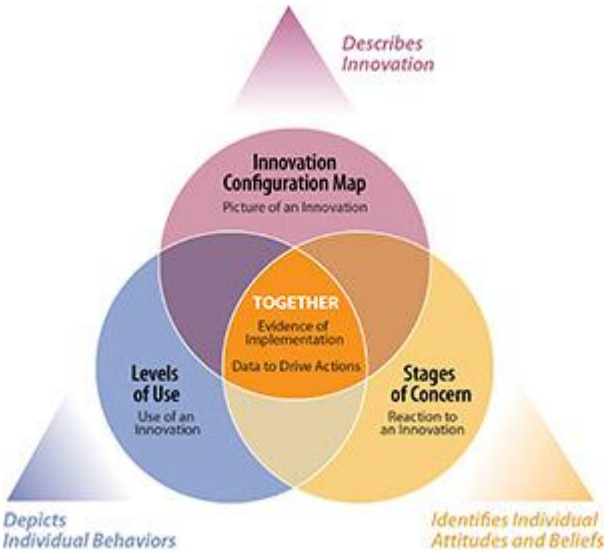


Figure 2.1 The Three Diagnostic Dimensions of CBAM

The Stages of Concern

The Stages of Concern measures the affective side of change, the feelings, emotions, and attitudes towards the new innovation (Hord & Roussin, 2013). The Concerns Based Adoption Model (CBAM) theory idealizes the Stages of Concern is a developmental progress in in which teachers implementing a change have concerns of varying intensity (Hord & Roussin, 2013). Seven stages help identify the different stages of the change process. A teacher who begins to implement a new innovation will likely be placed in stage 0 or stage 1, which correlates to the initial seeking of knowledge about the new innovation; whereas, a teacher at stage 5 and stage 6 will be more concerned about using the innovation with fidelity and improving the innovation (Hall & Hord, 1987). The Stages of Concerns evaluates teachers' responses about the new

innovation and identifies their appropriate stage based upon the teacher's response (Hall & Hord, 1987). At Stage 0, UNCONCERNED, the teacher has little knowledge about or interest in the change, while at Stage I, INFORMATIONAL, the teacher is interested in learning more about the innovation (Hall & Hord, 1987). At Stage II, PERSONAL, the person reflects on their anxieties about implementing the new innovation and at Stage III, MANAGEMENT, the teacher begins to experiment with the implementation and is usually concerned about the logistics and managing new behaviors associated with the practice (Hall & Hord, 1987). At Stage IV, CONSEQUENCE, the teacher's focus of concern is based on the impact of the change on students in the classroom and the possibilities of modifying the innovation, while at Stage V, COLLABORATION, teachers reflect interest in working with other teachers to improve the innovation to benefit students; while, Stage VI, REFOCUSING, the teacher is concerned about making major modifications to better serve students (Hall & Hord, 1987). According to Hall and Hord (1987), teachers feeling about an innovation will determine whether or not the innovation occurs in the classroom.

To gain teachers' insight about the innovation, I used the one-legged conference which allowed for the gathering of data in a very non-assuming, informal manner. The one-legged conference occurred in the hallway, break area, or work area, where the teacher was asked, in an informal, non-interview format, about the innovation, while the researcher gathered the data and scribed their responses in field notes. The Stages of Concern diagnostic tool consists of seven levels (Hord & Roussin, 2013).

Table 2.1 Stages of Concern

Concern Level	Typical Statement
Unconcerned	"I think I heard something about it, but I'm too busy right now with other priorities to be concerned about it."
Informational	"This seems interesting, and I would like to know more about it."
Personal	"I'm concerned about the changes I'll need to make in my routines."
Management	"I'm concerned about how much time it takes to get ready to teach with this new approach."
Consequence	"How will this new approach affect my students?"
Collaboration	"I'm looking forward to sharing some ideas about it with other teachers."
Refocusing	"I have some ideas about something that would work even better."

According to Hall and Hord (1987), individuals in early stages of change will likely have more self-focused concerns; however, as they embrace the change and become more skilled in using the innovation, their concerns focus shifts from self-focused to broader-focused, such as how the initiative might impact students.

The Levels of Use

Another component of the CBAM, the Levels of Use (LoU) diagnostic tool, focuses on the behaviors taking place or not taking place in relation to the innovation (Hall & Hord, 1987). The Levels of Use tool consists of eight behavioral profiles that describe actions educators engage in as they use the innovation, in this case PBL (Hord & Roussin, 2013). Unlike the Stages of Concern, the Levels of Use places emphasis on behaviors taking place, or not taking

place, in relation to the innovation, PBL (Hall& Hord, 1987). Taking account of feelings and perceptions of individuals about the new innovation, PBL, will be useful; however, what people feel and how they perceive a situation are different from what the individual will do (Hall & Hord, 1987). The Levels of Use framework focuses on general teacher behavior as they prepare to use, begin to use, and gain experience implementing a classroom change (Hall & Hord, 1987). Progression from one level to the next is marked by key decision points and corresponding behaviors in several domains: acquiring information, assessing, sharing, planning, status reporting, performance, and knowledge (Anderson, 1997; Hall & Hord, 1987). At Level 0, NONUSE, the teacher has little knowledge of the change and has not made plans to use it and at Level I, ORIENTATION, the teacher decides to seek more information about the innovation; whereas, at Level II, PREPARATION, the teacher is actively preparing to put the change into place, but they have failed to implement the change (Anderson, 1997; Hall & Hord, 1987). During Level III, MECHANICAL, the teacher begins implementation and usually struggles with the logistics of implementation, while at Level IV(A), ROUTINE, the teacher establishes a pattern of regular use and makes a few changes to the innovation (Hall & Hord, 1987). At Level IV(B), REFINEMENT, the teacher actively assesses the impact of the innovation and initiate changes, while at Level V (INTEGRATION), teachers begin to collaborate with other teachers to make changes in implementation; and, finally, at Level VI, RENEWAL, teachers feel comfortable in making major changes to the innovation (Hall & Hord, 1987).

Hall and Hord (1987) inform that respondents' data places them into certain categories on the Stages of Concern (SoC) and on the Levels of Use (LoU) diagnostic tool which consists of categories. The Stages of Concern (SoC) categories include unrelated, self, task, and impact (Hall & Hord, 1987). The category of unrelated correlates at Stage O (Awareness) is when the

teacher is not concerned about teaching the innovation (Hall & Hord, 1987). Stages 1 (Informational) and Stages 2 (Personal) are categorized under self and individuals in this category point to their feelings of potential inadequacy and the uncertainty about the situation (Hall & Hord, 1987). Stage 3 (Mechanical) correlates to the task category where concern focuses on logistics, preparation of materials, and the daily schedule. The last category, impact, is applicable to Stage 4 (Consequence), Stage 5 (Collaboration), and Stage 6 (Refocusing). At the impact category, teachers become concerned about how their teaching is affecting students and how they can improve themselves as teachers (Hall & Hord, 1987).

In looking at Levels of Use (LoU) diagnostic tool, Hall and Hord (1987) indicated two categories exist, a "non-use" and a "use" category. The levels are based upon the respondents' consistent use of the innovation properly. The "non-use" category is the absence of innovation or related behaviors of not using the innovation (Hall & Hord, 1987). Respondents categorized in Level 0-Nonuse, Level I-Orientation, and Level II-Preparation are categorized as "non-users" on the Levels of Use (LoU) diagnostic tool. In the "non-use", respondents are either not worried about using the innovation, reading up on the innovation, or preparing to implement the innovation to some extent (Hall & Hord, 1987).

The "use" category is described by at least one making a day-to-day focus on implementing the innovation; and, ultimately, as one matriculates to the higher levels of the Levels of Use diagnostic tool, they implement modifications to the innovation to make the innovation more effective for clients (Hall & Hord, 1987). Respondents who were categorized as "users" were placed into Level III-Mechanical, Level IVA-Routine, Level IVB-Refinement, Level V-Integration, and Level VI-Renewal of the Levels of Use diagnostic tool.

The Concerns-Based Adoption Model (CBAM) was useful in evaluating respondents' placement with regards to their self-efficacy. Specifically, the Stages of Concern diagnostic tool allowed me to op, the Levels of Use also uses a similar approach to determine how well they actually implement the new innovation.

Table 2.2 Levels of Use

Level	Typical Statement
Nonuse	"I've heard about it but, honestly, I have too many other things to do right now."
Orientation	"I'm looking at materials pertaining to the innovation and considering using it sometime in the future."
Preparation	"I've attended the workshop and I've set aside time every week for studying the materials."
Mechanical Use	"Most of my time is spent organizing materials and keeping things going as smoothly as possible every day."
Routine Use	"This year it has worked out beautifully. I'm sure there will be a few changes next year, but basically I will use it the same way I did this year."
Refinement	"I recently developed a more detailed assessment instrument to gain more specific information from students to see where I need to change my use of the innovation."
Integration	"Not everyone has all the skills needed to use the program so that it has the greatest impact on student learning. I've been working with another teacher for 2 years, and recently a third teacher began working with us."
Renewal	"I am still interested in the program and using it with modifications. Frankly, I'm reading, talking, and even doing a little research to see whether some other approach might be better for the students."

Summary

As we move into the second decade of the 21st century, the system of education has to transform itself to better equip students for success in the workforce (Wagner, 2008). Business leaders claim many of the youth leaving high school and higher education institutions are ill-prepared to be successful in a 21st century workforce (Luyten, Sheerens, Visscher, Maslowski, Witziers, & Steen, 2005).

In an effort to better prepare students for success, students need to think creatively, work collaboratively with other students, and be able to present their ideas and thoughts in a coherent manner (Wagner, 2008). Project-based learning (PBL) is an instructional modality which allows for students to work in groups that help facilitate 21st century skills, like collaboration, critical thinking, academic competency, and character competency (Jones, Rasmussen, & Moffitt, 1997). The learner-centered constructivist pedagogy is a major paradigm shift in teaching and learning, and thus, requires changes in practices at the school and classroom levels (Ravitz, 2010). As teachers, a critical component to PBL implementation, attempt to make these changes they often face steep learning curves and might encounter struggles that hinder their ability to continue with implementation (Ravitz, 2010). The classroom teachers' belief in their ability, or self-efficacy, to implement project-based learning (PBL) impacts the successful student acquisition of 21st century skills. If we continue with our traditional approaches to education, we will continue to receive the same results, which includes students taking state test to measure basic skills and will fail to prepare students to effectively transition into the workforce

Chapter 3

Methodology

This chapter outlines the method and design used to undertake the study. The major components of the chapter include the study design, purpose of the study, the research questions of the study, site selection, the Institutional Review Board (IRB) review, the framework of the study, the study site, the respondents, the researcher, data needs, data resources, data collection, and data analysis.

Design

A qualitative case study was used to gather greater understanding of the ways in which teachers' self-efficacy, a tenet of academic optimism, impacted instruction in a project-based classroom. According to Creswell (2007), great strength exists in the use of the qualitative method to answer questions about real life situations as it represents a legitimate mode of social and human science exploration. The study was best suited for the qualitative method as it focused on what teachers believed about their own self-efficacy, a tenet of academic optimism, and how their self-efficacy assisted students in the acquisition of 21st century skills in a project-based classroom.

Research Questions

The following research questions guided this study:

1. What do teachers do in a project-based learning classroom? Why? How?
2. How does teacher self-efficacy inform PBL instruction?
3. How useful is self-efficacy in understanding the project-based learning classroom?
4. What other realities about project-based learning are revealed by the data?

To address research question one, "What do teachers do in a project-based learning classroom? Why? How?", I reviewed documents from the district and from Engage, which was the institution that provided professional development for project-based learning teachers. I also used grand tour interview questions and the participants' drawings, which provided rich description to assist in answering the question.

In an effort to address research question two and three, "How does teacher self-efficacy inform PBL instruction?" and "How useful is self-efficacy in understanding project-based learning?", I used one-legged conferences, interviews, and observations to gather data and used that data with the Stages of Concern (SoC) and Levels of Use (LoU) diagnostic tool as a way to gauge teachers' emotions, thoughts, or beliefs about project-based learning (PBL), and their ability, or self-efficacy, to implement PBL.

In answering question four, "What other realities about project-based learning are revealed by the data?", I used one-legged conferences, interviews, drawing analysis, and observation notes from the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools. I believed teachers who reach the higher levels, herein defined as levels four, five, and six on the SoC diagnostic tool and levels four A, four B, five, and six on the LoU diagnostic tool had high self-efficacy, which positively impacted PBL instruction and the acquisition of 21st century skills. Table 3.1 presents each research question aligned to the methods used to answer them.

Table 3.1 Data Analysis Table

Research Question	Analysis Method
1. What do teachers do in a project-based learning (PBL) classroom? How? Why?	Content Analysis, Interviews, Drawing Analysis, One-Legged Conferences, Observations
2. How does teacher self-efficacy inform PBL instruction?	Interviews, Drawing Analysis, One-Legged Conference
3. How useful is self-efficacy in understanding the PBL classroom?	Interviews, Drawing Analysis, Stages of Concern Diagnostic Tool, Levels of Use Diagnostic Tool, Observations
4. What other realities about PBL are revealed by the data?	Interviews, Drawing Analysis, Observations

I needed to understand how teacher self-efficacy assisted in the acquisition of 21st century skills in a project-based classroom (PBL); therefore, I needed to know what training teachers experienced for PBL instruction which I achieved through content analysis. I also needed to gain insight on what teachers do in a PBL classroom, why teachers use PBL, and how individual teacher's beliefs, or self-efficacy, impacted the successful implementation of PBL in the classroom. I achieved this by conducting observations, one-legged conferences, and interviews.

Researcher

According to Gall, Gall, and Borg (2003), the researcher looks for constructs which bring order to the descriptive data and relates the data to other research findings reported in the literature. The credibility of the researcher is important in a qualitative study, as the researcher is the major instrument of data collection and analysis (Patton, 2005). According to Creswell (2007), the researcher goes to the people, setting, or site to observe behavior in its natural setting. Also, researchers bring their own worldviews, paradigms, or sets of beliefs to the research project and use interpretive and theoretical frameworks to guide their study (Denzin & Lincoln, 2005).

As the researcher, I am a public intermediate school campus principal in a suburban school district in the Southwestern part of the United States. I desire for students to acquire 21st century skills for college readiness and for their future economic and social success. As the instructional leader of the campus, it is imperative to hire, coach, and provide feedback to teachers who facilitate instruction in the classroom, especially the project-based classroom. It is vital the instructional leader understand the teachers' belief, or sense of self-efficacy, to implement project-based learning and it is important to discover strategies to increase teacher self-efficacy to facilitate student acquisition of 21st century skills through project-based learning.

I taught United States History for seven years at the high school level and also served as a social studies instructional support person for the district for four of those years. I served four years as an assistant principal in diverse, suburban high school and have served four years as a principal at a diverse, suburban intermediate school. In the last two years, I have received training through Engage, an institution which trains administrators and teachers on project-based learning, curriculum planning, and appropriate measures to assess student learning in a project-

based classroom. As the instructional leader in my building, I desire to be an asset to instructors' implementation of project-based learning, which could be done by observing teachers' instructional strategies, and by providing instructional feedback with the ultimate goal of preparing students with academic and soft skills to ensure success in the 21st century global workforce. This study provides a unique perspective of observing teachers' efficacy in a project-based learning classroom and how it impacts students' acquisition of 21st century skills.

According to Creswell (2007), I needed to focus on establishing supportive, respectful relationships with participants to ensure accounts were accurate. To this end, I conducted daily walkthroughs and met with teachers on a weekly basis to discuss observations, thus building a trusting relationship. Because of my administrative position, I had access to the teacher population who utilize project-based learning. I did acknowledge the possibility of a possible power issue; however, I do not feel a power imbalance between the researcher and the participants was present and I believed participants felt comfortable in expressing their true thoughts, since an established relationship had been in place for the last two years.

Respondents

To better understand thoughts and experiences with the implementation of project-based learning (PBL), this demographic section presents the personal attributes of each respondent. Six respondents, Nancy, Nina, Nick, Norma, Tara, and Tom, all implemented project-based learning (PBL) and all received the training from Engage in the summer of 2013, thus providing the reason for their selection for this study. The experience in the field of education for these teachers ranged from 2 years to 27 years, with the average teaching experiencing equaling 9.7 years. While Tom and Norma entered into the field of education after completing their credentials at a higher education institution, Nancy, Nick, Tara, and Nina entered into the field of

education after experiencing a different career. Nick came into education from the business world.

The respondents, four females and two males, were chosen as a result of their completing the 2013 Engage summer training and all respondents work at the same study site. Project-based learning (PBL) is implemented in two classroom settings. The first setting is a traditional classroom which has four traditional walls that can house up to 35 students in each class. One certified teacher facilitates instruction in the traditional classroom. In the non-traditional classroom setting, the adjoining walls which connect two traditional classrooms have been removed, thus creating one large room and houses up to 70 students in one, large room. Two certified instructors facilitate instruction in the non-traditional classroom.

Table 3.2 Teachers' Years of Experience

Name	Years of Experience	Content	Class type (T-Traditional/NT-Non-traditional
Tom	13	Reading	T
Tara	7	Reading	T
Nancy	7	Reading	NT
Norma	2	Science	NT
Nick	4	Science	NT
Nina	27	Math	NT

Each teacher had different content areas for which they were responsible in ensuring students master the respective TEKS. Three are reading teachers, two are science teachers, and one is a math teacher. In the project-based learning classroom, teachers responsible for ensuring students master the English language arts and social studies Texas Essential Knowledge and Skills (TEKS) are referred to as humanity teachers; while, instructors responsible for students ensuring students master the math and science TEKS are referred to as science teachers.

Four teachers interviewed worked in the larger, non-traditional classrooms (NT). One of the reasons the number of teachers is higher in the non-traditional (NT) setting, in comparison to the traditional (T) setting is because the district's initial thoughts were that the non-traditional (NT) setting better served the facilitation of project-based learning (PBL). During the 2013-2014, the district decided to implement PBL in a more traditional setting to compare the facilitation processes. Therefore, only two teachers taught PBL in a traditional classroom.

Nick is an African-American male who has been married for 20 years. He has two children, one in ninth grade and one who is attending a higher education institution. Nick was born in Texas and grew up in the eastern part of the state. He enjoys listening to music and cooking outdoors with his family. This is his first year of implementing project-based learning (PBL). Nick explains his previous work experiences:

> I have taught for three years and I went to a local four year university. I did some things after college, mainly in the business field, but I knew that I wanted to teach, you know help students. So, I started working in the special education behavior unit as a teacher aide. The behavior unit contained students who had extreme misbehaviors, so it was a good training ground for teaching. If I could work

with students with extreme behavior, I could do anything in a regular education class. I finally got an opportunity for this job as a science teacher. I love it!

Nick taught 60 students during one period with another certified teacher in one, large room. He has plans to continue to pursue a graduate degree in the fall and aspires to enter into administration. He explained he will be able to impact a larger number of students in an administrative position.

Nancy is an African American female who went back to school to earn her credentials to become a teacher after serving in the social work field for a number for years. At any given time, she might have up to six foster children who live with her and her husband. She has experienced many ups and downs with several of her foster children, but overall, she finds it be a rewarding experience. Nancy has implemented project-based learning (PBL) for the previous two years, with last year being a trial session. She explained why she became a teacher:

> I became a teacher, well because, I love kids and I think that teachers impact the lives of the kids they teach. We love these kids, these are our kids. They need to see they that you care, they you want to encourage them. I don't know half of these kids that give me hug in the hallway, they are not my students. I just say "hey baby, how are you". It doesn't hurt us to be nice.

Norma is married and completing her second year at the study site. She was hired at the beginning of the 2012-2013. She completed her higher education degree four years after graduating from high school, thus making her one of the youngest staff members on the campus. She enjoys family outings and spending time with her husband. Norma has always had a love for children, which is one of the main reasons she entered into the field of education. She worked summer camps during her high school years.

I attended a private religious higher education institution in Texas.

I think I always wanted to be a teacher, it is not something that just happened. I have been working with kids since I was like 12. I actually did a summer camp and I would work with kindergarten and 1st grade. So, I worked there from like when I was 12 until I was16. When I was 16, I actually got to direct the camp. Teaching was kind of like a natural transition.

Nina has taught in two different school districts in her 27-year career. She is from a rural area in the Southwestern part of the United States. She grew up on a farm and has two grandchildren with whom she spends a great amount of time. Nina has taught math at the study site for seven years. Nina referred to her style of teaching as "old school". She desires for her students to do well; and, in order to do well, Nina felt students need to be attentive in class, turn in their homework in a timely fashion, and maintain respectful behavior. For the previous four years, she taught math in a traditional classroom and usually had around 30 students in each classroom. She explained how she became a teacher:

It kind of just happened. You see, I come from a small town. I really didn't have any aspiration to do anything, but just knew I didn't want to stay at home. My dad was a farmer. So, I went to college and majored in business. So, when I got out of school, I could not find any jobs, so I started at Boykin's High School on a deficiency plan to be certified in elementary education. I did self-contained fourth grade, then did sixth grade. I taught math, science, and self-contained.

It kind of just happened. I mean no explanation at all.

Tara is a Hispanic female who also instructed project-based learning (PBL) on a trial basis the previous year. During the trial basis, Tara implemented PBL in a non-traditional

classroom. She has taught English language arts for the previous seven years and has been at the current site for the past four years. She is married with two children who keep her quite busy. Tara served in the armed forces and decided that teaching is what she desired to do after serving time in the military. She explained:

> This will be my 7th year. I started substituting after I got out of the military and I really enjoyed it. When I got into a permanent substitution position, then I decided wanted to go to school for that. So, I started teaching!

Tom is an African-American educator in his late 30's who has been teaching for 13 years in public education. He taught humanities and has two classes with 51 students total in a traditional classroom with adjoining walls are still up, thus not creating one, large great room. Before working at this school site, Tom worked for a large, urban school district and specialized in assisting teachers who were alternatively certified matriculate into the district curriculum and assessment. Tom is married with three children, including one set of twins. One of his reasons for entering into education was to make a difference in the lives of students'. Ultimately, Tom desires to become a campus administrator in the next few years. He explained:

> I want to become an administrator at a campus, possibly secondary. It has been goal of mine for a long time. Also, I have two twin daughters who are four years old and they are quite expensive. I could support my family better with an administrative position.

Several similarities and differences were observed from the six respondents'. Nick, Nancy, and Norma wanted to make the difference in the lives of children. Nancy claimed, "I became a teacher, well because, I love kids and I think that teachers impact the lives of kids." One difference between the respondents' is how they entered into the field of education. Norma

reports that she wanted to be a teacher from the time she helped in facilitating summer camps at the age of 12. Norma explains, "I think I always wanted to be a teacher, it is not something that just happened." On the other hand, Nina entered into the field of education differently. Nina states, "It kind of just happened. I really didn't have any aspiration to do anything, but just knew I did not want to stay at home." In similar fashion, Tara served in the armed forces for several years. Tara provided the following explanation, "I got a permanent substitution position, then decided I wanted to go to school for that."

Data Sources

Data for this study was accumulated in several ways: document analysis, interviews/drawings, and observations, of teachers in a project-based classroom. The required permission to gain access to project-based learning teachers was obtained from the Deputy Superintendent of the school district in December, 2013. I explained the purpose of the research and attained appropriate Institutional Review Board (IRB) permission. A copy of the email indicating approval can be located in Appendix A.

After receiving approval from the Deputy Superintendent, I then gained appropriate Institutional Review Board (IRB) permission which involved designing a exempt research protocol requesting researcher approval for a content review, personal interviews, a drawing analysis, and observations. The IRB was formally approved in January, 2014 and was reviewed by the Deputy Superintendent. The IRB and the Informed Consent Forms are located in located in Appendix A.

To answer the research questions, several sets of data were needed. First, I needed know what training was implemented for teachers tasked with shifting form traditional delivery to project-based learning (PBL). I also needed insight on what teachers did in a PBL classroom,

why teachers used PBL, and the ways in which individual teacher's beliefs, or self-efficacy, impacted the successful implementation of PBL in the classroom.

I needed to interact with teachers directly to gain insights into their perspectives about PBL. I asked the respondents' to illustrate their experiences with project-based learning (PBL) and then to describe their feelings about the implementation process. At the beginning of the interview, each participant received a blank piece of paper on which they were asked to illustrate their thoughts about project-based learning (PBL). According to Pink (2007), researchers should consider visual ethnography or the possibilities of narrative research. The drawings added rich, thick detail to participants' responses. Following the completion of the drawing, grand tour questions were used to guide the interview. They included:

1. Tell me about your drawing?
2. Tell me a little bit about yourself and why you became a teacher?
3. What is project-based learning?
4. How is project-based learning implemented? What do the students do? What does the teacher do?
5. What skills will students need in the 21st century workforce?
6. Do you believe you effectively implement project-based learning? Why? Why Not? In your opinion, what beliefs, actions, and procedures will show evidence that you believe, or have a sense of self-efficacy, that you can effectively facilitate instruction in a PBL class?

In an effort to make participant's feel comfortable, I asked if they desired to conduct the interview at school or at another location, like a coffee shop. Several participants felt more comfortable conducting the interviews at school, while others chose to have interviews

conducted at an off-site location. I used one-legged conferences to gain understanding of teachers' perceptions about implementing project-based learning (PBL). These informal conferences occurred as teacher's talked with me in the classroom, hallway, or teacher lounge about their thoughts, concerns, or issues about PBL. Interviews lasted between 16 minutes to 27 minutes and were conducted in locations of the participant's choice.

It was necessary for me to observe teachers in their setting. According to Hammersley and Atkinson (1995), observing is a skill that requires addressing issues, like impression management and the potential marginality of the researcher.

To determine how individual teacher's beliefs, or self-efficacy, impacted the successful implementation of PBL in the classroom, I conducted one-legged conferences and observed teacher behaviors in the classroom. Creswell (2007) informs that the researcher must select a site, identify who or what to observe, identify the role of the observer, design an observational protocols, and record activities.

Data Analysis

I used the Concerns-Based Adoption Model (CBAM) protocol to record findings about the beliefs and actions of PBL teachers (Hall & Hord, 1987). CBAM was developed in the early 1970's to determine the effectiveness of new innovations in schools (Hall & Hord, 1987). The CBAM model can be found in Appendix A. As part of the observations, I used the "one-legged conference" (Hall & Hord, 1987). The exchange takes place in a classroom, hallway, or teacher lounge and is usually one to two minutes in length during which the researcher asks open-ended questions about the implementation of the new innovation (Hall & Hord, 1987). It is vital to ask open-ended questions, like, "How's it going with PBL?" and one must be able to listen carefully to prompt an appropriate probing question (Hall & Hord, 1987

According to Hall and Hord (1987), some appropriate probing questions might include:

A) How do you feel about it?

B) What do you think of it?

C) Any problems you are experiencing with the new innovation?

After each one-legged conference, I immediately went back to my office and created a voice memo on my personal cellular phone. In the voice memo, I was able to speak about each participants response to each question and, eventually I used the voice memo to record responses in my field notes.

I used two components of the Concerns-Based Adoption Model (CBAM), the Stages of Concern (SoC) diagnostic tool and the Levels of Use (LoU) diagnostic tool. The Stages of Concern (SoC) measured the affective side of change, the feelings, emotions, and attitudes towards the new innovation; whereas, the Levels of Use (LoU) focused on the behavior dimension, or the implementation of the new innovation (Hall & Roussin, 2013). By using the one-legged conferences, I was able to collect data about teachers' perceptions about PBL through informal discussion, write the teachers' response in my journal, and used the Stages of Concern (SoC) tool to determine the teachers' perception about PBL.

The Stages of Concern diagnostic tool consists of seven levels (Hord & Roussin, 2013). Based on the teachers' response, I was able to identify teachers' thoughts, feelings, and emotions about implementing PBL in the classroom. The following teacher responses' correlate to the Stages of Concern (SoC) diagnostic tool:

Stage 0 (Unconcerned): "I am not concerned about PBL"

Stage 1 (Informational): "I would like to know more about PBL"

Stage 2 (Personal): "How is PBL affecting students"

Stage 3 (Management): “I spend all of my time getting materials ready”

Stage 4 (Consequence): “How is PBL affecting students”

Stage 5 (Collaboration): “I am concerned about relating what I am doing with what my coworkers do”

Stage 6 (Refocusing): “I have some ideas about what would work better”

According to Hall and Hord (1987), individuals in early stages of change will likely have more self-focused concerns; however, as they embrace the change and become more skilled in using the innovation, their concerns shifts from self-focused to broader-focused, such as how the initiative might impact students.

Another component of the CBAM, the Levels of Use (LoU) diagnostic tool, focuses on the behaviors taking place or not taking place in relation to the innovation (Hall & Hord, 1987). Observations allowed me to visit classrooms and to view the actions and procedures related to teacher self-efficacy and the implementation of project-based learning (PBL). Between February 6, 2014 and March 7, 2014, I conducted four observations on each teacher that lasted up to 30 minutes. The observations allowed me to observe the actions and procedures of each teacher in the classroom. I placed the notes of my observations of each teacher in my field notes.

Certain behaviors correlate with the Levels of Use (LoU) diagnostic tool. For example, level zero (Non-Use) teacher behaviors could include one not looking at literature about the PBL or even trying to find out more about the innovation; whereas, a level two (Preparation) teacher would be preparing materials to use in the innovation (Hall & Hord, 1987). The Levels of Use tool consists of eight behavioral profiles that describe actions educators engage in as they use the innovation, in this case PBL (Hord & Roussin, 2013). Unlike the Stages of Concern, the Levels

of Use places emphasis on behaviors taking place, or not taking place, in relation to the innovation, PBL (Hall& Hord, 1987).

Taking account of feelings and perceptions of individuals about the new innovation, PBL, was useful; however, what people feel and what they actually do are two different things. By using the Levels of Use diagnostic tool, I was able to distinguish conceptually and operationally the actions of teachers with regards to PBL. According to Hord and Roussin (2013), the Levels of Use is comprised of:

A) Level 0 (Non-use)- The person shows no interest in the innovation
B) Level 1(Orientation)-The person seeks information about the innovation
C) Level II(Preparation)- Prepares to begin use of the innovation
D) Level III(Mechanical)-Makes changes to better organize use; usually no smoothness in sequencing, pacing and distributing materials and activities.
E) Level IVA(Routine)-Makes few or no changes to an established pattern of use;
F) Level IVB (Refinement)-Makes changes to increase client outcomes based on assessment
G) Level V(Integration)-Makes changes to increase outcomes
H) Level VI (Renewal)-Explores major modifications to current innovation

Movement through each level is a quasi-developmental, not just a lock-step, one-way progression through each level. At the beginning of a new innovation, most individuals are at Stage 0, the non-user, and usually have concerns about gaining information or orienting themselves about the innovation (Hall & Hord, 1987). As teachers begin to become more experienced and skilled with the innovation, it is desired that concerns in Stages zero, one, two,

and three decrease; whereas, the intensity of beliefs and actions correlate to the higher stages in each respective diagnostic tool (Hall & Hord, 1987).

Hall and Hord (1987) inform that respondents' data places them into certain categories on the Stages of Concern (SoC) and on the Levels of Use (LoU) diagnostic tool which consists of several levels that are placed into categories. The Stages of Concern (SoC) categories include unrelated, self, task, and impact (Hall & Hord, 1987). The unrelated category correlates to Stage O (Awareness) in which teachers are not concerned about teaching the innovation (Hall & Hord, 1987). Stages 1 (Informational) and Stages 2 (Personal) are categorized under self. Individuals in this category point to their feelings of potential inadequacy and the uncertainty about the situation (Hall & Hord, 1987). Stage 3 (Mechanical) correlates to the task category where concerns focus on logistics, preparation of materials, and the daily schedule. The last category, impact, is applicable to Stage 4 (Consequence), Stage 5 (Collaboration), and Stage 6 (Refocusing). At the impact category, teachers become concerned about how their teaching is affecting students and how they can improve themselves as teachers (Hall & Hord, 1987).

In looking at Levels of Use (LoU) diagnostic tool, Hall and Hord (1987) indicated two categories exist, a "non-use" and a "use" category. The levels are based upon the respondents' consistent use of the innovation properly. The "non-use" category is the absence of innovation or related behaviors of not using the innovation properly (Hall & Hord, 1987). Respondents categorized in Level 0-Nonuse, Level I-Orientation, and Level II-Preparation are categorized as "non-users" on the Levels of Use (LoU) diagnostic tool. In the "non-use", respondents are either not worried about using the innovation, reading up on the innovation, or preparing to implement the innovation to some extent (Hall & Hord, 1987).

The "use" category is described by at least one making a day-to-day focus on implementing the innovation; and, ultimately, as on matriculates to the higher levels of the Levels of Use diagnostic tool, they implement modifications to the innovation to make the innovation more effective for clients (Hall & Hord, 1987). Respondents who were categorized as "users" were placed into Level III-Mechanical, Level IVA-Routine, Level IVB-Refinement, Level V-Integration, and Level VI-Renewal of the Levels of Use diagnostic tool.

Documents were reviewed, coded, and sorted as to how project-based learning (PBL) was implemented at the study site. The content analysis of the documents allowed me to review literature describing the vision of the district, why the district uses PBL in its grades three through eighth classrooms, and provided understanding of how PBL should be implemented. The documents provided me guidance on how to ensure PBL was following the appropriate PBL protocols. This allowed me to combine my observation data with the Levels of Use (LoU) diagnostic tool which provided insight on teacher self-efficacy and how it impacted acquisition of 21st century skills in a PBL classroom.

To address research question one, "What do teachers do in a project-based learning classroom? Why? How?", I reviewed documents from the district and from I-Engage, which is the institution providing professional development for project-based learning teachers. I also used grand tour interview questions and the participants' drawings which provided data in answering the question. The interview questions were transcribed and typed into a document. Member checking allowed for accuracy of the participants response. After I transcribed the participants' responses, I reviewed the responses and used the Levels of Use (LoU) and Stages of Concern (SoC) diagnostic tool to inform me on teacher self-efficacy.

To address research question two, “How does academic optimism, specifically as it relates to teacher self-efficacy, inform PBL instruction”, I used the one-legged conferences to gather data to use with the Stages of Concern (SoC) and Levels of Use (LoU) diagnostic tool as a way to gauge teachers’ emotions, thoughts, or beliefs about project-based learning (PBL), and their ability, or self-efficacy, to implement PBL.

By using the Stages of Concern (SoC) and Levels of Use (LoU) diagnostic tools, I determined teachers’ self-efficacy based upon their present levels of use in each tool. For example, if a teachers’ perception, based upon the teachers’ responses in the one-legged conferences, aligned with level 0 on the Stages of Concern (SoC) diagnostic tool, which equates to little concern about the innovation, the teacher would need to gain more information about the innovation to gain higher self-efficacy..

The ultimate desire is for instructors’ sense of self-efficacy to be measured in levels four, five, and six on the SoC diagnostic tool and to be at levels of four A, four B, five and six on the LoU diagnostic tool. As teachers rank in the higher levels of the LoU and SoC diagnostic tool, the teachers’ higher self-efficacy should equate to higher levels of use of PBL , thus assisting the teacher in effectively ensuring student acquisition of 21st century skills in a PBL classroom. The Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools allowed me to understand how the thoughts and actions of teachers, along with the interviews, impacted the success of teachers in a 21st century PBL classroom.

In answering question three, “How useful is self-efficacy in understanding the project-based learning?”, I used information from classroom observations, interviews, and one-legged conferences. In answering question four, “What other realities about project-based learning are revealed by the data?”, I used observation notes from the grand-tour interview questions,

drawing analysis, and one-legged conferences to assist in determining other realities about project-based learning.

In answering the research questions guiding this study, I talked to and observed teachers in project-based learning classrooms. On this campus, a total of 42 certified teachers provided instruction to students. I selected six respondents who received PBL training during the Summer of 2013, which provided information about the purpose of PBL, trainings on different instructional protocols used to implement PBL, and methods for campus administrators to provide instructional coaching. During the training offered in 2013, teachers produced curriculum resources, such as project unit plans, assessments, progress checks, and other resources for PBL classrooms.

Research Criteria

I established trustworthiness in the study by addressing four essential qualitative factors: credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). Prolonged engagement in the field allowed for compilation of evidence to formulate a compelling whole (Denzin & Lincoln, 2011). The triangulation of data (interview/drawing, document analysis, and observation) provided a confluence of evidence to provide confidence in the researcher's observations, interpretations, and conclusions (Eisner, 1991).

I achieved credibility in multiple ways. By providing rich, thick description based on my data collection and analysis (Lincoln & Guba, 1985), I could show the reader how credible my findings were. And, prolonged engagement in the field and the triangulation of data sources and, methods, served to enhance credibility as well (Creswell, 2007)..

Dependability was achieved by my consistent, rich detail of the context and setting. I audio recorded each interview with a digital voice recorder and transcribed feedback in my field

notes. Member checks were completed by giving each respective respondent their interview transcript to ensure the accuracy of the information.transcribed and given to each respective respondent to ensure the information was correct. This confirmed any mistakes made during transcription. With the digital recorder, transcription into field notes, and member checking, I achieved dependability with each interview.

I ensured transferability of the research by doing a thorough job of describing the research context and the assumptions that were central to the research. In this way, others could determine if the results of my study were applicable in their context or setting (Creswell, 2007). Document analysis, observation, and post interviews, provided sufficient description to transfer findings to other studies (Creswell, 2007).

Confirmability was established by examining the extent to which I was objective and bias free. I accomplished this through a peer review and advisor review, which provided me an opportunity to practice reflexivity to ensure no personal biases were included in the study. . Each chapter was reviewed by the researcher's advising chair and recommended revisions were made by the researcher Since I work at the site in a supervisory role, I acknowledged the possible power imbalance; however, I feel the non-threatening relationships established with the participants eradicated any imbalance.

Ethical Considerations

Protecting human subjects from undue harm is the cornerstone of education research (Gall, Gall, & Borg, 2007). Data collection was approved by the Institutional Review Board (IRB) and all procedures were followed in terms of complying with the IRB guidelines for the research. To ensure confidentiality, all district and school names were changed to protect the identity and al research materials were kept secure through out the study. Participants were

made aware that their participation was voluntary. All research documents were willingly surrendered for investigation in this study. All efforts were taken to ensure all human subjects were kept from undue harm.

Limitations of the study

Even though efforts were taken to ensure a well-designed, trustworthy study was conducted, the study has potential limitations. One of the first limitations is that I conducted research in one school of one independent school district. A study conducted at another school with other teachers might have yielded different results.

Another limitation involves the fact that the selected participants were aware that I was the administrator who evaluated them annually. Participant responses may have been affected by this fact, as well as the actions and procedures of classroom observations. I feel the supportive relationship established between the researcher and respondents allowed for a sense of trust to be established, thus allowing the respondents to give truthful perceptions about their experiences.

Summary

The chapter provided detail about the methodology of the study. The selection of the site, the data needs, and the data collection and analysis were discussed in this chapter. After reviewing the case study approach and my research questions, I described the procedures taken to answer the research questions. Also, I explained the use of the Concerns Based Adoption Model (CBAM) diagnostic tools, the Concern (SoC) and Levels of Use (LoU), and how those tools allowed me to operationalize teacher self-efficacy in a project-based learning classroom. The chapter also includes description of the ways in which trustworthiness was achieved in the study and ethical considerations

Chapter 4

Presentation of Data

This chapter provides the findings of the Tompkins Intermediate School and study respondents. Their story is told with thick, rich description and highlights the input from the respondents and the observations of the researcher. I structure the Presentation of Data around four sections of lived experience through the words of participants.

The first section provides a description of the study site. The second section, PBL and the Engage Model, provides the reader information on how project-based learning (PBL) is implemented at the study site. Several protocols are used to ensure PBL is implemented in a consistent manner and description is provided for each of those protocols.

In the third section, I present the perceptions of the respondents' about PBL (project-based learning), PBL implementation, and their perceptions of how well they implement PBL. I placed those emerging themes and common responses into categories. To a large extent, these categories represent areas of common ground among the participants. The first category is called PBL. It presents the respondents' descriptions of what project-based learning is and the procedures used to implement it. The second category describes the respondents' thoughts about the skills students will need for success in the 21st century workforce and probes the respondents to determine if PBL facilitates the acquisition of those skills. The third category details insights from the respondents' about implementing PBL in a traditional classroom or a non-traditional classroom. The last category provides respondents' assessment of whether they implement PBL effectively and why they feel that way.

School Description

Tompkins Intermediate School is classified as an intermediate school that serves fifth and sixth graders that is located in a suburban area of a major metropolitan city in the state of Texas. Based on the Texas Education Agency's Campus Report Card for 2013, the student demographics of Tompkins Intermediate School consist of 51% African American, 40.3% Hispanic, and 6.2% White students, with over 66% of the student population identified as low socioeconomic.

In 2013, the Texas Education Agency, the governmental entity that regulates public schools, implemented a new campus and district accountability system. According to the *2013 Accountability Manual,* school ratings are based on the performance of the State of Texas Assessments of Academic Readiness (STAAR) assessment for all students, African American, American Indian, Asian, Hispanic, Pacific Islander, White, Two or More Races, Economically Disadvantaged, Students with Disabilities, and English language learners (ELLs).

For the 2013 school year at Tompkins Intermediate School, 84% of all students mastered the STAAR Reading assessment, while 80% of African Americans, 87% of Hispanic, 91% of White, 68% of Students with Disabilities, 81% of Economically Disadvantaged, and 67% of English language learners mastered the reading assessment. With regards to mathematics for 2013, 74% of all students mastered the STAAR math assessment while 68% of African American, 80% of Hispanic, 81% White, 47% of Students with Disabilities, 72% of Economically Disadvantaged, and 63% of English language learners (ELLs) mastered the math assessment.

According to the *2013 Accountability Manual,* the state performance rating for intermediate schools was based on three performance indexes: student achievement, student

progress, and closing performance gaps. The range for each score is between 0 and 100. Tompkins Intermediate School earned a student achievement score of 75 for index one, a score of 44 for index two, and a 72 for index three. Clearly, the school exceeded the minimum score of 50 for index one, 29 for index two, and 55 for index three, resulting in the campus earning the "met standard" rating.

Vision of the District

The district is guided by its Core Beliefs and the Vision of the Learner which posits 21st century profound and purposeful learning is the ultimate goal for all students to experience in the district (see Figure 4.1). The Core Beliefs contained five components: purposeful engagement is the most effective long-term way to learn, quality teacher are the most important influence on the learning, collaboration and continuous improvement are key to continued growth, it is important to value each individual for their infinite value, and it is vital to build trust within the families and community.

Purposeful Engagement	is the most effective long-term way to learn and is our primary responsibility.
Quality Teachers	are the single most important influence on the quality of learning.
Collaboration & Continuous Improvement	We are a learning organization with a culture of continuous improvement and collaboration.
Valuing Each Individual	Each person is unique and of infinite value; therefore, we embrace and celebrate diversity.
Schools Impacting Community	Quality schools encourage and sustain quality of life, freedom, democracy, and economic growth

Figure 4.1 Core Beliefs (DISD, 2013)

The Vision of the Learner (Figure 4.2) depicts the ultimate 21st century skill set for student in the district. It contains four quadrants and focuses on skills, or attributes, that one will need for success in the 21st century workforce.

Figure 3.2 The Vision of the Learner (DISD, 2013)

The first quadrant focuses on academic competence. A focus is placed on ensuring students master the Texas Essential Knowledge and Skills (TEKS) so they to acquire basic skills. But, more than just attaining the basics, it desires students be highly proficient in math, reading, writing, science, and social studies.

The second quadrant focuses on learning skills. The district believes students will need the skill set to work with peers to create products. To assist in accomplishing this goal, PBL has been implemented to facilitate student acquisition of this skill.

The third quadrant focuses on positive character traits. Although it is desirable for students to be academically sound and to work well with others to create products, the district also desires for all students to be responsible, global citizens.

The fourth quadrant focuses on creative/critical thinking. The district feels creative thinking allows students to solve complex problems. PBL provides a platform for students to refine these important critical thinking skills. The Vision of the Learner illustrated the ways in which the district believes students will achieve 21st century success with the mastery of all four quadrants.

PBL and the Engage Model

The project-based learning instructional delivery system is designed to assist the district in achieving their Core Beliefs and the Vision of the Learner for every student. To train all teachers on PBL, the district used the Engage Model. While many PBL implementation models exist, the Engage model provided the specifics of implementing PBL for this school site.

The Engage website provided information regarding the training protocol used by teachers implementing project-based learning. The Engage model is comprised of five different learning protocols. The protocols are followed in order, thus one must do the launch protocol before implementing the research protocol. By following the order of each protocol, each teacher has a systematic approach to ensure the project-based learning safeguards are addressed and each protocol has suggestions to assist teachers with particular areas of trouble.

The first protocol is launch. It requires team formation, the development of a team name, the establishment of team goals, the determination of roles for each team member, and the protocol used to resolve conflict among team members (Engage, 2013). Students select from five roles: the project manager, the materials manager, the techie, the time-keeper, and the workshop manager. The project-manager ensures each team-member has tasks to complete and guides daily task completion. The time manager reminds the team of time constraints which impact successful completion of daily tasks. The materials managers assist the team with any supplies needed to complete the task. The techie responsibilities include assisting with any technology needs. The workshop manager is responsible for informing students of workshops which might assist the team to successfully master needed state standards embedded within the project (Engage, 2013). Students change roles on a daily basis which allows for the experience of different roles, while completing the same project.

The launch phase is vital as the three to five team-members establish team norms and the team goal; but, it also introduces students to their challenge brief, which contains an authentic problem, or driving question, which serves to drive student inquiry which embeds state standards in the project (Engage, 2013). The challenge brief presents students with a real-life problem to solve and contains the project-standards, which correlate to social-studies, English, math, or science state standards (Engage, 2013).

The second protocol phase, the plan phase, is where students identify what terms and concepts they know or are unsure about (Engage, 2013). The teacher facilitates student learning by reviewing the challenge brief to identify words or concepts they do know, or understand about the challenge brief requirements and identify any words or concepts they do not understand (Engage, 2013). The teacher prompts students on certain "need to knows" to ensure essential state standards are included on the list (Engage, 2013). After the teachers' solicit students for responses about what they know or need to know about the challenge, the teacher composes the entire class' knows and need to knows. The teacher ensures the state standards are included in the classes knows and need to knows list. The project manager divides research questions to each individual (Engage, 2013).

The research/work phase encompasses the largest amount of time, sometimes up to seven days, as students individually research their questions, collaborate with other members about their findings, and begin deliberation on the medium utilized to share with an authentic audience (Engage, 2013). The teacher monitors student progress by supervising a daily morning huddle, a time in which each group discusses their progress on their team to-do list and on their individual to-do list (Engage, 2013). As the teacher serves as facilitator during the learning process, they

are still responsible for ensuring students master state standards in math, reading, science, and social studies.

Based upon the students' discussion, the teacher can determine which state standards need to be assessed in more depth and complexity. The teacher develops progress checks, such as quizzes, do-it-yourself workshops, or formal assessment, to ensure students master the state standards. If certain students do not meet the state standards, the teacher creates a workshop for those students to re-teach and re-assess student mastery (Engage, 2013).

Serving as the facilitator, the teacher uses a variety of instructional tools, which might include a research summary of student work, an exit-ticket which checks for understanding by the students answering of a question or a two-question assessment item (Engage, 2013). Also, a team huddle is held to determine the needs of the team, the findings from each individual, and what goals need to be accomplished for the next day. Multiple cycles of formative assessment demonstrates the iterative, process-oriented nature of learning (Ravitz, 2010). Instead of students receiving large chunks of new information in advance of the project, students receive information in increments and must have various feedback at various points over the course of the project (Engage, 2013).

The critique phase occurs when students present the culmination of their groups work to their fellow peers and teacher for feedback (Engage, 2013). The critique phase allows for students to fine-tune their presentations and to ensure appropriate standards are in place for their presentation, the fifth/last protocol, to an authentic audience of educators, business leaders, or other school leaders.

The last phase, share, allows group members to present their findings to an authentic audience, which might include city officials, school officials, or experts in a certain field. The

share portion allows student group members to provide a solution to a complex problem with the use of interactive technology. Share could involve a presentation; however, it could also encompass other modes of delivery, as the group determines the most appropriate method to convey information.

On the Engage website, I observed videos which provided recommendations for implementing each protocol correctly. The videos on each protocol provided an actual visual of implementation suggestions and recommendation. The video also provided a visual of how the actions should look for both student and teacher. Also, the Engage website provided detail about the training of the appropriate protocols needed to implement PBL and had resources which would assist with the implementation. These resources included a project research summary guide, a do-it-yourself rubric, and other project requirement resources. Table 4.1 summarizes the Engage protocols with the observable teacher actions and behavior

Table 4.1 Engage Project-Based Learning Protocols (Engage, 2013).

Protocol	Teacher Observed Behaviors
Launch	Teacher assist in team formation; Reviews challenge brief to identify key themes; Identifies key vocabulary words
Plan	Teacher facilitates what students know, what they need to know; Prompts students to important concepts
Research/Work	Teacher monitors student progress; Ask probing questions to determine students' needs; Checks for accuracy of research
Critique	Teacher checks students work for accuracy; facilitates peer reviews for accuracy
Share	Teacher uses soft-skill rubric for assessment; Monitors other students behavior.

Respondents Knowledge of PBL

Six respondents, Nancy, Nina, Nick, Norma, Tara, and Tom, all implemented project-based learning (PBL) and all received the training from Engage in the summer of 2013, thus providing the reason for their selection for this study. All respondents provided responses to their perceptions about project-based learning (PBL), skills students would need in the 21st century,

and how they felt about themselves with regards to implementing PBL. I wanted to know why they felt they did, or did not implement PBL well.

PBL Processes

Central to all respondents' comments was how project-based learning (PBL) is a different instructional delivery system, in comparison to the traditional delivery system. Nick explains, "the PBL process is more student-centered, rather than teacher-centered." Instead of teacher's facilitating instruction with lecture, notes or worksheets, and an assessment piece, instructors determine what students need to know in order to master the TEKS and provide resources to help assist the students in discovering the answer or solution to the problem. Respondents gave responses which revolved around a challenge and then working to research a solution to that problem. Nina explains,

> So, we give their kids a driving question and from that driving question, they are given different information for which build off information to create a product. So, they are more or less coming up with a product to present, rather than completing a sheet of paper.

Similar to Nina, Tara describes what PBL entails for the students. She states:

> For PBL, our students are presented with a question, not necessarily a problem. But, a question, you know, on how can we inform a person? So our students have to come up with what they know first and create. So, they come up with their own questions, what they need to know, and what they need to come up with.

All respondents mentioned the five protocols and gave a brief description of each. Nancy explains,

> In the team phase, you set up the teams and choose a team name. In the plan phase and in the work phase, they start working and planning out the project. They share what they

have been working on and there is also a critique phase where you give them feedback about the project.

Similar to Nancy, Tom explains the plan protocol in detail, noting

First, you give the kids the challenge brief, letting them know that this is the activity we are going to accomplish and here is a rubric. We then move to research, critique, and the presentation. You spend most of the time in the research/work protocol.

Another common perception was the role of the teacher in a PBL classroom. Instead of the teacher being the deliverer of instruction, the instructor gauges where each student is through a variety of assessment tools and helps facilitate what each student needs to complete their portion of answering a question. Nick explains, "We are going around and facilitating by asking questions and telling kid things that need to be done. So, really it's up to the student to drive, drive the education, and we are just keeping the bus on the road." Likewise, Tom emphasizes the students determine what they need to know, rather than the teacher giving direct instruction to everyone. "We begin with then end in mind and then we have the kid's research. The students say what they know and what they need to know." Nancy also indicates the role of the teacher as a facilitator: "Teachers serve as facilitators and students do a majority of the work."

Nancy and Tara felt comfortable serving as a facilitator, rather than a lecturer during instruction; one respondent found it challenging. Nancy acknowledges that she feels more confident in the process. "I think by going through the process, I had a better grasp of how things should go so it is easier for me to picture things." Likewise, Tara feels better about serving as a facilitator. She reports, "I follow the protocols and desk critiquing my students work and go through the process of helping them. I believe that I do." Nina had a different experience

in serving as a facilitator of instruction. The size of the non-traditional classroom provides challenges:

> Well, first I would tell them about the typical classroom in which the teachers' is instructing, usually out of textbooks. PBL is different. I have 30 students in my class and Mr. Jay has 28, so with the wall down and both classes joined that is up to 60 students in one big old classroom. I don't know. For one thing, it is too many kids. It is entirely too many kids. I think 25 students in one class is ideal.

All respondents provided detail about the use of the different protocols. The protocols contain resources, for both students and teachers. Nancy explains:

> We have certain protocols to follow in each project. In the team phase, you set up the teams and they choose a team name. In the plan phase and the work phase, they start working and planning out there project and then in the share phase, they share what they have been working on. There is also a critique phase where you give them feedback about the project. Really, we like them to present to an authentic audience, but that is not always possible. So, they share with their peers. Teachers serve as facilitators and the students do a majority of the work.

Like Nancy, Tara explained the significance of each protocol and how students have to determine what they know or what they need to know.

> In order to create and inform, they collaborate and share out questions. Then, they start their research. They divide their research and determine the most effective way to do it. And, then they share out. Research is where they spend the most time.

Not every PBL teacher felt positive about protocols, however. Norma is responsible for the facilitation of science instruction in a non-traditional project-based learning classroom (PBL).

Unlike others, she feels the protocols present barriers in facilitating her content area. She goes on to explain:

> There are protocols for the students to use, but they are not always valuable protocols. There is some value to them, but they are all not needed all the time. There are things that the students may need to know and I am not sure that I know they need to know it. So that's my problem with them.

The respondents' gave some common descriptions about project-based learning (PBL). For example, the teacher serves as a facilitator in the PBL process, rather than the direct-instruction deliverer. Nancy explains, "The teacher serves as the facilitator and students do a majority of the work." The PBL process also involves teachers providing an academic challenge or question for students to solve. Tara provides more detail about the challenge: "Students are presented with a question, not necessarily a problem." Another common theme was the different protocols used in the PBL process. The five protocols, herein defined as launch, plan, research/work, critique, and share were mentioned by all six respondents', although one respondent, Norma, felt the protocols were not useful, the other five respondents identified they understood the rationale behind using each of the protocols.

21st Century Skills

All respondents indicated students need basic academic skills, like reading, math and writing for future success. All respondents mentioned the necessity of at least one soft skills, like being able to collaborate with other students, thinking creatively, being able to present their ideas in a logical manner, or being a person of character.

The ability to use technology effectively is one skill that all respondents indicated students will need for success in the 21st century. Technology was described in several different

ways, ranging from using a computer to research material to using different types of software to produce a finished product. For example, Tom provided the following response:

> They are going to need technology, the ability to use the computer, and be able to use the technology, as technology is always changing. This is what we are using now, but this is what might replace it.

Like Tom, Nick indicated there is a difference between using technology and having knowledge of what technology needs to be used for in any given situation. He felt the changing face of technology would present challenges to students in the 21st century, as technology did change rapidly. Nick claimed students "need to be technology savvy, because technology is all around them. They need to determine what tool they need to solve a problem, or a question."

Norma also felt students need to be savvy to the ever changing face of technology and must be able to adapt to use technology in the right situation. Norma explained her thoughts, "Also, they need to adapt to the changing technology because it is always changing. Students have to be able to adapt or determine the best way to solve problems."

Another common response from respondents' was the need for students to be able to collaborate and to focus on getting along with peers. All respondents felt students would need to get along with others, or have a set of social skills, to experience success in the 21st century workforce. Nancy provided the following insight:

> Of the big things, they need to be able to get along with other people. I stress a lot in my classroom that you don't have to like the people you work with, but you do know how to get along with the person. If you want things, you have to work towards a goal.

Nick felt students need to embrace the differences of others and must be able to work together on a team. He also values the importance of working as a team and through each other will be necessary for the success of students in the 21st century.

> If you're working construction, business, or education, whatever it is, they are going to have to work on a team and get along. Whatever it is, they need to learn how to get it done and they need to be able to get work done through other people. I mean, you know you have to get work done through other people; because, no one man or one woman can get it done by themselves.

Tom also felt the students were being better prepared for the 21st century workforce by starting to work on teams at such an early age. He claimed "Because you have to get along. And, you know they are getting this at an early age, like at age 10 or 11, we didn't get this until college, when we were like 18 or 19. Think it helps them in that aspect."

Nina believed students need to do a better job of expressing their ideas to crowds. She felt many students do not have the skills to present their ideas; however, they are comfortable in reciting popular songs to peers. She wondered why so many of the students' efforts are placed on things like music or rap, rather than focusing on the things that will help them in life. She also felt they need to be able to understand and work mathematics for success in the 21st century.

> They need to know how to communicate. They need to know how to express themselves, but they need math skills. Not just add, subtract, multiplying, divide, they also need to solve word problems. Math teaches you how to solve complex problems and it will help them on their jobs.

Just like Nina, Tara does acknowledge the value of attaining soft skills, like collaboration and the ability to think creatively; however, she also felt students need basic skills for success in

the 21st century. If one goes into a particular field, certain background skills will be necessary for success. She explained:

> I think students need to know how to read. I think that like with the math, it depends on what field of study they would go into. You have to have a strong foundation or background to be successful in certain fields, like an engineer or doctor.

While technology and collaborating are important for 21st century success, Tara felt students need to understand the value of communicating with others in person. Although being able to use technology to solve problems or answer questions is a great skill to have for future success, she felt the human connection was also important for success in the 21st century. She claimed "I know they need to know how to socialize. But, with the internet there is a lot of socializing that's not going on. You know. Not appropriate interaction with people. They are not learning how to interact with other people in person. That's important."

Like Tara, Norma felt soft skills are essential. "I think common sense is big and being practical. They need morals too. They need to know what is right and what is wrong. Many of the students don't know those boundaries and they cross them. I really think they don't know those boundaries."

In summary, the respondents' felt several different skills would be needed for success in the 21st century workforce. Two respondents, Tara and Nina focused on having a grasp of academic skills. Tara explained, "Students need to know how to read." Like Tara, Nina had similar feelings about the acquisition of basic skills. She felt math was important, "They need to know math and how to solve problems with math." While two respondents mentioned hard skills, herein defined as academic competency in math, reading, science, or social studies, all respondents mentioned that students will need to be able to co-exist or work with others in the

workforce. Tom believed "students have to get along" with other students in order to co-exist in the 21st century workforce. Another common theme among all respondents' was the need to be able to use technology in the workforce. One respondent, Tara, felt technology and collaboration were important; however students needed to grasp a larger concept. Tara explained that dialogue on-line via certain mediums was different than interacting with other humans in person. She explained, "They are not learning how to interact with other people in person. That's important."

Soft Skills

Respondents' indicated that both soft and hard skills would be needed for success in the 21st century. Hard skills were defined as students attaining the necessary academic competencies in math, reading, science, or social studies; whereas, soft skills were defined as students attaining skills to collaborate, to think creatively and use technology, and to be a person of integrity.

Also, project-based learning (PBL) was implemented in two different types of classrooms, the non-traditional (NT) in which two teachers provided instruction in one, large room in which the adjoining wall had been removed and could have up to 70 students. On the other hand, the traditional classroom (T) was a classroom in which one certified teacher provided instruction to up to 35 students. The respondents provided insight on how project-based learning facilitated the acquisition of hard and soft skills; but, also discussed the implementation of PBL in a traditional (T) or in a non-traditional (NT) in the following section.

The respondents felt project-based learning (PBL) helped students acquire 21st century skills, especially in certain areas that focused on soft-skills, like collaboration, thinking creatively, or presenting their ideas to others. Another common response was that technology was often used in the PBL classroom and students were able to use technology in a practical, effective way. Several respondents expressed concerns about the hard skills, or the academic

skill acquisition in math, science, and reading through the use of project-based learning. The hard skills included the ability to solve math problems or being able to analyze the plot of a story or identifying different character traits. Nick feels students did acquire softs skills during the project-based learning process.

> I feel 21st century skills like, collaboration, communication, and soft skills are being addressed by PBL. They present the research to the class or to an audience. They are going to have to work on a team and get along. I do feel, I mean, I feel like with PBL it does address a lot of things that we can't do in a traditional classroom. I do. Even when we were doing traditional lessons, you would have to put a project into the lesson to get those 21st century skills. PBL allows them to use technology, it allows them to use their presentational skills. You know (laughter) for some kids that's the most frightening thing in the world! To get in front of a class and speak! So it's a training ground to overcome that fear.

Tom also observes the benefit in students experiencing project-based learning (PBL). He said:

> I think project based -learning (PBL) works and it is a really good process. You know, it really helps kids to learn how to work in different groups, because, when you go to work, you will always have people that you don't get along with; yet, you still have to get the job accomplished. You have to get along with others, even if you don't get along with them. You know, by them getting this at an early age, it will help them because we didn't that till college, when we were like 18 or 19.

Nancy provided the following insight about how students have progressed, since the beginning of the school year. She claimed:

> At the first of the year, students don't have the social skills. They develop as they year goes on. Initially, they don't have a clue! They don't know how to resolve conflict, or push forward to work things out. So, they learn things as the year goes along. In some aspects, I think they have improved, because I see a lot of growth. I think they learn from each other. They learn a lot from each other. The kids I interact with really do enjoy project-based learning process.

Although a consensus indicated that PBL provided students with the social skills needed for the 21st century workforce, all but one of the respondents expressed concern about students acquiring the hard skills, herein defined as content skills in math, reading, and social studies, through project-based learning.

Nancy felt many students were more deficient in basic reading and math skills, thus causing more remediation before starting the project-based learning (PBL) process. She stated:

> Now, I am really more familiar with the reading side of it, but for PBL students, I think it is a little harder for them to get the basics in math and reading. Now, for social studies, PBL is wonderful for social studies. Some of the kids come to us, a little weaker in reading, so they need a lot of basic, reading skills and it is hard to do that in a PBL, while sticking to the protocols. Because, we are asking them to read and, if you don't have those basic reading skills, it is hard to do the other in the class. Their vocabulary is very limited. I think that's what really hurt us, because it is limited. Currently, we do workshops; but, I think it is cumbersome for a teacher to do a workshop in small groups. Sometimes, the whole class is weak and they just need direct instruction for reading. If you do workshops, you spend a lot of time on it; whereas, you could just teach them whole group instruction at one time and knock it out.

Like Tara, Nina also expressed concerns with teaching students who were deficient in their mathematical skills. She explained teaching math using the protocols, proved to be difficult. She indicated:

> Well, because sixth grade math is so detailed, there is a lot of work that goes into teaching the concepts. A lot of work and the time that goes toward that, PBL does not allow for that. I was given 45 minutes in the Fall and that's not enough time to teach math. I kind of just threw math out there and I didn't get to the depth. Now, that we changed it to one and half hour, it is better. I pull two days, some students to a smaller class and that helps. I can actually help them.

Like Nancy and Nina, Tara felt reading and writing was somewhat difficult to implement in the project-based learning (PBL) classroom. She was most concerned in addressing certain genres of reading and teaching different styles of writing, because the protocols do not allow for flexibility. She felt she could better utilize her time in class, if she were given an opportunity to improvise the process. Tara explained:

> It is very challenging. There is hardly any poetry, and if it is, it is way above their level of understanding. There is some fiction. We are able to find a couple of historical fiction pieces. Then, you are stuck in historical fiction which is not all that interesting. This year, I didn't really teach the writing process. I feel bad. Even though they are not tested in that area, it still needs to be practiced. It was rushed. You do a grammar worksheet or something. It is kind of like, you guys know where the commas go or you have done this before. You know where you are supposed to put periods. We are really rushed and not able to go through the writing process. The last four PBL's were asking for multi-paragraph essays, but not going through the process.

Tara also explained that she was concerned with one of the protocols, the research/work protocol. She had been working to make the process more efficient; however, she still had difficulties in ensuring all students attained the vital information without direct instruction. She stated:

> The problem is when they divide their research questions. One person has a piece of information and the other person has no idea about the one person's information. How do all the students learn the information? That is still a challenge, because just like when a child tells others this is what I learned, but it doesn't stick with the other students that didn't do the research. They are just getting this information and are not processing the information. That is still a challenge. You know, to make sure all the kids learn all of the information. It is time restricted. PBL is time restricted. You only have a certain amount to do the research and then you have to move on. Then they need to start creating. In share, we are talking about an audience.

On another note, Tom felt that through different processes, like workshops, he could effectively ensure students acquired the necessary academic skills they need for success. Tom explained:

> Instead of teaching whole group, the teacher can instruct a certain number of students who haven't mastered the skill. If it's like how to use a technology application, you teach one person from each group and their job is to go back and tell the group. In some cases, I might do two workshops for students who didn't master analyzing a certain type of text. So, instead of the whole class getting the reteach, only the 12 students who need it get the reteach. The other students continue to work on what they need to. In doing workshops for academics, it depends on the number of students who would benefit from the reteach.

> If it is like 10 or 12 students, then I can pull them to my desk, reteach them, and assess them to make sure they mastered the concept. That helps the kids who mastered the concept, they don't have to go through the re-teaching of materials they learned. If it is more than that, it becomes difficult because you're teaching a majority of the classroom.

Classroom Configuration

The implementation of project-based learning (PBL) occurred in two different settings at the study site. One version occurred in traditional classrooms, herein defined as a class with one certified teacher and configurations have four traditional walls. The other version had the walls removed and allowed for two certified teachers to share one, large classroom. The size of this classroom was quite different in comparison to a traditional classroom. Depending on the setting, the configurations proved to be challenging for some.

Nina admitted her control in a traditional classroom made her feel more comfortable in managing her classroom, while the open-concept of the PBL classroom had been a big challenge in her classroom management strategy. Nina gave the following explanation:

> For one thing, it is too many kids. It is entirely too many kids. I think PBL gives the kids a lot of time and they are not utilizing time to the fullest. Everybody in PBL should not be there. You got a lot of kids in PBL that I haven't seen growth in. I think PBL allows for the immature child to get off task and stay off task. I think a kid has to be responsible and mature. They need some ground rules from home. If they don't have that, PBL is not for them. I think they need to be recommended by teachers or some application process. I have about a good 30 kids and that's being conservative that should be in PBL in there. They don't do work. I think for the most part, they don't know what to do, they

are talking. For instance, when we have them do the morning huddle (laughter). They are talking about things that don't have anything to do with the project.

Norma described the challenge of ensuring the science skills were mastered by students. Norma claimed her subject matter has provided several challenges. She stated:

> I think getting the labs in is the biggest problem. I can't do 20 separate labs in workshops, because there is no whole group teaching. So you have groups of 5 students in it, so that's like 10 labs per sections, on the same lab. I think I waste a lot of time.

Nancy brought forth another notion which impacts the successful implementation of project-based learning (PBL). Even though she has established a professional relationship with her colleagues, she explained it is difficult in sharing a project-based learning classroom with another teacher. In years past, she has had her own classroom and implemented instruction and classroom management the way she desired. She explained her thoughts:

> When you share a space with another person, you have to be mindful of that person. You don't want to offend your partner. When you work with new people and you have to share a space with a total stranger. I mean you may know each other as co-workers; but, when you have to spend your entire day with that one person, I think you rub each other the wrong way. It may not be intentional, but you don't take enough time to see how that person operates. That's one of the things you really have to take into consideration. Because, their style of teaching and style of discipline is totally different, you have to understand and be flexible. Everybody is unique in their own way. Not to say one way is better than the others, but everyone is different. We have four distinct personalities in our cluster and that is different for me.

Tom and Tara had an average of 25 students in each traditional class. The smaller class size was a more favorable instructional platform, especially in the eyes of Tara, who implemented project-based learning (PBL) in a non-traditional setting the year before. She informed, "I mean the walls up provide me the opportunity to actually determine what my kids need. I only have 24, instead of 50. I can better manage their behavior to, you know I am right there not all over the room." Tom felt the traditional classroom gave him more flexibility in implementing project-based learning, especially when it's time to critique students work and determine what each student needs. Tom rendered the following:

> I mean, I have seen the classes with the walls down. It is overwhelming, because you might have up to 60 students in one room and your trying to check their work and give them guidance on what they need to do, while trying to make sure other students are behaving. It is loud too. I think in my smaller class, I can better manage those things because the kids are only a few steps away from you.

The implementation of project-based learning (PBL) occurred in two classroom structures, the traditional (T) setting and the non-traditional (NT) setting. Several respondents' indicated they faced challenges in the non-traditional setting. Nina explained the number of students in one, large room was a difficulty for her. The large class size of the non-traditional classroom was voiced by other respondents. For example, Tara, who has implemented PBL in both a traditional and non-traditional setting, gave the following perspective, "I mean the walls up provide me the opportunity to actually determine what kids need."

In similar fashion, Tom felt the traditional classroom setting has allowed him to be successful in the implementation of project-based learning (PBL). He felt the smaller classroom setting better assisted with implementation of PBL. Norma also mentioned class size and how it

affected her implementation of science labs. She felt that with a smaller number of students, she would be able to more effectively facilitate science instruction in a PBL classroom.

Nancy expressed her concern of sharing space with another teacher in the non-traditional classroom. Although one might be cordial to colleagues in the hallway or break room, it is entirely different when one shares a classroom with another teacher for the entire year. She explained that one is careful not to offend their partner, despite different philosophies about discipline or classroom management.

The non-traditional classroom proved to provide challenges to several respondents, primarily due to the large number of students in the one large room. Several respondents indicated the traditional classroom allowed for more effective monitoring of student behavior and more opportunity to assist students with their questions.

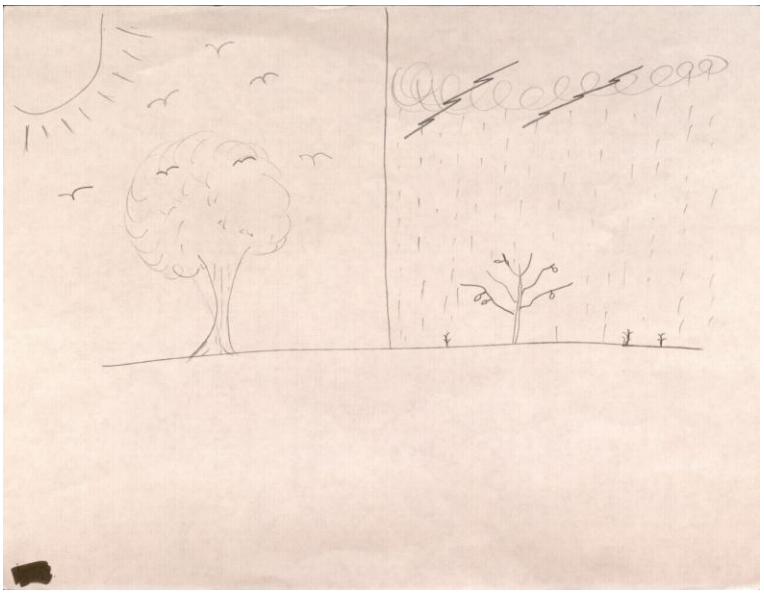
Respondents Experiences with PBL

In an effort to understand the teachers' perceptions about project-based learning and their implementation experiences with PBL, I asked each respondent to illustrate their PBL experience and to explain the experience. In presenting the respondents stories, I first present respondents' who taught in the non-traditional setting for the 2013-2014 school year followed by respondents who implemented project-based learning (PBL) in a traditional classroom.

In the next section, the reader will be able to gain better understanding of respondents' perceptions of how they feel they implement project-based learning (PBL). The reader will see each respondents' drawing which explains their experience and will receive detail from each respondent about their implementation belief.

Nick

Nick shared a classroom with another teacher, and they both share up to 60 students during one class. Figure 4.3 presents his "picture" of PBL implementation in his non-traditional classroom.



4.3 Nick's PBL Interpretation

He explained his drawing:

It's the tale of PBL and on one side there is the sun, birds flying, and even some of the birds are nesting. There is a very large tree. I will consider it to be the oak tree. Things are very prospering and going well, it is very robust and vibrant and it is green. That represents some times we spend in PBL. I mean you see the growth and the bright spots. Now, on the other side is a weak tree with a few leaves and some seedlings around. There is a picture of lightning and if you had sound, there would be claps of thunder. It is storming. There are some days in PBL where it seems like its storming. But, even in the

rain, the seedlings are getting watered, even if the tree has like five leaves on it. It is still, you know, getting watered and nurtured. Even though it is cloudy and rainy or raining, there is still learning going on and we can't see it during the rain. But it is there. And when the sun comes out, you see the finished product with the birds

At the beginning of the year, Nick indicated it was a struggle to implement PBL. This was evidenced in my observation notes. During a one-legged conference, I asked Nick "How is it going with PBL?" He claimed it was going ok, but had concerns with the students following the protocols and actually being responsible for doing their work. He claimed two or three students did not pull their weight and other members of the group had to do extra work. He wanted to know how he could make sure everyone did their part during the project-based learning (PBL) process.

He reflected back on his drawing to discuss some of the difficulties:

I think there have been more days with lightning with rain, but I also think that as we get towards this time of the year, we are starting to see that the sun is coming out. You know I think the "AHA" moment I got is when you first start, it rains a lot of days. But, you know the rain is beneficial. It's testing me as a teacher to be flexible and different and to keep my composure in all situations. You know it is like something I have not ever done before. Man, it is raining thing at first!!

Nick felt his persistence in learning PBL has helped him in becoming more effective in implementing PBL. During observations, Nick followed appropriate protocols. During one observation, students were in the research/work phase using computers and textbooks to investigate causes and effects of earthquakes. He moved from group to group checking their

progress. During this observation, Nick called the entire group to attention. He informed them they need to be on task and working on their individual work.

He also informed me about his trials early in implementing PBL and spoke about why he had difficulties:

> Well, I would say it's a work in progress. I would say early on we were not effective, but we were learning as well as the kids. I do some things that were very unnatural. The most unnatural thing was to let the kids figure it out and not to talk more, because you know I wanted to tell them. As a teacher, you are used to talking (laugh) and I want them to get it. But you know in this mode, you shouldn't talk all the time. I have to learn (laugh) to limit my speech, my talking. It is kind of hard. It is a work in progress. I think I am more effective, in comparison to September or December. I am still using the I-Engage website to look at the steps and look at the considerations and determine what is working well and what is not working well.

Upon reflection, Nick felt his persistence had assisted him in the facilitation of PBL. He explained:

> Well, I mean, personally, I have a can do attitude. If I am presented with a challenge, I am going to figure a way to make it work, to make it happen. "Can't" hasn't been a part of my vocabulary. You know, in high school playing sports, I learned a lot of lessons of what you can do and what you cannot do. Particularly, what you can do is really more than what you think you do. You can do more than you expect. My personal belief is I can do this, or I wouldn't be here. I learn from my mistakes. Critique and make changes, then get with the coaches and go back, and you know, I feel I can do this. Just give me the rules.

Nancy

Nancy taught in the classroom with the walls down. She had a kidney shaped table which she used as her desk, but also allowed students to come and sit to visit with her during the morning breakfast hour. During two observations, two students approached Nancy's table to give her a hug. She informed them that they need to be in their seat and must use the chat trees to communicate with the teachers. Figure 4.4 presents Nancy's PBL interpretation.

Figure 4.4 Nancy's Project-based learning (PBL) Interpretation

She provided the following explanation about her drawing:

I drew me. At the beginning at the bottom of a hill or a mountain, because it was an uphill battle. Very challenging. It was new and the more comfortable I got with the

process, I kind of plateaued out. I get it! That is my bright idea. I get it. I understand how it is implemented and feel a whole lot better about the process.

Nancy felt last year's trial experiences with the project-based learning have helped her tremendously. She taught 54 students during one period. The trainings for the summer have provided her with more resources to better implement PBL.

This year she felt she better understood the project-based learning (PBL) process and felt she better understood the protocols. During my four observations, I observed students in one of the PBL protocols two times out of four. During the first observation, students were working in their research/work phase. Students were dividing up their research questions and determining what resources they might use to complete their research. Nancy moved from group to group reviewing the students' questions. Nancy called the class to order to give them detail. She indicated that the research questions should be more than just who or what questions. She gave an example. She stated, "A question might be who is Thomas Jefferson, but each student needs to provide detail about his accomplishments and what documents he wrote that are important, just don't say he was a president."

On another observation, Nancy was conducting a workshop on alliteration. Seven students were at her table and she provided them a brief explanation of alliteration and provided some examples, then she requested students give her some examples. Students were eager to participate in the activity which was noted by their desire to give examples of alliteration with words. On the other two observations, I observed students taking a reading assessment. The test reflected the format of the state assessment and had 45 questions for the students. During the observation, a tape is played guiding the students reading. The other teacher in the classroom stopped the tape and asked the question, "What do you think Cal meant when he said?" Several

students raised their hand to answer the question. Nancy walked around the room to monitor students, while the other teacher probed students about inferring on the author's intent.

Nancy believed she implemented project-based learning effectively as evidenced in the following:

> I think I do to the best of my ability, because I follow the protocols and make sure kids are doing what they need to be doing. We have a resource with all the protocols written down in the I-Engage website. You would see the kids in each phase of the protocol doing what they need to be doing, like collaborating, researching, and analyzing things. You would see them working together on the computer to design something or possibly they are actually putting something together on their tables.

Nancy expressed one component she felt was vital to student success, whether it was in a project-based learning (PBL) class or traditional classroom.

> If students don't really care for you too much, you don't get as much from them. So, you have to listen to their little stories. You have to build those relationships. When you really don't feel like it, because you are important to them and you may not know it, but they depend on you. When you are not there at school, they send you emails and they ask you, "Why were you not here?" Yesterday, I was out and I came back today. And they were all around my table, asking me questions about how I was doing. But, you kind of have to answer their questions. They are drawn to you, because I guess they think you care about them. They want you to care. And some of our kids are very needy at this point and time. Not sure why, but they are very needy.

During a one-legged conference, Nancy indicated that things were going ok and that she had started looking for some reading materials that focused on social studies which could better

address the metacognitive skills needed while still addressing the social studies content to facilitate project-based learning (PBL).

Nina

Nina liked coming to work early and listening to her religious music. On many occasions, she tutored students during the early morning. She enjoyed her morning coffee and talking with other colleagues. She expected a great amount from her students and wanted them to be successful. Figure 4.5 presents her PBL implementation interpretation

Figure 4.5 Nina's PBL Interpretation

She explained her drawing with the following description:

Well, all teachers like for kids to be productive. You know, come in the class working. Ok, now this side with the trees represent forest and the way I envision the forest. You got a lot of animals that are getting along with one another. Then, you have some sunshine coming through the trees, the branches of the trees and all is calm and quiet and serene. On the other hand, there is a desert. You got sunshine, but the environment is different. It is hot and dry and a lot of discomfort going on. So, that's the desert. So, if

you put it into context, on one side is peace and tranquility, then there is hot and discomfort, not a lot of plant life. I have been more on the desert side this year.

Nina admitted this year has been a difficult one for her. She stressed that the time allotted for mathematical instruction concerns her, as well as the best way to provide math instruction in a project-based learning (PBL) classroom, since direct-instruction math was not the desired method.

During my four observations of Nina's classroom, I did not observe her using the protocols fully. On one observation, students' were presented with a word-problem which asked students to create a meal. Several mixed fractions were presented in the word problem and the students had to find the common denominator for each fraction and then add the mixed fractions. During the observation, I observed some students with their heads down and not engaged in the learning activities, while the majority of the students had their heads up and were giving the teacher their attention.

On another occasion, I observed five stations set up for students. At one station, students played a game, which required each student to solve certain problems and explain their answers. Then, they moved their tokens towards a goal. At another station, students practiced their fact fluency of mathematical facts. Students competed with each other for the fastest time of answering certain questions correctly. On another station, students had two word problems which caused them to work multi-step problems. On the board of the classroom, it read, "STATE TEST REVIEW for MATH".

When asked if she felt she implemented project-based learning well, she provided the following detail:

No. I do not. Because, I have been frustrated. Because, the time I need to get the concept over to the kids, I don't have. I know you guys talk about DIYs and workshop and progress checks. With this being the first year, I think I made some mistakes. You know first year. I feel like my partner is a plus. If I had the wrong person in there, I would really be stressed to the max!!!I really like teaching math and I know there are some areas where I can improve, but having my partner is a big plus.

Norma

Norma was a second-year teacher and had experienced project-based learning (PBL) in a non-traditional (NT) classroom. Figure 4.6 presents her interpretation of PBL implementation.

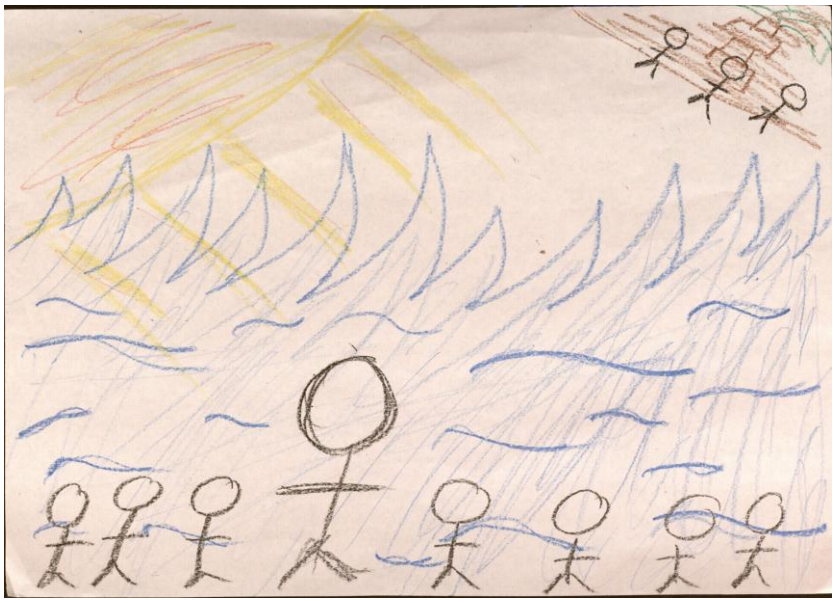


Figure 4.6 Norma's PBL Interpretation

The reason I drew this picture of all us underwater, teachers and students. I think for the teachers and the students it is sometimes overwhelming. I have some sunlight in the water. Even though you seem overwhelmed, you do have glimpses of greatness within it.

It is not all bad. And, then I have some people on the island and these are the people who tell you to just keep swimming. They don't necessarily give you a life boat (laughter), they just want you to swim harder (laughter). I think that's sometimes how we feel. You know, just keep doing it, just keep doing it, but not telling me how I can get out of the water (laughter). It is not all bad, it is just overwhelming!

Norma had some concerns about effectively implementing her core subject in a project-based learning classroom (PBL). During my four observations, Norma used the appropriate protocols only once. I observed science instruction and it was not aligned to any of the Engage Protocols. The lessons involved direct instruction, vocabulary building, completing a particular lab or moving from station to station.

During my first observation, I remained in the class for 30 minutes. The first portion of the class was guided by a direct teach piece. In the direct teach piece, students took notes on different types of rock formations. Students, almost all, jotted down verbatim what Norma has placed under Elmo, which projects the writing on the white board. Students are compliant and behaving during the lecture. After the notes are finished, Norma organized students into groups of five. They were rotating to different stations which included a lab that had oil and water. Students would be mixing different things like salt and sugar into the beacons and record their findings. Another station was the computer station which had a computer program that facilitated instruction on an earlier learned concept. At another station, students go to the desk of Norma where she provided them a simulated scenario involving the food chain. She placed five cards of different animals, which included a grasshopper, frog, rabbit, deer, and a tiger. She asked students to place the animals in the appropriate positions and provided explanations. Students were receptive and actively participated in the activity.

When asked directly if she felt she was implemented PBL, Norma clearly provided a one word response:

> No! (laughter). I think, I cut a lot of corners because I want to make sure the students are learning the material. So that when they are doing the project, they are actually applying what they really know. Because, I don't like when we get to a project and you know the students are supposed to guide their instruction and learning. I don't like when I get to a project and like all of this is wrong, so a lot of the times I will have to do videos before I let them go and create. I don't do team huddles, we do like a whole group thing.

She felt that she could implement science within a project-based learning (PBL) classroom, if some structures were different.

> Yeah, I think it could be really effective in a smaller classroom. I think with the amount of kids we have, it is hard for it to be effective. I think I could better facilitate with a smaller classroom. I have about 45 to 50 kids in my classroom. With 25 students, you know, because we have broken our groups down to three or four. Instead of 15 or 20 small groups for labs, you go to three or four. It helps

She felt one component is critical to success in the classroom:

> Classroom management. Not just necessarily consequences, but like your rules, your procedures, and actually the way you run your class. When you come in, this is what you do. I think great teachers have great classroom management and I think they also have a relationship with the students. They are doing what is the best for kids.

Currently, she felt more comfortable with the process; however, still had questions about effectively implementing science in a PBL classroom.

I think for me, the lack of resources in science is really overwhelming. Especially, for me being a second year teacher. There is a lot I need to learn about the content area and the resources we have. I am creating and I am not really sure that it's the best because its only my second year dealing with concept. I don't know if I am as in depth as I need to be. There are things that the students may need to know for science. I am not sure that I know they need to know it. So that's it for me. I would like experienced people to create the resources and then I could tweak them for my students. I think it is more of a district thing.

Tara

Tara has taught project-based learning in a non-traditional (NT) and a traditional (T) setting. During the time of the study, Tara implemented instruction in a traditional setting. She enjoys spending time with her family and watching her son's baseball games. Figure 4.7 represents her PBL experience interpretation

Figure 4.7 Tara's PBL Interpretation

Tara illustrated fireworks and set the background visual as night time. She explained her illustration:

> Ok, it is on white paper, but I am thinking it is night time. Everything is dark and there are fireworks. I drew fireworks because they really look pretty and they make a lot of noise. When I think of PBL, it is kind of what you see. You hear a lot of noise, it really looks nice and it looks good. That's all I could think of. The kids are talking, collaborating, and that's what it looks like on the outside. But, on the inside, if everyone saw the behind the scenes, the prettiness of the fireworks is gone. It is just dark. What are your kids really getting out of it, once all the fireworks are over with, like on the academic side.

Tara felt she implemented project-based learning effectively; however, she felt one component would have allowed for more effective and efficient implementation of project-based learning (PBL). She explained:

> I believe I do. I follow the protocols and go through the process of desk critiquing my students work. I go through the process of helping them desk critique each other. I do progress checks for what we need to check and get grades, so I believe that I do. Classroom management is important to the classroom and with the walls being up, like in a traditional class, it makes it easier.

In looking at my observation notes, the data collected indicates Tara does implement project-based learning consistently, as students were engaged in the project-based learning protocol on three of the four observations. During the first observation, I observed on the whiteboard an arrow pointing to one of the five protocols listed on the board. Students were in

the research/work phase and were working on creating their final presentations. I also observed students had created posters of knows and need to knows which were placed on the walls. Also, the driving question was placed on the board near the front. Tara moved around from student to student ensuring they are working on their presentation. She reviewed one student's response to a research question. She engaged in dialogue with her, "Right here, you have that Thomas Jefferson was a president. Ok, but I need more. Remember, I want to know why he is important and how he became important. Ok." Tara continued to move around the room to ask students questions about their research.

On another observation, one young female student went to Tara's desk to receive help or ask a question. Tara reminded her of the proper way to ask questions, which is to place your question mark on you chat tree. The chat tree is a long device from which students attach small notecards on. The notecards include a question mark, a plus five, a plus 10, and need help. This provided the teacher with what specific concern he or she needs to address, whether it is a question, the request for additional time to complete a task, or an urgent call for help.

Tara felt one attribute to her implementing project-based learning (PBL) was critical. She explained:

> Great teachers have the end in mind at all times. A great teacher can think on his or her feet, changing things from day to day. They are always thinking about what is in the best interest of her or his students and available to his or her students. Available means at different levels. Like being available academically or being someone who is a good listener to build relationships with their students. Relationships are important. They affect their productivity in the classroom.

Tom

Tom taught in a traditional classroom. His room was decorated with many encouraging quotes and pictures of his family. He also had a wall dedicated to explain the project-based (PBL) process and detailed what protocol the class would be working on for the day. Tom also used a flip chart that exposed the challenge brief and driving question. Figure 4.8 provided the reader an illustration of Tom's experience with implementing PBL.

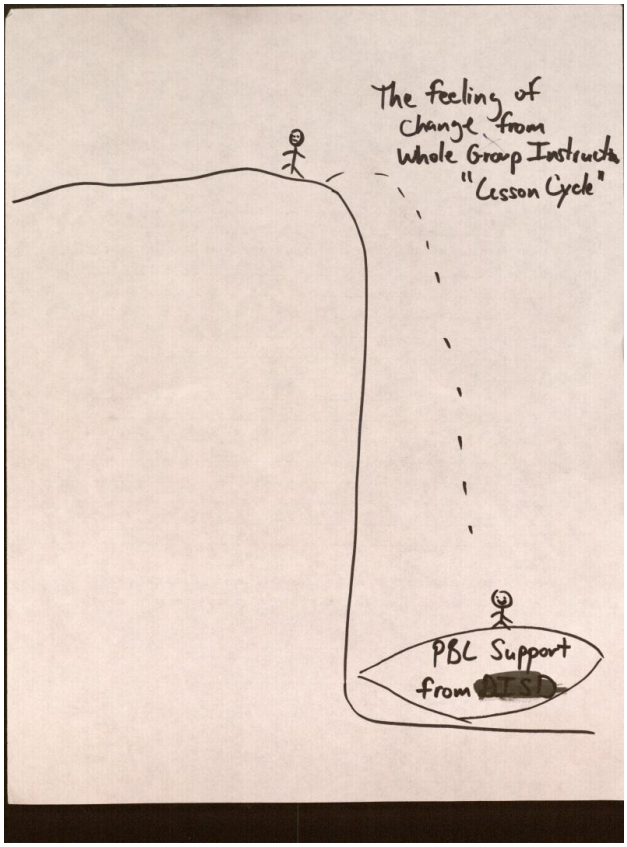


Figure 4.8 Tom's PBL Interpretation

Tom explained:

Well, I am an educator on the edge, on the edge of a cliff. You know, it is like you have been teaching whole group instruction for many years,

and now your being told to change the whole process. So, you are afraid about doing this new type of instruction. So, I jump off the cliff and have feelings of falling off the cliff, like oh my God!! Then, at the bottom I have

PBL support, with a nice soft pillow. At first, I had a blank face, a 1,000 yard stare, but once I got needed support, I was fine and that is my feelings about PBL.

When asked if he felt that he effectively implemented project-based learning (PBL), Tom assuredly responded:

Yes. Yes, I do. At times, I feel like I do 90-95% of the time.

Because sometimes, I feel like I have to teach the whole group, just to make sure the kids get it. You know, that's just me. I feel comfortable as a teacher if I spend five to ten minutes to make sure they get it. Then, I can go in a workshop to help kids. So, I say 90-95% of the time. I feel like I am effective, because I have this resource, a guide, to make sure I include certain things into each protocol to make sure they follow the process to get the content.

If you would come into my class, you would see the process done. You would see me moving around, helping different groups and you would see the timer on the board. You would see the PBL process and you would see what phase we are in for the day, like researching or creating.

During Tom's observations, I did observe him implementing the project-based learning (PBL) protocols on all four observations. During my four classroom observations, I observed in all four instances that project-based learning was implemented following the respective protocols. During one observation, Tom was walking around the classroom asking students to

show their research on expansionism. He asked one student a question about the source of research and recommends she use her text to gain more information.

On another observation, Tom held a workshop with five students during the research/work protocol, while other students work on their research. During the workshop, Tom explained to students what personification was and provided some examples of personification.

During another observation, students were in plan protocol and Tom facilitates student learning by asking students to report out what they know and need to know. He establishes some ground rules, like no repeats, and informs the class if the explanation is clear to all students, then they will not add the know or need to know to their lists. Tom does prompt some students to guide their thinking. For example, he informs class that civil war has been described to the class, therefore, if the topic of study is American Civil War, then students know it is conflict between Americans. He probes one student, "Now what institution was in place that some people felt were wrong and it involved African-American's only?" Students respond with slavery. Students then identify they are not aware of what state's rights might be, other than states should have rights of their own.

Tom informed that he was intimidated about implementing project-based learning (PBL) at the beginning of the year. As a result of training and support from the district, Derek believes the project-based learning (PBL) process has helped him grow as a teacher.

> It was hard at first. You know, you have to be flexible. In education, things sometimes come and go. Your responsible for students passing a test and I sometimes go back to doing it the old way. But, with the help from

the district and you know, Mrs. Addison really helps stay on track. Just being flexible. It's a struggle, but you know it's my job and it's what the district wants us to do, so you just do it.

Summary

The current chapter presents the study site description, information about the project-based learning (PBL) model, Engage, and how it is implemented at the site, and provides demographics and other information about each respondent. The perspectives of the participants about project-based learning and implementation of project-based learning is organized around four major categories. The first gathers insight about respondents' perspectives about PBL. The second categories delves into respondent's thoughts about what 21st century skills students will need for success in the workforce and how does PBL assist in the acquisition of those skills. The third category reviews the respondents' experience of working in two different types of classroom configurations, non-traditional (NT) or traditional (T), and gained insight on how both of those configurations impact the facilitation of project-based learning. In the fourth category, respondents provide drawings about their experiences in implementing project-based learning (PBL) and explain why they feel they effectively implement project-based learning. In the next chapter, I analyze the data.

Chapter 5

Analysis

This chapter presents an analysis of the data presented in Chapter Four through the lens of teacher self-efficacy. Emerging from the research on Academic Optimism (Hoy, Hoy, & Tarter, 2006; Beard, Hoy, & Woolfolk Hoy, 2010) and the Concerns Based Adoption Model (CBAM); Hall & Hord, 1987), two diagnostic tools assisted in the analysis of teachers' beliefs about PBL, whether they implemented PBL effectively and why. According to Hall and Hord (1987), as respondents matriculate through the appropriate stages or levels of each respective diagnostic tool, the more effective they are in implementing an innovation. Thus, my argument is higher an individual is on each diagnostic scale, the higher self-efficacy they have in their abilities to implement PBL.

Concerns Based Adoption Model (CBAM)

The Concerns-Based Adoption Model (CBAM) was used to evaluate respondents' placement with regards to their self-efficacy. The Stages of Concern (SoC) diagnostic tool provided a visual summary of the analysis of teachers self-efficacy related to whether they implemented PBL effectively. The Levels of Use (LoU) diagnostic tool provided a visual summary of the degree to which teachers implemented PBL in a way that supported PBL principles. While respondents' beliefs give a view of how they felt about PBL, the actions of the respondents provided more concrete evidence of those who effectively implemented PBL.

Specifically, the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools allowed me to operationalize respondents' self-efficacy as it related to the implementation of PBL. The higher an individual is assessed on each diagnostic tool, the greater their success in implementing the innovation (in this case PBL) and the individual's self-efficacy.

Stages of Concern (SoC) Diagnostic Tool

Hall and Hord (1987) informed respondents' data placed them into certain categories on the Stages of Concern (SoC) and on the Levels of Use (LoU) diagnostic tool which consists of four categories for the SoC and two categories for the LoU. The SoC categories include unrelated, self, task, and impact (Hall & Hord, 1987). The unrelated category correlates is at Stage O (Awareness) in which teachers are not concerned about teaching the innovation (Hall & Hord, 1987). Stages 1 (Informational) and Stages 2 (Personal) are categorized under the "self" category which individuals usually point to their feelings of potential inadequacy and the uncertainty about the innovation (Hall & Hord, 1987). Stage 3 (Mechanical) is aligned to the task category where concerns focus on logistics, preparation of materials, and the daily schedule. The last category, impact, is applicable to Stage 4 (Consequence), Stage 5 (Collaboration), and Stage 6 (Refocusing). At the impact category, teachers become concerned about how their teaching was affecting students and how they might improve themselves as teachers (Hall & Hord, 1987). Respondents in this study were categorized in either, "self", "task" or "impact" on the SoC diagnostic tool. Nina's and Norma's data categorized them in "self", while Nick's was categorized as "task". Tara, Tom, and Nancy data placed them in the "impact" category.

Levels of Use (LoU) Diagnostic Tool

In looking at Levels of Use (LoU) diagnostic tool, Hall and Hord (1987) indicated two categories exist, a "non-use" and a "use" category. The levels are based upon the respondents' consistent use of the innovation properly. The "non-use" category is the absence of innovation or related behaviors of not using the innovation properly (Hall & Hord, 1987). Respondents categorized in Level 0-Nonuse, Level I-Orientation, and Level II-Preparation were categorized as "non-users" on the Levels of Use (LoU) diagnostic tool. In the "non-use", respondents are

either not worried about using the innovation, reading up on the innovation, or preparing to implement the innovation to some extent (Hall & Hord, 1987). The "use" category is described by at least one making a day-to-day focus on implementing the innovation; and, ultimately, as one matriculates to the higher levels of the Levels of Use diagnostic tool, they implement modifications to the innovation to make the innovation more effective for clients (Hall & Hord, 1987). Respondents who were categorized as "users" were placed into Level III-Mechanical, Level IVA-Routine, Level IVB-Refinement, Level V-Integration, and Level VI-Renewal of the Levels of Use diagnostic tool.

In the first section of this analysis, I used the Stages of Concern (SoC) diagnostic tool to place respondents' in their appropriate SoC stages level based upon respondents' data. Also, in this section, I present evidence of each respondents assessment or rationale for their perspectives as to how they implement project-based learning (PBL). Data from observations, interviews, drawings, and one-legged conferences were used to place respondents' into their respective levels.

In the second section, I used the Levels of Use (LoU) diagnostic tool to place group respondents' into their appropriate (LoU) levels based upon the respondents' actions within the PBL classroom. Again, data was collected from observations, one-legged conferences, interviews, and drawings to determine the appropriate group in which to place respondents.

I conclude this chapter with a collective review across respondents. Also, I used the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools and the data to determine the appropriate categories for each respondent.

The analytical construct academic optimism emerges from research on positive psychology, optimism, social capital, and collective properties which make a difference in

achievement for all students (Hoy, Hoy, & Tarter, 2006; Beard, Hoy, & Woolfolk Hoy, 2010). Academic optimism, at the individual level, is a teacher's belief that they can make a difference in the academic performance of students by emphasizing academics and learning, by trusting students and parents to be active participants, and by believing in their own capacity to overcome difficulties and to be resilient in difficult situations (Hoy, Hoy, & Kurz, 2008; Hoy, Tarter, & Woolfolk Hoy, 2006). In this study, a focus was placed on individual teacher self-efficacy and how teacher self-efficacy facilitated the implementation of PBL.

In developing the Concerns Based Adoption Model (CBAM), heavy emphasis was placed on definitions of what can be seen and observed in the site (Hall & Hord, 1987). According to Hall and Hord (1987), levels exist to identify the level of use of an innovation. Implementing innovations is a process in which individuals matriculate through a set of developmental stages that can be categorized in terms of concern and use. By analyzing the beliefs and actions of respondents' using the Stages of Concern (SoC) and Levels of Use (LoU) diagnostic tools, I was able to determine the self-efficacy of each respondent. The higher the level, in each respective diagnostic tool, the higher the individual's self-efficacy.

The Stages of Concern measured the affective side of change, like the feelings, emotions, and attitudes towards the new innovation (Hall & Roussin, 2013). According to Hord and Roussin (2013), certain responses'correlated to certain levels in the Stages of Concern diagnostic tool (see Figure 5.1)

Table 5.1 Stages of Concern Diagnostic Tool (Hall & Hord, 1987)

Stages of Concern	Response Correlations	Unrelated/Self/Task/Impact
Stage 0 (Unconcerned)	I am not concerned about it	Unrelated
Stage 1 (Informational)	I would like to know more about it	Self
Stage 2 (Personal)	How will using it affect me	Self
Stage 3 (Management)	I seem to spend time getting materials ready	Task
Stage 4 (Consequence)	How is my use affecting clients	Impact
Stage 5 (Collaboration)	I am concerned about informing my co-workers	Impact
Stage 6 (Refocusing)	I think this would work better if..	Impact

The Levels of Use tool consists of behavioral profiles that describe actions educators engage in as they use the innovation (Hord & Roussin, 2013: see Figure 5.2). Taking account of feelings and perceptions of individuals about the new innovation, PBL, was useful; however, what people feel and how they perceive a situation are different from what the individual will do

(Hall & Hord, 1987). By using the Stages of Concern and Levels of Use diagnostic tools, I was able to distinguish conceptually and operationally the thoughts and actions of teachers' with regards to PBL; and, ultimately their self-efficacy in the implementation of PBL.

Table 5.2 Levels of Use Diagnostic Tool (Hall & Hord, 1987)

Level 0 (Non-Use)	Person shows no interest in PBL	Non-user
Level I (Orientation)	Person seeks information about PBL	Non-user
Level II (Preparation)	Prepares to begin use of PBL	Non-user
Level III (Mechanical)	Makes changes to better use PBL	User
Level IVA (Routine)	Makes few or no changes to PBL use	User
Level IVB (Refinement)	Make changes to increase outcomes	User
Level V(Integration)	Make changes to increase outcomes	User
Level VI (Renewal)	Explores modifications to current PBL practice	User

Stages of Concern (SoC) Analysis

Table 5.3 presents a summary of the Stages of Concern analysis used in this study. Each respondent is located within the stage indicated by a review of the entirety of their data.

Table 5.3 Stages of Concern Analysis

Stage 0 (Unconcerned)	Respondent	Unrelated/Self/Task/Impact
Stage 1 (Informational)		
Stage 2 (Personal)	Nina and Norma	Self
Stage 3 (Management)	Nick	Task
Stage 4 (Consequence)	Tara and Tom	Impact
Stage 5 (Collaboration)	Nancy	Impact
Stage 6 Refocusing		

No respondents were categorized into these two stages. The respondents did not indicate that they were not unconcerned about the implementation of project-based learning (PBL) or that they wanted to know more about PBL. This is possibly due to the districts' directive that all who attended the project-based learning (PBL) training in the summer of 2013, implement PBL in 2013; it was not optional.

Both Nina and Norma had strong anxiety about their ability to implement project-based learning (PBL) within their classroom. When asked if they felt they implemented (PBL) effectively, both respondents indicated they did not implement PBL well.

Nina admitted this year has been a difficult year. For her, teaching math to a large number of students in a non-traditional classroom was very challenging. She admitted her control in a traditional classroom made her feel more comfortable in managing her classroom, while the open-concept of the PBL classroom had been a big challenge in her classroom management strategy. Nina explained, "For one thing, it is too many kids. It is entirely too many kids. I think PBL gives the kids a lot of time and they are not utilizing time to the fullest."

When Nina was asked if she implemented project-based learning (PBL) in an effective manner, she said, "No. I do not. Because, I have been frustrated." Nina admits that she is an "old school teacher" and is concerned about the students completing work in a timely fashion. Also, Nina expressed her frustration with the amount of work the kids were turning in. She felt they used the PBL classroom to talk and socialize, rather than be attentive to her instruction.

During my observations, I did not see Nina using any of the protocols to instruct mathematics fully. She did have the protocol, research/work, on the board and chat trees were up; however, I did not see the probing questions Engage recommended for providing students with guidance.

Norma acknowledged her struggles of implementing science in the project-based learning (PBL) setting. When asked if she felt she implemented PBL effectively, Norma candidly stated, "No! (laughter). I think I cut a lot of corners, because I want to make sure the students are learning the material."

With this being her second year, Norma does not feel that she has mastered the conceptual knowledge. She explained:

> I need to learn about the content area and I am creating resources and I am not really sure that it's the best. Because, it is like my second year and its only my second year dealing with concepts. I don't know if I am as in depth as I need to be. There are things that the students may need to know and I am not sure that I know they need to know it.

Norma's illustration was very telling about her perception of project-based learning (PBL) and her experiences with implementing PBL. In the picture, she depicts both students and teachers under water struggling to get to the shore. Figure 5.1 is the illustration of Norma's experience with PBL.

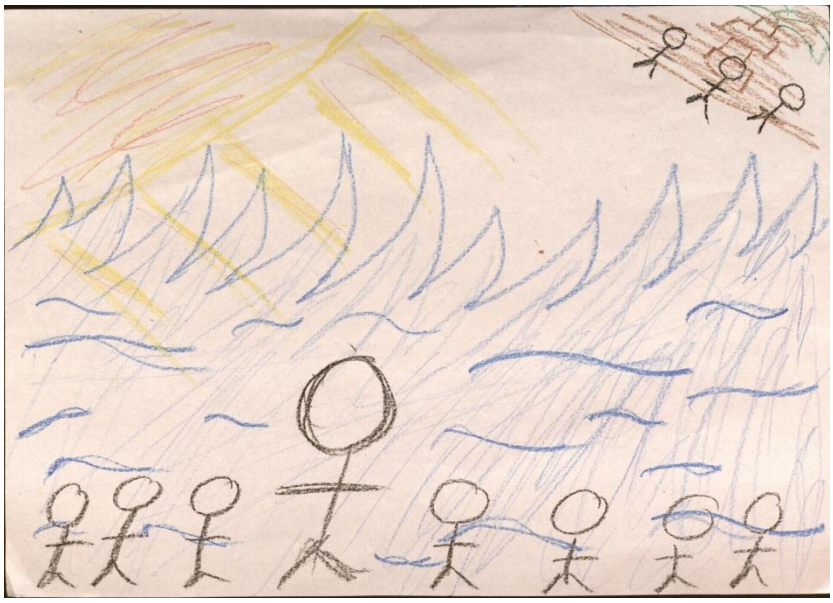


Figure 5.1 Norma's PBL Interpretation

Norma's perceptions from her illustration about being overwhelmed align with my observation notes and her focus on teaching the science content. I observed students using some components of the Engage model, but the facilitation process was not in alignment in the Engage

process, in which the teacher probed students about their research, critiqued the research questions, and conducted workshops based upon individual student needs. On another occasion, students were receiving direct instruction and jotted down their notes.

According to Hall and Hord (1987), in the Stages of Concern (SoC) diagnostic tool for Stage 2-Personal, respondents' usually reflect experiencing anxiety about being able to implement the change, about their amount of knowledge of their content, or the appropriateness of the change in their classroom. Statements like "I wonder if I know enough to teach them" or "Will I be able to control them?" are indicative of the attributes of a person in Stage 2 (Hall & Hord, 1987, p.57). Nina indicated her concern about the large classrooms and being able to facilitate math instruction, while Norma informed her concerns about teaching her content area effectively. Nina and Norma were placed in Stage 2 (Personal) in the category of "self" of the Stages of Concern diagnostic tool.

Mechanical occurs when teachers' begin to experiment with the implementation and their concerns intensify around the logistics and the new behaviors associated with putting the change into effort. Nick's data placed him in this stage.

Nick indicated this year has been "a work in progress." He feels progress has been made in the implementation of project-based learning (PBL), especially when comparing current progress to progress experienced in the earlier part of the year. As time has progressed during the year, he feels he does a much better job:

> Well, I would say it's a work in progress. Early on, I would say no. The most unnatural thing was to let the kids figure it out and not to tell them. As a teacher, your used to talking (laugh). You know, I think I am more effective now, when compared to September.

Nick's illustration supports this reality. In his picture, he explained both good and bad times as a part of his project-based learning (PBL) experience. Figure 5.2 is Nick's illustration.

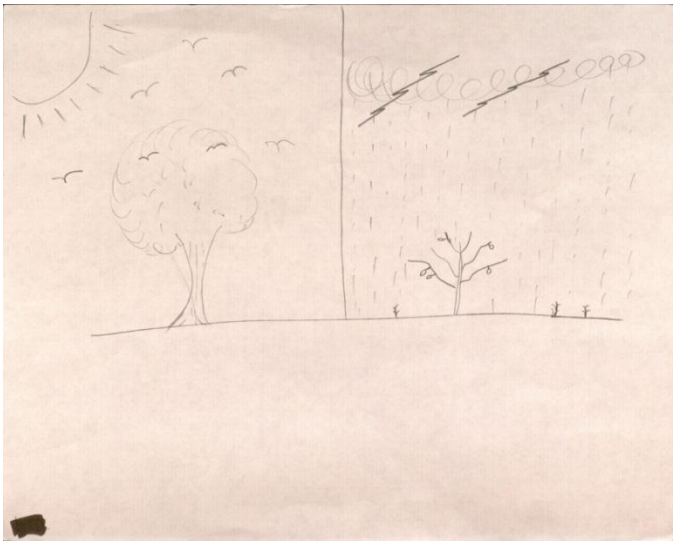


Figure 5.2 Nick's PBL Interpretation

He provided the reasoning behind his perception of PBL. He started with explanation of the sunny side of his picture then moves to the right.

> Very robust. Very vibrant. That represents some times we spend in PBL, I mean you see the growth. Now, on the other side (of the picture) is a weak tree with a few leafs and some seedlings around. There is a picture of lightning and if you had sound there would be claps of thunder. It is storming. Some days in PBL it seems like its storming. I think, you know, there have been more days with lightning with rain.

During classroom observations, I saw Nick following the appropriate Engage protocols. Students were in the research/work phase using computers and textbooks to investigate causes and effects of earthquakes. He moved from group to group checking their progress. During this observation, Nick called the entire group to attention. He informed them they needed to be on task and working on their individual work. At the same time, he indicated that two students were

failing to meet the expectation in their groups. He had conferenced with them and called their parent/guardian; however, their non-participation in the PBL process continued.

According to Hall and Hord (1987), individuals aligning with Stage 3-Mechanical (categorized as "task") on the Stages of Concern (SoC) diagnostic tool are usually focused on the processes or tasks of the innovation, in this case project-based learning (PBL), and the issues related to efficiency and the management of the innovation. On several instances, Nick indicated his concerns about students who were not following the instructions; therefore, he did have concerns about the management of student behavior, or those students who failed to complete their task in a proficient manner and how might he change those misbehaviors.

Tara's and Tom's data placed them into Stage Four (Consequence) of the SoC diagnostic tool. This also categorized both as "impact" under the SoC diagnostic tool. Both Tara and Tom were concerned about students not mastering some skills, but both felt they implemented project-based learning and provided the same rationale as to why they feel they implemented well.

Why did Tara feel she was able to implement project-based learning (PBL) well? "I follow the protocols and go through the process of desk critiquing my students work and go through the process of helping them desk critique. I believe that I do."

In similar fashion, Tom also felt that he implemented project-based learning (PBL) effectively. "I feel that I am effective. For one thing, I have this resource. It is a guide to make sure I include certain things into each protocol to make sure they follow the process and get the content."

Both Tara and Tom were concerned about certain elements of content. Tara in the hallway conversation said that it was going well and the kids were following the protocol. She

mentioned that she would like the class to read a fictional novel to practice inference and analyzing different texts; however, time would not permit for it in PBL. She explains:

> It is very challenging. There is hardly any poetry, and if it is, it is way above their level of understanding. We can not cover it, unless we are covering something about the Industrial Revolution. I didn't really teach the writing process. I feel bad. Even though they are not tested in that area, it still needs to be practiced. It was rushed. You do a grammar worksheet or something. You guys know where the commas go, you have done this before, or you know where you are supposed to put periods. We are really rushed and not able to go through the writing process.

In similar fashion, Tom said that although the kids were doing a much better job of completing their individual research, he was concerned about them being able to solve certain types of problems, like the ones found on the state assessment. Tom stated, "Sometimes I feel like I have to teach whole group just to make sure the kids get it."

According to Hall and Hord (1987), individuals aligned with Stage 4-Consequences which is categorized in "impact" of the Stages of Concern (SoC) diagnostic tool usually focused on the impact it would have on students. The focus was usually on the relevance of the innovation for students and the evaluation of the students' outcomes. Both Tara and Tom were concerned about their students getting the basics. Both expressed concern on strategies to ensure students had deeper understanding of reading concepts. On another note, both Tara and Tom facilitated project-based learning (PBL) in a traditional classroom. Both respondents felt the smaller number of students and the configuration of the classroom assisted in the facilitation of projected based learning.

Nancy is the only respondent whose data placed her into Stage 5 (Collaboration) which is categorized as "impact" on the Stages of Concern (SoC) diagnostic tool. Observations, interviews, and her drawing analysis indicated Nancy was confident in her ability to effectively implement project-based learning. Figure 5.3 is Nancy's illustration regarding her experiences with project-based learning.

Figure 5.3 Nancy's PBL Interpretation

She provided explanation about her drawing:

> I drew me. At the beginning at the bottom of a hill or a mountain, because it was an uphill battle. Very challenging. It was new and the more comfortable I got with the process, I kind of plateaued out. I get it! That is my bright idea. I get it. I understand how it is implemented and feel a whole lot better about the process.

Nancy felt last year's trial experience with the project-based learning helped her tremendously. For this year, she taught 54 students during one period and felt the trainings over the summer provided her with more resources to better implement (project-based learning) PBL. She believed she implemented project-based learning effectively:

> I think I do to the best of my ability, because I follow the protocols and make sure kids are doing what they need to be doing. You would see the kids in each phase of the protocol doing what they need to be doing, like collaborating, researching, and analyzing things.

All of this was confirmed in my observations. In addition, Nancy explained that she was thinking of some ways to improve the social studies and English instruction in the project-based learning (PBL) classroom.

> I wish we would have had some curriculum writers who knew the TEKS and knew how to mesh them really well. We would have had better projects. I can really see the tie between reading and social studies. I really do. I think social studies and reading can work.

She also indicated that she was talking to a teacher at Patriot Intermediate and that they bought a subscription to this resource.

The Stages of Concern framework described the feelings a teacher might have about a change in instructional practices (Hall & Hord, 1987). Each respondent had different reasons for their personal beliefs. Teachers were placed in the middle areas of the Stages of Concern (SoC) diagnostic tool. And, then there were not patterns of traditional versus non-traditional classroom types; traditional classroom teachers were not clustered in one area of the diagnostic tool with non-traditional classroom teachers in another area.

Levels of Use (LoU) Analysis

According to Hall and Hord (1987), the Levels of Use (LoU) diagnostic tool focuses on the behaviors that are or are not taking place in relation to the innovation. Table 5.4 presents the teachers' Level of Use assessments.

Table 5.4 Levels of Use Analysis

Level 0 (Non-Use)	Respondent	Non-User/User
Level I (Orientation)		
Level II (Preparation)		
Level III (Mechanical)	Nina and Norma	User
Level IVA (Routine)	Nick	User
Level IVB (Refinement)	Tara and Tom	User
Level V (Integration)	Nancy	User
Level VI (Renewal)		

It comes as no surprise that none of the respondents' data supported any of the first three categories in the Levels of Use (LoU) diagnostic tool- Level 0 (Nonuse), Level I (Orientation), and Level II (Preparation). The respondents' of this study were given a district directive to implement project-based learning (PBL) during the 2013-2014 school year and received training during the summer of 2013. Therefore, all respondents have knowledge about PBL, have learned about the different processes, and have implemented the procedure during the course of

the 2013-2014 school year. All respondents were observed implementing the Engage protocol to some extent.

The behaviors and actions of two respondents', Nina and Norma, placed them into this level and categorized them as "users". According to Hall and Hord (1987), the mechanical behaviors indicated a tendency for disjointedness, lack of smoothness in sequencing, pacing, and changes in use. These behaviors are made more to meet user needs than client needs. Both Nina and Norma indicated they tried to implement math and science with the project-based learning (PBL) format.

Norma used the appropriate protocols only once during my observations of her science time. I observed science instruction during all observations; however, it was not aligned to any of the Engage protocols. During one observation, the lessons involved direct instruction, vocabulary building, completing a particular lab or moving from station to station.

During Nina's observation, I observed elements of the Engage protocol, but only in pieces. On all four occasions, Nina provided traditional mathematical instruction.

According to Hall and Hord (1987), teachers at this level ineffectively used their time and are more concerned about the short term, or day-to-day focus. Both respondents' used the PBL process at least once, however, they both made changes to the PBL process to better assist their needs in the facilitation of their content area.

Nick's data indicated his behaviors and actions placed him in Level IVA (Routine) of the Levels of Use (LoU) diagnostic tool. He indicated he found difficulty in stepping away from the direct instruction format, as he felt that was the best way for students to gain information. After several months of implementation, he explained, "You know, I think I am more effective now, when compared to September. You know, I AM more effective now."

During his observations, I saw Nick following the appropriate Engage protocols. During one observation, students were in the research/work phase using computers and textbooks to investigate causes and effects of earthquakes. He moved from group to group checking their progress. Nick called the entire group to attention and informed them they needed to be on task and working on their individual work. Nick did have concerns with students who were not completing their work in the project-based learning classroom. He informed me that he was struggling on "what to do" with the few students who "did not pull their weight"

According to Hall and Hord (1987), teachers at Level IVA (Routine) have established their routines; however, they are unchanging in their pattern of use and very little thought is given to improvising the innovation based upon the needs of students. Nicks data indicated he implemented project-based learning in an unchanging pattern of use and the implementation of processes to accommodate a challenge proved difficult.

The observation data for both Tara and Tom correlated to Level IVB (Refinement) of the Levels of Use (LoU) diagnostic tool. Both respondents' were found implementing project-based learning (PBL) and using the Engage protocols during all their observations.

During Tara's observations, students were in the research/work phase and were working on creating their final presentations. Students had created posters of knows and need to knows which were placed on the walls. Also, the driving question was placed on the board near the front. Tara moved around from student to student ensuring they were working on their presentation. She reviewed one student's response to a research question. She engaged in dialogue with the student, "Right here, you have that Thomas Jefferson was a president. Ok, but I need more. Remember, I want to know why he is important and how he became important. Ok." Tara continued to move around the room to ask student questions about their research.

Just like Tara, Tom indicated he consistently implemented project-based learning (PBL) properly with the use of the Engage process. I observed him implementing the project-based learning (PBL) protocols on all four observations. During one observation, Tom walked around the classroom and asked students to show their research on expansionism. He asked one student a question about the source of research and recommended she use her text to gain more information. On another observation, Tom held a workshop with five students during the research/work protocol, while other students worked on their research. During the workshop, Tom explained to students what personification is and provided some examples of personification.

Both respondents indicated concern about how the current process might be impacting their students. Tom indicated he felt he had to direct teach to ensure students attain some basics. In the same light, Tara felt concerned about the process impacting her students in gaining valued basic reading and writing skills. She indicated PBL did not allow for her facilitation of instruction on certain genres, like poetry, and with writing.

> This year, I didn't really teach the writing process. I feel bad. Even though they are not tested in that area, it still needs to be practiced. It was rushed. You do a grammar worksheet or something… you guys know where the commas go, you have done this before. You know where you are supposed to put periods.

According to Hall and Hord (1987), teachers at Level IVB-Refinement of the Levels of Use (LoU) worked to determine how the innovation might have impacted their students and how the teachers might better facilitate the learning experience of students. Both Tara and Tom implemented the PBL process using the appropriate Engage protocol, however, they did make

some instructional changes, like direct teach, to better address the perceived needs of their students.

According to Hall and Hord (1987), Level V (Integration) described a state in which teachers collaborated with other teachers to impact the implementation beyond their individual classroom. Only Nancy's behaviors and actions indicated she was in Level V (Integration) on the Levels of Use diagnostic tool.

Nancy had implemented project-based learning (PBL) in a non-traditional classroom. She indicated this year's training has increased her belief in implementing PBL effectively. In her explanation of her drawing analysis, Nancy indicated that "She got it," when it came to PBL implementation.

She implemented PBL, using the Engage protocols, effectively and consistently during social studies instruction time. During one observation, students were working in their research/work phase dividing up their research questions and determining what resources they might use to complete their research. Nancy moved from group to group reviewing the students' questions, when she came upon one student's research. After reviewing the student's work, she called the class to attention and informed research questions should be more than just who or what questions, by stating "A question might be who is Thomas Jefferson, but each student needs to provide detail about his accomplishments and what documents he wrote that are important, just don't say he was a president."

On another occasion, Nancy conducted a workshop on alliteration. Seven students were at her table and she provided them a brief explanation of alliteration and provided some examples, then she requested students give her some examples. In the other observations, I saw

students taking a reading assessment. Both were in the format of the state assessment and were English language Arts tests which were administered by Nancy's partner in the classroom.

During her interview, Nancy informed that she felt that different genres of reading could be incorporated into the social studies portion of project-based learning (PBL) with a better resource. She explained:

> I can really see how we could implement reading and social studies better, if we had those magazine or articles. We could make reading a part of the social studies. Because the reading book doesn't tie the reading has genre to social studies.

During another conversation with Nancy, I discovered that she had started working with another project-based learning (PBL) teacher at Patriot Intermediate, a school across town from the study site, to better implement reading sources into the social studies. She implemented PBL consistently and data indicated she worked with other colleagues to improve the innovation outside of her own building.

The Levels of Use (LoU) diagnostic tool allows one to use data from observations, one-legged conferences, drawing analysis, and interviews and places those individuals into appropriate levels. As expected, no respondents' behaviors placed them into Level 0, 1, 2 of the LoU diagnostic tool. Once again, I also observed that non-traditional and traditional respondents were not clustered into one area of the LoU diagnostic tool. For example, Tara, Tom, and Nancy behaviors placed them in the higher levels of the LoU diagnostic tool and they taught in different classroom settings. While the data placed all respondents in the "user" category of the LoU diagnostic tool, it should be noted that Nina and Norma used the appropriate PBL protocols at a minimal level.

Collective Review of Self-Efficacy

Table 5.5 provides a summary of respondent demographics and their Stages of Concern and Levels of Use assessments.

Table 5.5 Demographics with Stages of Concern and Levels of Use

Name	Gender	Experience	Subject	Classroom type	Stages of Concern (SoC	SoC category	Levels of Use (LoU)	LoU category
Nina	F	27	Math	Non-Traditional	Stage2-Personal	Self	Level III-Mechanical	User
Norma	F	2	Science	Non-Traditional	Stage2-Personal	Self	Level III-Mechanical	User
Nick	M	4	Science	Non-Traditional	Stage 3-Management	Task	Level IVA-Routine	User
Tara	F	7	Reading	Traditional	Stage 4-Consequence	Impact	Level IVB-Refinement	User
Tom	M	13	Reading	Traditional	Stage 4-Consequence	Impact	Level IVB-Refinement	User
Nancy	F	7	Reading	Non-Traditional	Stage 5-Collaboration	Impact	Level V-Integration	User

Both Nina and Norma indicated concern with implementing project-based learning for math and science. The data placed both respondents' in Stage 2 (Personal) of the Stages of Concern (SoC) diagnostic tool and Level III (Mechanical) of the Levels of Use (LoU) diagnostic. Both female respondents' were responsible for the math and science, STEM, content in the project-based learning classroom and both taught in non-traditional settings. And, both teachers candidly indicated that they felt they did not implement project-based learning. Across all respondents, Nina and Norma had the lowest self-efficacy with regards to their belief of effectively implementing project-based learning. According to Hall and Hord (1987), these assessments indicated that Nina and Norma are "users" of PBL; however, they did not implement the innovation consistently.

Like Nina and Norma, Nick taught science, STEM, in the non-traditional setting and expressed difficulties in implementing project-based learning (PBL). Nick's data placed him into Stage 3 (Management) of the Stages of Concern (SoC), and Level IVA (Routine) on the Levels of Use (LoU) diagnostic tool. His sense of self-efficacy was also higher than that of Nina and Norma. To experience an even higher sense of self-efficacy, he needs to be become more comfortable in implementing innovations to improve PBL for all students.

In comparison to the previous three STEM teachers in non-traditional classrooms, Tara and Tom taught reading in traditional classrooms, each believed smaller setting was more conducive to facilitate PBL instruction. Both were placed in Stage 4 (Consequence) of the Stages of Concern (SoC) and Level IVB (Refinement) of the Levels of Use (LoU) diagnostic tool; they are PBL "users" and have experienced higher self-efficacy in association with the implementation of project-based learning (PBL). Unlike Nina and Norma, Nick whose concerns

revolved around their ability to facilitate math or science instruction in the PBL process, both Tara and Tom were concerned about their students attaining the necessary, basic skills needed for success.

Nancy, a non-traditional classroom teacher of reading, possessed the highest assessments on the Stages of Concern (SoC) and the Levels of Use (LoU), Stage 5 and Level V accordingly. Not only did she implement PBL consistently, Nancy was seeking ways to improve social studies text to improve the integration of different genres of reading. She clearly had the highest sense of self-efficacy in implementing instruction in the project-based learning classroom (PBL).

It seems the higher the individual was in the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool, the greater the likelihood the individual possessed self-efficacy. Individuals with reading content areas, non-STEM, were more likely to be assessed higher on the SoC and the LoU diagnostic tools. It seems, then that the acquisition of the skills and understanding of project-based learning (PBL) implementation at this site is best accomplished by reading teachers in either type of classroom. Gender is not determinant; teaching content is.

In this chapter, the respondents' data were analyzed using the Concerns Based Adoption Model (CBAM), specifically the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool. In closing this chapter, the data indicated respondents' felt the traditional classroom setting better assisted in facilitating the project-based learning process. Tara and Tom indicated the smaller classroom size allowed for better monitoring of student behaviors and progress. On the other hand, the non-traditional classroom seemed to be difficult for some respondents'. Both Nina and Norma instructed in a non-traditional setting and both indicated the mere numbers of students was overwhelming to effectively facilitate math and science instruction in a project-based learning (PBL) classroom. Nina indicated the math was conceptual

and PBL did not lend itself to appropriate facilitation, while Norma expressed concern about conducting labs for the large numbers of students in the PBL classroom. With regards to another concern about the non-traditional classroom, Nancy experienced stresses of sharing a class with another teacher. Although one might know the other teacher in a professionally, it is different when one shares a classroom an entire year with another person. Both Tara and Tom believed the smaller, traditional classroom allowed for them to more easily facilitate the PBL process, while monitoring all students. Tara mentioned the quieter atmosphere in a traditional classroom was a big plus for her, in comparison to the increased noise level of the larger non-traditional classroom. The classroom structure seemed to impact the respondents' perceptions about implementing project-based learning (PBL).

Both males and females fell into different spectrums of the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool. While Nina and Norma were at the lower spectrum of both diagnostic tools, Nick and Tom were both placed into the "user" category of both diagnostic tools. Nick and Tom had a common theme in their belief of being able to facilitate project-based learning (PBL) instruction. For Nick, it was personal sense of pride. He shared with me that "can't" was not a part of his vocabulary and felt his experiences in high school athletics allowed him to persevere through the PBL process. He indicated that he would have to find a way to work through PBL difficulties. Tom shared similar sentiment, however, it was not related to perseverance, but rather expectation. Tom indicated that "the district expected him to do the job, so he had to do it, if he wanted to keep his job." Tom felt that his like or dislike of PBL could not interfere with the job he signed up to do for the school year. Nancy, who was ranked at the highest level of all respondents in both diagnostic tools, believed forming relationships with students was very important to succeed in anything.

Content areas also seemed significant in the implementation of project-based learning (PBL). Based upon the data, all three respondents who were placed into the higher levels of the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools all taught reading. Norma expressed that she felt the reading and social studies could be integrated smoothly, while she was unsure about how math and science would be implemented in a more cohesive manner. Nina expressed math was very conceptual and difficult to implement in a project-based learning (PBL) format and that she needed time to teach the basics. In similar fashion, Norma explained the difficulties of overseeing up to 12 different lab experiments in a PBL classroom. In the next chapter, I provide the reader with the conclusions of this study, recommendations for future research, and my reflections.

Chapter 6

Summary of Study

In this concluding chapter, I present a summary of the study, conclusions, implications for theory, research, practice, and make recommendations for future studies. The chapter concludes with my final thoughts on the study and lessons learned.

The purpose of this study was to understand ways in which teacher self-efficacy, a tenet of academic optimism, impacted instruction in a project-based learning (PBL) classroom. Academic optimism was used as the orienting theoretical framework; however, a special focus was placed on one tenet of academic optimism, teacher self-efficacy. In addition to collective teacher efficacy, academic emphasis, and faculty trust make up the three components of academic optimism (Goddard, Hoy, &Woolfolk Hoy, 2000). I chose teacher self-efficacy as a focus for this study because I believe that before one can be academically optimistic and embody academic emphasis and collective trust, one must have high self-efficacy.

A qualitative case study was used to gather greater understanding of the ways in which teachers' self-efficacy impacted instruction and student acquisition of 21st century skills in a project-based classroom. According to Creswell (2007), great strength exists in the use of the qualitative method to answer questions about real life situations as it represents a legitimate mode of social and human science exploration. The study was best suited for the qualitative method as it focuses on what teachers believe about their own self-efficacy and how their self-efficacy assisted in their implementation of project-based learning (PBL) to ensure students acquired 21st century skills.

Data for this study was collected in several ways: content analysis, interviews/drawings, and observations, of teachers in a project-based classroom. The data collected allowed for rich, thick description to be added to the study.

The Concerns-Based Adoption Model (CBAM) was used to evaluate respondents' placement with regards to their self-efficacy. Specifically, the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools allowed me to operationalize respondents' self-efficacy as it related to the implementation of project-based learning (PBL). The higher an individual was assessed on each diagnostic tool, the greater his/her successful implementation of the innovation (in this case PBL) and the individual's self-efficacy.

Respondents in this study were male and female teachers ranging in years of experience in the classroom from 2 to 27. They were math, science, and reading content specialists teaching in traditional and non-traditional classroom settings. Table 6.1 provides a summary of participant demographics including gender, content area, class type, and the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool placements.

Findings Summary

Table 6.1 Respondent Demographics with Stages of Concern and Levels of Use

Name	Gender	Experience	Subject	Classroom type	Stages of Concern (SoC	SoC category	Levels of Use (LoU)	LoU category
Nina	F	27	Math	Non-Traditional	Stage2-Personal	Self	Level III-Mechanical	User
Norma	F	2	Science	Non-Traditional	Stage2-Personal	Self	Level III-Mechanical	User
Nick	M	4	Science	Non-Traditional	Stage 3-Management	Task	Level IVA-Routine	User
Tara	F	7	Reading	Traditional	Stage 4-Consequence	Impact	Level IVB-Refinement	User
Tom	M	13	Reading	Traditional	Stage 4-Consequence	Impact	Level IVB-Refinement	User
Nancy	F	7	Reading	Non-Traditional	Stage 5-Collaboration	Impact	Level V-Integration	User

The study's research questions serve to frame the findings and the conclusions:

1.What do teachers do in a project-based learning classroom? Why? How?

All respondents attended the 2013 Engage summer training; therefore, each participant planned learning experiences for the upcoming year and all respondents' understood the districts' charge of implementing PBL process for the 2013-2014 school year. It was an expectation that all teachers who received training would implement PBL. The Vision of the Learner and the District's Core Beliefs indicated the district's desire to prepare all students for success in the 21st century which would ensure all students embody academic competencies; but, also embody certain soft skills, like collaboration, thinking creatively, and being an ethical individual.

All respondents were able to explain what project-based learning entailed for both students and teachers. A common response from all respondents' was that it was more student centered, rather than focus centered. Respondents also mentioned the teacher served as a facilitator. All respondents, including those in either the self, task, or impact category of the Stages of Concern tool and the "user" category of the Levels of Use tool acknowledged knowing about the five different protocols.

Hard skills were defined as the academic competency needed in math, science, reading, and social studies; while, soft skills referred to skills such as thinking creatively, collaborating with others, and being individuals of integrity. All respondents' felt that project-based learning (PBL) assisted in the acquisition of soft skills students needed for success in the 21st century.

However, all respondents' voiced concern about students acquiring the hard skills, especially math and science, in the project-based learning (PBL) setting. Regardless of content taught, classroom setting, placement on the Stages of Concern (SoC) or the Levels of Use (LoU)

diagnostic tools, respondents were concerned about students' mastery of their respective content. Especially, this was true for the math and science instructors.

Project-based learning (PBL) effectively assisted in the acquisition of soft skills; however, the acquisition of hard skills, especially math and science, were difficult to integrate in the PBL setting. Math and science instructors voiced serious concerns about content acquisition in the project-based learning PBL setting and their data placed them as having lower self-efficacy.

2. How does teacher self-efficacy inform PBL instruction?

Teachers with higher self-efficacy were more successful in PBL implementation. All respondents with higher self-efficacy, herein defined as those categorized in the "impact" on the Stages of Concern (SoC) diagnostic tool and as "users" on the Levels of Use (LoU) diagnostic tool indicated they used the protocols to guide project-based learning (PBL) instruction. Those who implemented project-based learning (PBL) at high levels and who had higher self-efficacy noted the importance of using the PBL protocols. They often reflected back to the Engage website as a resource to better implement PBL. Respondents with higher self-efficacy also believed they implemented PBL effectively. The reasoning behind their belief ranged from "it is my job", or one taking ownership of facilitating the innovation (in this case PBL). One respondent pointed to doing what was best for kids and she believed that PBL would help them.

Respondents with lower self-efficacy, herein defined as those categorized in the "self" on the Stages of Concern (SoC) diagnostic tool all indicated they knew about the protocols. However, they did not mention the use of them to guide instruction in the project-based learning classroom. Two respondents believed they did not implement project-based learning (PBL) effectively. These respondents stated that they wanted students to experience success; however,

they voiced concerns of facilitating math and science instruction in a non-traditional, PBL classroom.

3. How useful is self-efficacy in understanding the project-based learning (PBL) classroom?

Teacher self-efficacy is very useful in understanding the facilitation of instruction in the project-based learning classroom (PBL). Hoy, Tarter, and Hoy (2006) would explain that an academically optimistic school environment contains teachers' who believe in their ability to impact all students, regardless of socioeconomic status, race or gender. Academic optimism sets the tone, or presents a climate of high academic achievement for students, fosters a positive tone by staff that exhibits a belief that problems can be collectively solved (Hoy et al., 2006). Woolfolk Hoy, Hoy, and Kurz (2008) determined that academic optimism is an individual teacher characteristic.

All respondents received the same training in the summer of 2013 to implement project-based learning (PBL); however, several respondents felt more capable in implementing PBL than others. Individuals in the "self" categories of the Stages of Concern (SoC) diagnostic tools felt less confident in their ability to facilitate project-based learning. While all respondents' were categorized as "users" on the Levels of Use (LoU) diagnostic tool, two respondents' rarely used the protocols to implement PBL. All two with lower self-efficacy facilitated instruction in either the math or science in the non-traditional classroom and, as a matter of fact, two respondents' candidly informed they believed that they did not implement PBL well. Their reasoning revolved around frustration of facilitating math and science content in the PBL classroom. Respondents' who had lower self-efficacy identified a recurring theme of struggle in their interviews and with their drawing analysis.

The respondents' who felt confident in implementing project-based learning (PBL) ranked higher in the "impact" category on the Stages of Concern (SoC) and in the "user" category in the Levels of Use (LoU) diagnostic tools. These respondents' expressed in their interviews, drawing analysis their belief of successfully implementing PBL. Respondents from this category pointed to following the appropriate protocols and a stated they believed they implemented PBL well. It should be noted the three facilitated reading instruction and two facilitated reading instruction in a traditional classroom.

Several important themes emerged from respondents who facilitated project-based learning (PBL) at high levels. First, all three believed they implemented PBL well and gave the same response as to why they felt this way; they all used the protocols. The respondents also mentioned the importance of forming relationships with students, or letting them know "that you are there" for them as an important component to instruction. The respondent with the highest sense of self-efficacy indicated the bond between teacher and student has to be real, not superficial, as students understand one's genuineness.

A sense of responsibility to fulfill their duties was a common theme for those with higher sense of self-efficacy. All respondents informed that it was their job or that they were paid to implement project-based learning (PBL) to the best of their ability. These respondents' also took ownership of the implementation. Regardless of their personal feelings, each respondent took steps to learn about new resources, to collaborate with others about implementation, and to be open about trying different strategies.

Interestingly, those individuals who had the highest self-efficacy were reading teachers and teachers with lower self-efficacy were math or science teachers, thus prompting me to infer the math and science facilitation in a non-traditional, project-based learning (PBL) classroom

had a negative effect on the self-efficacy of those teachers. The traditional and non-traditional setting did not impact the facilitation of project-based learning for reading; however, the non-traditional setting proved difficult for the math and science teachers.

4. What other realities about project-based learning (PBL) are revealed by the data?

Several themes emerged during this study. Also, concerns about certain structures and the implementation of certain content seemed to be challenges for several respondents.

Four of the respondents were female and two respondents were male. Based upon the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools, two females data placed them into the lower stages of self-efficacy, placing them into the respective categories of "self" or "use" on the SoC and LoU diagnostic tool. On the other hand, two females data placed them into the higher stages of self-efficacy, thus placing them into the "impact" or "use" category on the SoC and LoU diagnostic tools. The same was true for the males. The data placed one respondent into a lower stage of self-efficacy and into the "task" and "use" category, while another male respondent was placed him into the higher stages. It seems that Gender had no impact on the self-efficacy of respondents' and their implementation of project-based learning.

Three of the respondents were responsible for reading content in the project-based learning (PBL) classroom, while two respondents were responsible for math content and one was responsible for science. Two respondents who taught math or science measured at lower levels of self-efficacy on the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools which caused them to be placed the "self" and "user" category. One respondent, who instructed science, also measured at the lower levels of the diagnostic tools, which caused their data to be placed at the "task" and "user" category of the SoC and LoU. The instructors spoke of the procedural requirements of teaching math and science, and felt project-based learning did not

lend itself to successful implementation for their content. My observations indicated math and science were primarily instructed through traditional practices.

The three respondents who facilitated reading in the project-based learning (PBL) classroom had a higher sense of self-efficacy based upon the data used in the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools and were placed in the "impact" and "user" category of the respective tool. My observations indicated these respondents' were using the protocols.

While a few respondents indicated a desire to have more time to teach reading and writing skills, data indicated project-based learning was most effectively implemented in the reading project-based learning (PBL) classrooms; whereas, the PBL format used for instructing math and science classes were not very successful. Project-based learning is better facilitated with the reading and social studies content; but, it is not better facilitated with the math and science content.

Project-based learning (PBL) was implemented in two different types of classrooms. The non-traditional classroom consisted of one, large room in which two teachers facilitated instruction to a group of up to 70 students. The districts' initial thoughts were that the non-traditional classroom structure better allowed PBL facilitation, as teachers could collaborate and two content areas could be combined in one classroom. During the 2013 school year, the district implemented PBL in the traditional setting which consisted of a regular classroom with one teacher that housed up to 35 students.

Two respondents' in the "self" and "use" category of the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tool facilitated math and science instruction in the project-based learning (PBL) classroom. The respondents indicated large classroom size was disruptive

to learning and the facilitation of the needed practices for math and science skill acquisition was difficult in the non-traditional. One respondent instructed reading in the non-traditional classroom; however, the data for this respondent placed her as having the highest sense of self-efficacy with regards to the implementation of PBL. The respondents' who taught math or science in the non-traditional classroom setting had a lower sense of self-efficacy

Respondents who instructed in the traditional classroom setting were ranked in the "impact" and the "user" category the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools. Both respondents felt the smaller classroom better allowed them to implement project-based learning (PBL) more effectively. Interestingly, the lower noise level in the traditional classroom setting was also noted as a positive. In comparison to the non-traditional classroom, the traditional classroom provided a more favorable classroom structure to effectively implement project-based learning.

Other themes emerged from the study to better guide the implementation of project-based learning at other sites. Classroom setting, sharing a classroom with another teacher, and specific content facilitation in the project-based learning (PBL) were themes which emerged from the study.

Classroom setting was an important component to implementing project-based learning (PBL). The non-traditional setting classroom provided the optimum opportunity to facilitate reading content through the PBL format. The ability to monitor 25-30 students and facilitate the PBL instruction was easier achieved in this setting, when compared to the non-traditional setting.

While the non-traditional classroom setting provided for two certified teachers to integrate their subjects, it also provided barriers to facilitating instruction. The great amount of students in one classroom caused for a sense of being overwhelmed. With up to 60 students in

one large classroom, the ability to monitor student behavior and to facilitate PBL instruction was difficult.

The sharing of one large classroom by two adults can also present challenges. Although professional and courteous, the differing philosophies on classroom management, daily procedures, and discipline can cause for tension. .

Another reality observed during the study was the lack of success in facilitating math or science in a project-based learning (PBL) format. Respondents' who facilitated math and science instruction noted that they had a lack of time to apply the learned material and a lack of time in providing students with the direct instruction to provide them the basics to problem solve. Math and science instruction require students to know appropriate procedures to solve problems; but, more importantly, students must be able to conceptually apply those procedures to solve complex problems. On the other hand, it appears reading and social studies are easier integrated in the project-based learning (PBL) format.

The traditional classroom and reading content better serve in facilitating project-based learning (PBL) effectively. The smaller size of the traditional classroom better provides the instructor to monitor behavior and to facilitate PBL, while the large classrooms provided overwhelming feelings. Math and science were difficult to facilitate through the project-based learning (PBL) process. The respondents with the lower sense of self-efficacy, based upon their placement on the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools, facilitated math or science content in the non-traditional setting.

Teacher self-efficacy, a tenet of academic optimism, provided important insight into the factors involving successful implementation of project-based learning (PBL). The study revealed the following conclusions:

1. Project-based learning (PBL) is not the ideal format for the facilitation of math content. Due to the complex nature of instructing math, the PBL protocols do not lend themselves to ensure the depth and complexity of each TEK. Students deficient in performing procedural skills in math need direct, intensive remediation to ensure their mastery of the basic skills, so that one might be able to apply their procedural knowledge to the overall conceptual problem. Although direct instruction is not necessarily the answer for math and science instruction in the project-based learning classroom, I do feel a hybrid, direct instruction and application, would better serve students receiving instruction in the project-based learning classroom. Science facilitation better lends itself to successful implementation in the project-based learning (PBL); however, several refinements need to occur to ensure the learning experience is optimal.

On the other hand, the facilitation of reading and social studies content seemed to integrate much easier in the project-based learning (PBL) classroom. The respondents' who had the higher levels of self-efficacy based upon the Stages of Concern (SoC) and the Levels of Use (LoU) diagnostic tools facilitated reading instruction. The reading teachers desired more time to facilitate instruction on the foundational skills needed for reading and writing. This might be accomplished with the first hour being devoted to traditional instruction in writing and reading, while the remaining two hours of the block are devoted to the implementation of PBL.

2. The non-traditional classroom setting proved to be a challenge in implementing project-based learning (PBL). The larger classroom provided challenges with the monitoring student behavior and the implementing of PBL. The smaller traditional classrooms provided instructors with a setting conducive to monitoring student behavior and to effectively facilitate project-based learning (PBL). I would recommend PBL be facilitated in the traditional

classroom for the facilitation of reading and social studies content. The facilitation of math and science might be better served with a different instructional delivery system, but also in a traditional setting. Although direct instruction is not necessarily the answer for math and science instruction, I do feel a hybrid, direct instruction and application, would better serve students receiving instruction in math and science.

3. Finally, respondents who had higher self-efficacy in implementing project-based learning (PBL) took ownership of the responsibility to implement it. Several respondents informed that it was their job or that they were doing this to better assist the students. Furthermore, their actions indicated they took steps to better learn the implementation process and continued to try to improve the innovation. Those who had a higher self-efficacy also indicated the forming of relationships with students was very important; more importantly, their actions indicated they did form appropriate relationships with the students. The teachers with high self-efficacy were well-liked by their students.

Study Implications

Findings from this study provided valuable information on teacher self-efficacy in a project-based learning (PBL) classroom. The findings will be useful to institutions, schools, administrators, and teachers in better understanding how teacher self-efficacy impacted the acquisition of 21st century skills in the PBL classroom. The extent to which teachers have a high sense of self-efficacy directly impacted the successful implementation of PBL.

Research

This study was designed to add to the body of knowledge about teacher self-efficacy, a tenet of academic optimism, and how it impacted successful acquisition of 21st century skills in

project-based learning (PBL) classroom. The study presented data to a unique problem which will further assist researchers with successful PBL implementation.

Academic optimism is a latent construct related to student achievement which focuses on improving student achievement despite the status of the schools socioeconomic status (SES). My rationale for this study stems from my desire to identify characteristics that allowed teachers to be successful in implementing project-based learning (PBL). Academic optimism provided a lens to view teacher self-efficacy and how it impacts the teachers' successful implementation of project-based learning so students' acquire 21st century skills.

As students enter into the 21st century workforce, administrators and teachers at schools, both public and higher education institutions, would benefit from investigating how project-based learning (PBL) assist in the acquisition of 21st century skills. This study was completed at one study site with six respondents.

I recommend consideration for further research into the structures which might better facilitate successful implementation of math and science in the project-based learning (PBL) classroom. Also, I feel more research concerning the implementation of math and science in a PBL elementary classroom would be beneficial to other practitioners and administrators. I also feel more research about teacher self-efficacy, especially for those who teach math and science in the project-based learning classroom, will prove to be beneficial. It would also be interesting to gauge how the self-efficacy of professors in higher education institutions informs instructional practices.

By allowing the voices of the respondents to be heard about their perceptions of project-based learning, I revealed aspects of how self-efficacy informs successful implementation of project-based learning (PBL). Also, the study provides recommendation to certain structures

which assisted with successful implementation of PBL. By using the qualitative method, I was able to reveal aspects about teacher self-efficacy and its impact on the successful implementation of PBL that may not have been accessible through quantitative analysis.

Theory

Although substantial research has employed academic optimism (Hoy, Tarter, and Hoy (2006), I found no studies which view teacher self-efficacy, a tenet of academic optimism, and its impact on the acquisition of 21st century skills in a project-based learning classroom. Through mainly quantitative studies, academic optimism has been established to predict student achievement in urban schools (Smith & Hoy, 2007) to predict student achievement in urban elementary reading (Bevel & Mitchell, 2012), and to predict student achievement in urban elementary schools for math (Goddard, Sweetland, & Hoy, 2000). Increased understanding of teacher self-efficacy, a tenet of academic optimism, in relation to the implementation of project-based learning may help provide strategies to administrators, teachers, and faculty who assist in preparing teachers for success in the 21st century classroom. I feel more research should focus on the implementation of PBL in the intermediate grade level mathematics classroom

Practice

The study provided the detailed description of experiences of six respondents at one study site who implemented project-based learning (PBL). The qualitative method allowed me to highlight the significance of the classroom setting, the importance of the content taught, and other realities, which related to the concept of teacher self-efficacy and its impact on PBL instruction. For an administrator looking to incorporate PBL as an instructional delivery system at their school, this study provides particulars about the benefits of a traditional classroom

setting, in comparison to a non-traditional classroom setting. Also, it informs about the difficulties of facilitating math or science instruction through the project-based learning format.

This study adds to the body of knowledge regarding teacher self-efficacy and its impact on the successful acquisition of 21st century skills in a project-based learning (PBL) classroom. It provides relevant data about structures of PBL, some characteristics of teachers with high self-efficacy and structures that assist with PBL instruction, and insight on concerns with content facilitation in a PBL classroom. The information will help administrators, teachers, and college faculty in their quest to better prepare teachers for success in a 21st century classroom which might use PBL as the instructional delivery system.

Final Thoughts

This study could not have been completed without the perspectives of the participants. I am appreciative of their time and attention to answering questions and engaging in dialogue about the complexities of implementing a new instructional delivery system, PBL. As the researcher, I also work at the study site in an administrative position. I was pleasantly surprised by respondents' willingness to be candid about their perceptions of PBL. As a result of their candidness, I could better identify with the struggles of the participants. I was able to better understand why some respondents, despite attending the Engage training, failed to incorporate the appropriate protocols in PBL instruction. This was especially true with mathematics and science content in the PBL classroom. As a result of the study, I feel trust was established with the math and science teachers to the point that revisions on how math and science are facilitated will be better received in math and science instruction.

Teacher self-efficacy played an important role as to whether project-based learning was implemented effectively. For those teachers who ranked highest on the two diagnostic tools,

they plainly indicated they felt they implemented PBL well. These individuals pointed to using the Engage protocols to ensure all facets were implemented properly and indicated they felt it "was their job" to implement the innovation well. On the other hand, those respondents who felt they did not implement PBL well, clearly stated that they did not. The nature of the content played a big part as to how respondents felt about implementation, math and science teachers felt they did not implement PBL as well as reading teachers.

I found myself identifying with the perspectives of the respondents, as none of the respondents were viewed to be merely obstinate in their execution of project-based learning. In all cases, the concerns, which ranged from the effectiveness of facilitating math and science instruction to the large, non-traditional classroom, revolved around doing what they thought best for the student. They all indicated they wanted students to be successful; however, several structures of project-based learning proved to be overwhelming. I found, in practice, it is very difficult to shift from teaching in a traditional classroom instruction with all of its quirks and rules, to a student-centered, constructivist learning project-based learning (PBL) delivery system.

For me, the most important findings from the teachers with highest self-efficacy in implementing project based learning (PBL) were the work ethic of those teachers, the ownership they took in implementing PBL well, and the relationships they created with their students. The teachers with high self-efficacy pointed to following certain protocols of the process and always researching ways to make PBL more effective for students. I think it is worth noting that the instructors who had lower self-efficacy taught either math and science. I would like to give consideration to the difficulties of implementing math and science in the project-based learning

format and how this might have contributed to those teachers perceptions about facilitation of math or science in a PBL classroom.

Appendix A-District Approval

From: McHaney, Larry
To: Cyprian, Thomas
Subject: RE: Email with Permission to Conduct Case Study

Hi Thomas,
I have reviewed your request and I do approved it. Is there an official form I need to sign for you or is this email sufficient? I would like to discuss some concerns and ideas. Please let me know when you are available.

Thanks

Larry J. McHaney, Ph.D.
(972) 708-2045

Appendix B- Informed Consent Document

UT Arlington
Informed Consent Document

PRINCIPAL INVESTIGATOR
Thomas Cyprian University of Texas at Arlington

FACULTY ADVISOR
Dr. Adrienne Hyle, University of Texas at Arlington, Department of Educational Leadership and Policy Studies, 817-272-0149

TITLE OF PROJECT
Teacher Self-Efficacy in a Project-Based Learning Classroom

PURPOSE
You are being asked to participate in a study about teacher self-efficacy and the ways in which it may impact student acquisition of 21st century skills in a project-based learning classroom. Your participation is voluntary and your refusal to participate will involve no penalty or loss of benefits to which you are other entitled. Please ask any questions if there is anything you do not understand.

DURATION
You will be asked to participate in one individual interview, which will last no longer than two hours, and you will be observed four times by me for up to 30 minutes during your regular class period.

NUMBER OF PARTICIPANTS
The number of participants will be six.

PROCEDURES
The procedures allow you to voluntary participate in an individual interview with grand tour questions and a drawing which will allow you to illustrate your experiences with project-based learning. The interview will be taped by a digital recorder. After the interview, the tape will be transcribed, which means the contents of the interview will be typed exactly as they were recorded, word-for-word. The tape will be destroyed after transcription. The tape and transcription will not be used for any future research. Four observations will occur per teacher. The researcher will observe only the teacher and what the teacher does in the classroom for up to 30 minutes. The researcher will write down in field notes what the teacher is doing during these observations. Each teacher will be provided with their individual field notes to view.

POSSIBLE BENEFITS

IRB Approval Date: JAN 3 1 2014

IRB Expiration Date:

UT Arlington
Informed Consent Document

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study:

_____

Signature and printed name of principal investigator or person obtaining consent **Date**

CONSENT

By signing below, you confirm that you are 18 years of age or older and have read or had this document read to you. You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits, to which you are otherwise entitled.

_____

SIGNATURE OF VOLUNTEER **DATE**

IRB Approval Date: JAN 3 1 2014

IRB Expiration Date:

Appendix C-Interview Questions

Interview Protocol

1. Tell me about your drawing?
2. Tell me a little bit about yourself and why you became a teacher?
3. What is project-based learning?
4. How is project-based learning implemented? What do the students do? What does the teacher do?
5. What skills will students need in the 21st century workforce?
6. Do you believe you effectively implement project-based learning? Why? Why Not?
7. In your opinion, what beliefs, actions, and procedures will show evidence that you believe, or have a sense of self-efficacy, that you can effectively facilitate instruction in a PBL class?

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