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The Association Between Teacher Self-Efficacy, Teacher Motivation and the Implementation of Project-Based Learning (PBL) Teaching Methods

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THE ASSOCIATION BETWEEN TEACHER SELF-EFFICACY, TEACHER MOTIVATION, AND THE IMPLEMENTATION OF PROJECT-BASED LEARNING (PBL) TEACHING METHODS

by

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Abstract

This exploratory study analyzed the association between teacher self-efficacy, teacher motivation, and the implementation of project-based learning teaching methods. In addition, the study also analyzed the association between teacher self-efficacy, teacher motivation, and project-based learning methods with demographic variables and school context variables. The survey study used two items from the Ravitz 2008 PBL survey, the Teachers' Sense of Efficacy Scale (TSES), and the Work Tasks Management Scale for Teachers (WTMST). Moderate to significant correlations were found between the teacher implementation of PBL methods and teacher efficacy in instructional strategies. Strong correlations were identified between teacher efficacy in classroom management and PBL implementation. In addition, while the association between intrinsic motivation for teaching and PBL implementation was weak, a strong correlation was discovered between identified regulation and PBL implementation. These results point toward a need for further studies on the relationship between teacher efficacy, identified regulation, and PBL implementation.

Keywords: project-based learning, teacher self-efficacy, teacher motivation, Guskey Model

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Chapter One

Although project-based learning (PBL) has its roots in Dewey's (1897) notion of learning through projects and later in Kilpatrick's 1908 "project method" (Beyer, 1997; Knoll, 1997), PBL has increased in popularity within the last two decades. According to Google's Ngram tool, which tracks the frequency of terms within published materials, the phase "project-based learning" first appeared in 1980 but remained relatively obscure until 1993. At that point, the term began a linear increase, followed by an exponential growth in the term a decade later in correspondence with the rise of 21st century learning.

With the rise of automation, machine learning, and artificial intelligence, K-12 educational institutions have grappled with the best ways to help students navigate the complex maze of a globalized workforce. Many institutions have gravitated toward project-based learning as a method to help students develop 21st century skills, including collaboration, information literacy, critical thinking, and problem-solving, and global citizenship (Ertmer, Ottenbreit-Leftwich, & Tondeur, 2014; Ravitz, Hixson, English, & Mergendoller, 2012). However, despite the popularity of project-based learning within K-12 education, the term can often seem nebulous, with multiple interpretations that vary by context (Thomas, 2000). As a pedagogical model, project-based learning incorporates elements of inquiry-based learning (Banchi & Bell, 2008; Meyer, et al., 2012; Pedaste, et al., 2015), problem-based learning (Duffy, Lowyck, & Jonassen, 1993), and service-learning (Jacoby, 2014).

While the PBL process differs between various models, common elements exist within the PBL method. First, there is a provocation or question that leads to sustained inquiry (Bell,

2010; Krajcik & Shin, 2014; Lam, Cheng, & Ma, 2009; Larmer, Mergendoller, & Boss, 2015; Markham, Mergendoller, Larmer & Ravitz, 2003; Parker et al., 2011). This extended, student-led investigation facilitates the internal construction of knowledge (Pellegrino and Hilton, 2012; Ravitz, 2010). Although the level of teacher direction varies according to context, there is a general emphasis on student self-direction and choice with students generating original content creation (Krajcik & Shin 2014; Ravitz, 2010). As Chris Lehmann (2012), principal of the Science Leadership Academy puts it, "if you give out a project and get back 30 of the exact same thing, you didn't give a project. You gave out a recipe. That's recipe-based learning. Project-based learning means that the kids have got to own it."

Finally, the PBL process emphasizes an authentic audience with students sharing their findings, results, conclusions or products with members outside of their immediate classroom (Bell, 2010; Darling-Hammond, 2006; Grant, 2002; Larmer, Mergendoller, & Boss, 2015; Ravitz, 2008, 2010). However, for Krajcik and Shin (2014), PBL should not require a launch to an audience so much as the creation of tangible artifacts that students find inherently meaningful.

With the ascent of project-based learning, educational institutions have implemented systemic shifts toward project-based learning. One key area has been through professional development interventions, including PBL workshops. However, it is unclear whether professional development workshops at the teacher level lead to project-based learning at the student level. For teachers, PBL can seem like a significant risk. Project-based learning often requires teachers to shift from the director of instruction to the facilitator of learning, resulting in

fear and uncertainty (Ertmer & Simons, 2006; Grant & Hill, 2006). Furthermore, teachers often move into a neophyte role as they work to integrate previous teaching strategies with newer PBL methods. (Marx, et al., 1991, 1997). According to Fullan (2007), this change in practice is dependent on both intrinsic interest in innovation and on positive teacher self-efficacy. A lack of success often leads to a regression away from PBL methods and back to former practices (Lam, Cheng, & Choy, 2010).

The rise of PBL has coincided with the rise in outcomes-oriented school policy. Policies like No Child Left Behind (2002) and Race to the Top (2009) have emphasized student achievement through standardized tests (Viteritti, 2011). Similarly, outcomes-oriented professional development evaluations have measured the success of professional development implementation at the student level, with a focus on student achievement scores (Zubrzycki, 2013). This can prove problematic when evaluating the success of PBL professional development. While PBL implementation can lead to moderate increases in student achievement (Branch, 2015; Çelik, Ertas, & Ilhan, 2018; Chen & Yang, 2019) teachers often experience an initial dip in student achievement as they adopt new teaching strategies and determine appropriate scaffolds for learning (Hmelo-Silver, Duncan, & Chinn, 2007). This dip in achievement can make PBL implementation seem risky in an outcomes-oriented school culture that emphasizes student achievement through standardized tests (Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011).

In addition, outcomes-oriented professional development evaluations do not factor in teacher motivation and self-efficacy. The Guskey Model (2005), the most prevalent outcomes-

oriented evaluation framework, fails to address both teacher motivation and teacher self-efficacy. While the model includes phases in implementation, the focus is on the fidelity of implementation. In other words, the evaluation protocols measure whether or not teachers adequately implemented specific strategies learned in professional development. This focus on the fidelity of implementation conceptualizes educators as conduits of educational change in a way that minimizes individual teacher agency. By determining if an association exists between teacher efficacy, motivation, and PBL implementation, researchers and practitioners could potentially determine a link between internal factors at the teacher level (self-efficacy and motivation) and thus provide systemic support at the institutional level.

Purpose of the Study

This study sought to determine the extent to which teacher self-efficacy and intrinsic motivation correlate with the implementation of PBL instructional methods for teachers who have attended a PBL workshop. The survey study also investigated the potential association between teacher demographic variables (gender, race/ethnicity, teaching experience) and school contextual variables (subject area, grade level, and school socioeconomic status) with the implementation of PBL instructional methods for teachers who have attended a PBL workshop.

Rationale of the Study

In 1983, the National Commission on Excellence in Education published “A Nation at Risk” report, which ushered in a new era of evidence-based policies in K-12 education. By the mid-1990s, states began tying professional development funding to specific student outcomes with a stronger emphasis on both teacher and institutional accountability (Corcoran, 1995; St.

John, Ward, & Laine, 1999). On a practical level, districts struggled to tie specific professional development interventions to increases in learning outcomes (Hertert, 1997). However, despite these difficulties, public school districts continue to use student-based, outcomes-oriented evaluation methods to determine the effectiveness of professional development interventions.

Within this climate of evidence-based policies, Guskey (1987) emerged as a prominent advocate for measuring the effect of professional development at the student outcomes level. For Guskey, research on professional development should make an explicit link between professional development interventions and student learning outcomes (Guskey, 1997). Later, Guskey incorporated elements from corporate training program evaluations (Kirkpatrick, 1994) and applied them to teacher professional development, leading to the Guskey Model (2000). With this framework, Guskey argued that institutional support was a more critical component than teacher efficacy or motivation in leading to teachers' use of new knowledge and skills in their classroom practice (Guskey, 1997).

While the prominent Guskey Model (2005) includes elements of process-oriented evaluations, the focus remains outcomes-oriented. Here, Guskey advocates for measuring the success of professional development through improvement in student learning outcomes, which he describes as "professional development's ultimate goal" (Guskey, 2003). However, institutions tend to focus solely on student achievement data rather than specific learning outcomes found in more localized common assessments (Guskey, 2007). Unfortunately, this evaluation process fails to address the role of teacher self-efficacy and intrinsic motivation.

The lack of focus on teacher efficacy and motivation is potentially problematic in professional development with pedagogical models that require teachers to make a dramatic shift in their practice. For many teachers, PBL involves a shift from teacher-centered to student-centered learning (Ertmer & Simons, 2006; Grant & Hill, 2006; Kolodner, et al., 2003). This shift toward PBL might require an internal drive to change one's practice (intrinsic motivation) because PBL is more interesting, enjoyable, or closely aligned with a teacher's values and beliefs. However, PBL implementation might also be an act of compliance or a desire for a separable outcome (extrinsic motivation). Teachers might implement PBL for specific rewards or due to social pressure to enact a new district initiative. In addition, the shift toward PBL might also require a belief that one can implement a new approach (self-efficacy). Understanding motivation and self-efficacy at the teacher level could help illuminate the connection between professional development interventions and the propensity for teachers to implement specific teaching strategies.

Research Questions

This study investigated three primary research questions:

1. Is there a correlation between teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?
2. Is there a correlation between teacher demographic variables (gender, race/ethnicity, teaching experience) and teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?

3. Is there a correlation between school context variables (subject area, grade level, and school socioeconomic status) and teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?

Significance of the Study

By isolating intrinsic motivation and self-efficacy, this study distinguished between a teacher's desire to implement project-based curriculum (intrinsic motivation) and the belief that one can accomplish the task in order to determine (self-efficacy) through the use of two self-reported surveys. By measuring correlation, this study did not address whether motivation or self-efficacy worked as mediators on one another or whether they existed in a reciprocal relationship. Instead, the present study focused on which variable had a stronger correlation with the teacher implementation of PBL methods.

If self-efficacy had a strong association with implementation and intrinsic motivation had a weak association, it would potentially mean professional development would need to focus on helping teachers believe they *can* implement a particular set of strategies (Bandura, 1986). If intrinsic motivation had a strong association with implementation and self-efficacy had a weak association, it would potentially mean professional development should address the *desire* to implement particular teaching methods (Deci & Ryan, 1985, 1995). If both self-efficacy and intrinsic motivation had a strong relationship with teacher implementation, it could mean that future professional development evaluations would need to measure both elements after a professional development intervention. However, if neither variable had a significant association with implementation, it would confirm the idea that teacher motivation and self-efficacy are not

significant in determining whether or not implementation occurs. In the process, this would strengthen the rationale for the omission of efficacy and motivation within the prominent Guskey Model (2005) for evaluating professional development.

Because this was a correlational study, it was impossible to determine whether or not self-efficacy and motivation could predict the implementation of PBL strategies. It is possible that teaching from a PBL framework might actually increase one's self-efficacy or intrinsic motivation. It is also possible that teachers with pre-existing high self-efficacy and intrinsic motivation might have a higher propensity to implement PBL strategies. However, this non-experimental survey study did not address cause and effect. Instead, it was an exploratory correlational study that can help determine if future experimental studies are needed.

Furthermore, the present study included contextual factors with the hopes of shedding light on the largely underexplored role of teacher demographic variables and school context variables and PBL. In the past, the research has not adequately explored PBL implementation and gender or race/ethnicity. The variable of teaching experience could potentially shed light on what it is like for veteran teachers to become neophytes again in their practice; an idea explored in qualitative research (Marx, et al., 1991, 1997). The inclusion of school context factors could potentially provide insights into how policy and environmental variables impact PBL implementation.

Definition of Terms

Autonomy: the ability and freedom to self-regulate; defined here through the lens of self-determination theory as the opposite end of the spectrum with controlled regulation (Deci & Ryan, 1995)

Elective Course: a non-tested course that students at the secondary level select based on a menu of options as a part of the overall elective course credit requirement; often it is required at the elementary level and colloquially referred to as "specials" rather than elective

Gender: a socially and culturally constructed category that varies according to context and history (Bielby, 2000; Omi & Winant, 1994) that defines certain tendencies on a continuum from masculine to feminine ("U.S. Census Glossary of Terms," 2011). It is often but not always linked to the biological term "sex."

Guskey Model: an outcomes-oriented conceptual framework for assessing the effectiveness of professional development interventions (Guskey, 2005) that also integrates elements of process-oriented evaluations.

Implementation of PBL methods: the execution of PBL teaching strategies aligned with a PBL pedagogical approach (Ravitz, 2008). This is measured by the rate of implementation or the overall percentage of time spent on various tasks rather than the frequency of tasks. Because PBL projects vary in length, the frequency of projects would be a problematic representation of overall PBL implementation.

Multi-subject / Single Subject: the distinction in teaching load between teaching a single content area (such as math, science, social studies, language arts) or multiple content areas; note that a

single subject teacher might still teach multiple grade levels and a variety of courses within a subject (such as a science teacher who teaches freshman Chemistry or junior AP Physics)

Outcomes-Oriented Evaluations: assessing the effectiveness of an intervention by measuring the progress toward meeting a particular objective; in contrast to process-oriented evaluations (Guskey, 2002; McDonald, 2011, 2012)

Process-Oriented Evaluations: assessing the effectiveness of an intervention by measuring fidelity of implementation with an emphasis on perceived barriers (Guskey, 2002; McDonald, 2011, 2012).

Professional Development: institution-sanctioned teacher learning experiences intended for the acquisition of professional competencies (Buysse, Winton, & Rous, 2009); while some educational researchers use the more holistic term "professional learning" to incorporate personal experiences and peer collaboration (Webster-Wright, 2009) professional development limits the scope to learning experiences that are formally supported by the K-12 institution; furthermore, the Guskey Model focuses on the institutional review of Professional Development interventions.

Project-Based Learning (PBL): A student-centered pedagogical model that incorporates elements of constructivist learning theories with the goal of learning through the research, ideation, design, and creation of a project; note that some researchers use the term "project based learning" rather than "project-based learning," though the terms are synonymous.

Race/ethnicity: While sociologists tend to define these terms separately (Lewis, 1998; Nagel, 2003), this study uses the combined classification based on the U.S. Census (2011) and the U.S.

Department of Education (National Center for Education Statistics, 2002), including American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, and White

Self-Determination Theory: a macro theory conceptualizing motivation on a continuum from extrinsic motivation to intrinsic motivation based on three innate drives: competence, autonomy, and relatedness (Deci & Ryan, 1985, 1995)

Social Cognitive Theory: a macro theory of learning and motivation that conceptualizes a reciprocal relationship between environment and self with an emphasis on self-regulation, self-motivation, and self-efficacy (Bandura, 1975)

School Socioeconomic Status: the generalized socioeconomic status of the student population based on the percentage of students in poverty rather than the median family income; while the socioeconomic status of the school differs from student to student, the school socioeconomic status is the generalized status defined in this study as the school's Title One status, which factors in the concentration of low-income students based on the percentage of students who qualify for the federal Free and Reduced Lunch program (U.S. Department of Education)

Teacher Self-Efficacy: a teacher's belief in his or her capability of accomplishing a specific task; note that the terms "teacher self-efficacy" and "teacher efficacy" are used interchangeably in the literature (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998)

Teacher Intrinsic Motivation: a teacher's desire to accomplish a task based on internal rewards, such as enjoyment or satisfaction (Deci, 1975; Deci & Ryan, 1985)

Teacher Identified Regulation: a teacher's desire to accomplish a task based in order to accomplish objectives or goals (Deci, 1975; Deci & Ryan, 1985)

Teacher Introjected Regulation: a teacher's desire to accomplish a task based on a sense of guilt or the desire to avoid feeling bad (Deci, 1975; Deci & Ryan, 1985)

Teacher Extrinsic Motivation: a teacher's desire to accomplish a task based on external rewards, such as compliance, social pressure, or compensation (Deci, 1975; Deci & Ryan, 1985)

Teacher Amotivation: a teacher's lack of desire to accomplish a specific task (Deci, 1975; Deci & Ryan, 1985)

Teaching Experience: completed years teaching in a full-time capacity as defined by local and state policy

Tested Subjects: the designation of a course or subject area as "tested" is based on the state-mandated standardized assessment (sometimes colloquially known as "core subjects"); courses or subjects that do not have a corresponding state test are considered "untested."

Teachers' Sense of Efficacy Scale (TSES): an instrument for measuring teacher self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001)

Work Tasks Motivation Scale (WTMST): an instrument for measuring teacher motivation using the framework of self-determination theory (Fernet, Senécal, Guay, Marsh, & Dowson, 2008)

Limitations

This correlational survey study had specific limitations. First, self-efficacy and motivation are inherently contextual and multivariate, and thus the timing of a survey could potentially impact the results. Self-reported motivational and self-efficacy levels have been

known to vary from day to day. A teacher's motivation to implement project-based learning might wane when faced with contextual challenges with classroom management (Marx, et al., 1997). Similarly, teachers who implement PBL often experience a phase where they become novices again (Marx, et al., 1991, 1997), which might lead to an internal questioning of their abilities and hence, a drop in self-efficacy. Because motivation and self-efficacy are task-specific, there was the possibility that the scores might vary based on a teacher's personal progression through the PBL implementation process.

Furthermore, teacher self-efficacy and motivation might have varied depending on the time of year, including a seasonal generalized decrease in motivation and self-efficacy in the winter months (Kwasky & Groh, 2014). Overall, office referrals tend to be highest in December (Putnam, Luiselli, Handler, & Jefferson, 2003; Tidwell, Flannery, & Lewis-Palmer, 2003). Note that this fact does not necessarily prove an increase in disruptive student behavior but rather, an increase in the reporting of disruptive behavior. It is possible that teachers perceive more misbehavior in the weeks leading up to the winter break as a result of teacher task-based fatigue in classroom management. This could operate as a limitation, impacting teacher intrinsic motivation and efficacy scores in classroom management during a time that teachers perceive as inherently challenging. However, while it is possible that the timing may skew the results, a late December survey was more likely to produce false negatives rather than false positives. This study would have been more problematic if the surveys were conducted during the first few weeks of school when teachers might be more likely to overreport on efficacy and motivation due to the "honeymoon effect" of the new school year (Brady, Segal, Bamford, & Deer, 1998).

After all, a significant test of motivation and self-efficacy is its persistence amid a challenging context.

Moreover, the variance in efficacy based on survey timing during a school year have been minimal in other studies. For example, a longitudinal study on teacher burnout demonstrated that seasonal and school context factors had a low association with self-efficacy and teacher burnout (Pas, Bradshaw, & Hershfeldt, 2012). Another study on burnout found that teacher stress and perceived attributions (perceived cause of success or failure) were weakly associated with self-efficacy (Wang, Hall, & Rahimi, 2015). In other words, a teacher's belief in the ability to accomplish a task was not related to the perception of why a task was successful or unsuccessful. While neither of these studies involved project-based learning, they demonstrated that additional seasonal stress due to contextual factors would not significantly impact self-reported teacher self-efficacy.

Because self-efficacy and motivation are context-specific, the school context could have functioned as another limitation. Researchers have demonstrated an association between institutional support for PBL and teacher implementation of PBL (Hofman, Jansen, & Spijkerboer, 2011; Marx, et al. 2001). However, these contextual factors align more closely to the notion of "collective efficacy," or the teacher's belief that the school context will support PBL implementation rather than self-efficacy (Bandura, 1997; Goddard, Hoy, & Hoy, 2000). Collective efficacy is less about the belief that one *can* accomplish a task so much as the belief that an institution is capable of successfully implementing an intervention. In this sense, collective efficacy more closely resembles attribution theory than self-efficacy because it focuses

on the success of an action rather than the capacity to accomplish a task (Kelly, 1967; Stajkovic & Sommer, 2000).

The present study addressed contextual limitations by surveying teachers from the same school district within a two-week time period. This narrowed down the context. While this study did not distinguish between teachers from specific schools within the district (for privacy reasons), the diversity of the sample was designed to produce a broader, more representative sample overall. In addition, the inclusion of contextual variables within the survey helped address the potential association between implementation rates and school socioeconomic status, subject area, and grade level. Furthermore, the inclusion of extrinsic motivation functioned as a discriminant variable to elucidate whether extrinsic incentives were motivating teachers for implementation.

Another limitation was the variance in the initial skill level and conceptual understanding of project-based learning when teachers first attend a PBL workshop. Project-based learning overlaps with multiple constructivist learning theories, meaning a PBL novice with experience in inquiry-based or problem-based learning might have an easier time integrating the framework into their pre-existing practice (Hmelo-Silver, Duncan, & Chinn, 2007). Thus, this study did not examine the acquisition of skills in professional development or make causal inferences about previous skills and current teaching methods.

This study reduces the limitation of initial skill level by surveying teachers who each attended an introductory PBL training explicitly aimed at teachers who were new to PBL. In addition, the inclusion of subject area as a moderating variable allows the researcher to

determine if teachers with initial experience in inquiry-based learning (the science teachers using inquiry-oriented curriculum and NGSS standards) have a higher rate of implementation, self-efficacy, or motivation compared to teachers in subject areas where the standards do not emphasize student inquiry.

Effective PBL requires a subset of structures and strategies to support multiple aspects of the PBL unit. Marx et al. (1991) explored the challenges teachers faced in transforming classroom practices through the implementation of a problem-based PBL science curriculum. These challenges included the need for structures to facilitate student collaboration rather than merely participation, the use of technology for content creation rather than consumption, and the need for students to construct their own understandings rather than covering materials. These studies focus on the *quality* of PBL implementation rather than the rate of implementation. By contrast, this present study limited its scope to the association between self-efficacy, motivation, and the rate of implementation, with rate being defined as the overall percentage of time spent on specific PBL tasks. An examination of PBL instructional quality would have been outside the scope of the study, which focused on the factors that led teachers to use specific teaching strategies. Further, from a feasibility standpoint, measuring the quality of PBL would have required face-to-face observations.

Delimitations

There were also specific delimitations to this study. The first was the focus on a contextual, task-based view of self-efficacy and motivation, which did not include a unidimensional mindset or disposition toward self-efficacy, conceptualized by Duckworth's

theory of "grit" (Duckworth & Gross, 2014; Duckworth & Quinn, 2009) and Dweck's theory of fixed versus growth mindsets (Dweck, 2008).

By limiting the study to task-specific and context-dependent variables, the research left open the possibility that a unidimensional mechanism might influence a teacher's motivation or self-efficacy, while keeping the parameters limited to the task-specific variables of motivation and self-efficacy. Both grit and growth mindset address the role of persistence – including how one handles setbacks after attempting to implement an action – through the lens of attribution theory and goal-orientation (Dweck, 2017). This present study, by contrast, focused on the belief that one *can* accomplish a task (self-efficacy) and has the *desire* to accomplish a task (motivation), rather than focusing on the perceived cause of particular events (attribution).

Another delimitation was the various personal factors that could influence teacher self-efficacy and motivation. Each teacher had a set of knowledge, values, beliefs, and experience that could influence their self-efficacy and intrinsic motivation. However, these concerns have typically been examined through qualitative studies (Ertmer, 2005; Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011; Tamim & Grant, 2013) Both the Work Tasks Motivation Scale (WTMST) and Teachers' Sense of Efficacy Scale (TSES) have been proven valid and reliable as instruments in multiple countries, showing no statistical variance for teachers despite a wide range of formal teaching experience. While personal influences can work as moderators between professional development, self-efficacy, and motivation, these factors do not appear to be strong enough to skew results at a statistically significant level for the instruments used in the present study.

Another delimitation was the selection of a correlational study design. This study did not seek to address whether self-efficacy or motivation cause an increase in PBL implementation. It was possible that teachers who experienced success with PBL had an increase in self-efficacy or intrinsic motivation as a result of their success in implementing PBL methods. It was also possible that the practice of teaching PBL methods would lead to an increase in efficacy or motivation. Finally, it was possible that teachers with higher motivation or self-efficacy already had a higher propensity to attempt PBL methods after attending a workshop.

The practical purpose of this study was to inform the way schools design, implement, and assess professional development by determining if an association exists between teacher motivation, self-efficacy, and implementation. An experimental or quasi-experimental study in the future could build on this research to determine if a causal relationship exists between the variables. However, that was beyond the scope of this exploratory study.

A final delimitation was the selection of the school district. While the school district was representative of the nation as a whole in racial and socioeconomic demographics, local and regional differences limited the generalizability of the study results. For example, this study focused on suburban teachers and did not include the perspectives of urban or rural teachers.

Summary

With the popularity of PBL, districts are putting institutional resources into PBL workshops. In order to assess the effectiveness of the professional development interventions, they often use outcomes-oriented processes, including the Guskey Model (2005). However, this model does not take into account the role of teacher efficacy or motivation in the teacher

implementation of specific instructional strategies. By examining the relationship between teacher efficacy, teacher motivation, and PBL methods, this study could help inform educational leaders and professional development designers in a critical area missing from the Guskey Model. The following chapter provides a review of the relevant research on professional development, teacher efficacy, and teacher motivation.

Chapter Two

Review of the Literature

The first theme analyzes the current literature on self-efficacy, motivation, and professional development. It explores the prominent conceptual frameworks in assessing professional development, self-efficacy (Bandura, 1986) and motivation (Deci & Ryan, 1985), and the valid and reliable instruments used to measure these variables. The second theme explores the connections between these variables in relation to professional development. Finally, the last theme addresses the potential conflating of variables, including the variance in teacher experience, contextual factors that might work as moderating variables, and the challenges inherent in isolating the variables under this study.

Measuring the Key Variables

The first theme examines the conceptual frameworks and grounded theories for evaluating professional development, teacher self-efficacy, and teacher motivation. Each sub-theme focuses on the validity and reliability of specific research instruments and the research precedent for measuring key variables.

Measuring professional development through outcomes-oriented evaluations. Educational institutions have struggled to determine the best way to assess the effectiveness of professional development. One approach has been to focus on improvements in teacher outcomes. A comprehensive multi-district, mixed-methods study by the New Teacher Project (2015), used formal teacher evaluations coupled with standardized test scores to evaluate the overall effects on student outcomes. Researchers used Value Added Metrics (VAM) to determine

whether professional development led to increases in student growth and student achievement on standardized tests. Unfortunately, VAM scores can be unreliable predictors of the successful implementation of teaching strategies due to the contextual variations in student populations and achievement data from year to year (Braun, 2015; Chudowsky, Braun, & Koenig, 2010). Moreover, while there are many statistical models for VAM (Harris, 2011; McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2000), each algorithm focuses on the overall value teachers add to student achievement scores (Sanders & Rivers, 2009) rather than assessing the specific learning outcomes aligned to professional development.

Guskey (1987) argues for assessing the results of teachers' professional development at the student level. In his view, the assessments need to isolate learning targets rather than simply offering a holistic evaluation score. He operationalizes it through a conceptual framework (Guskey, 2000, 2005) for evaluating teacher change as a result of professional development within K-12 education, which he adapted from Kirkpatrick's (1994, 1998) levels of evaluating corporate and vocational training programs. The Guskey Model includes four sequential levels: (a) professional development, (b) change in teachers' classroom practices, (c) change student learning outcomes, and (d) in teachers' beliefs and attitudes. Unlike the VAM model, the Guskey Model does not rely solely on norm-referenced standardized tests to evaluate professional development; though he discovered that classroom teachers are more likely to value informal formative assessments while school administrators were more likely to view district and state-level standardized assessments as valid data (Guskey, 2007). Note that the Guskey Model is a

conceptual framework for evaluating professional development rather than a specific instrument or tool.

In addition to the conceptual framework, Guskey developed a five-level evaluation protocol (2005) for measuring the effectiveness of specific professional development interventions. The first level is “Participants’ Reactions,” which involves surveys of the quality of the professional development with a focus on teacher engagement in learning. Level two is the “Participants’ Learning” or the acquisition of teacher knowledge. The third level is the “organizational support and change,” which focuses on extrinsic contextual variables, such as leadership support and school culture. The fourth level is the “participants’ use of new knowledge and skills” measured by questionnaires and direct observations. Finally, the fifth level is “student learning outcomes” which could be student records, achievement scores, or common assessment data. The Guskey evaluation protocol focuses on the fidelity of implementation of new strategies and the impact on student achievement. Unlike the Guskey Model, the Guskey evaluation protocol does not explicitly address teacher attitudes or beliefs. While the first level includes teacher reactions, the focus is solely on how teachers viewed the quality of the professional development experience. Attitudes and beliefs can be integrated in Level 2 but they are not a required element. According to Guskey, “Level 2 focuses on measuring the new knowledge, skills, and perhaps attitudes or dispositions that participants gain.” (2016, p. 34). Note that Guskey does not include teacher motivation and self-efficacy within this evaluation protocol.

Researchers have operationalized the Guskey evaluation protocol to study professional development at the K-12 and higher education levels. Lydon and King (2009) collected data on the fourth and fifth levels of the Guskey Model in a study demonstrating that reading workshops could lead to increased implementation of specific pedagogical strategies and improved student achievement scores. However, most studies operationalizing the Guskey model rely entirely on student data as a measure of the efficacy of professional development; whether it is a study of a particular course (Muñoz, Guskey, & Aberli, 2009), the effectiveness of job-embedded professional development (Abbott, Lee, & Rossiter, 2018; Zambak, Alston, Marshall, & Tyminski, 2017) or the implementation of Professional Learning Communities (Poskitt, 2014).

However, the link between professional development and student outcomes is often tenuous, given the complex variables that contribute to student achievement. The failure to increase student achievement might not reflect poor design in professional development so much as contextual factors that are outside teachers' control or influence, even if they have strong professional development. As Guskey (1997) points out, professional development requires institutional support for teachers implementing new strategies. In the case of project-based learning, teachers often face contextual challenges which have been analyzed thematically to include time, classroom management, technology use, administrator support, and assessment policies (Cook & Weaver, 2015; Marx et al., 1997). Grant & Hill's 2006 study included these themes but also emphasized the fear of low standardized test scores as a significant barrier to project-based learning (PBL) implementation, suggesting the focus on student achievement as a

measure of professional development might be leading to risk-aversion and a lack of implementation at the teacher level.

Moreover, with the Guskey model, changes in teacher attitudes and beliefs are the result rather than the prerequisite of implementation (Guskey, 1986). However, with PBL, changes in teacher attitudes and beliefs might become apparent at different stages of PBL implementation for individual teachers. The process might not be sequential at all. While the Guskey Model conceptualizes professional development as linear and sequential (Boylan, Coldwell, Maxwell, & Jordan, 2018), teachers rarely implement PBL strategies systematically and instead often select a few new strategies to implement into pre-existing schemas (Marx, Blumenfeld, Krajcik, & Soloway, 1997) in a way that is often individual and idiosyncratic.

In recent years, non-linear models of professional development evaluation have emerged that depart from the emphasis on student achievement and instead focus on the role of a teacher as a change agent. Joyce and Showers (1988) focused on the role of teacher modeling, peer teaching, and coaching through on-going job-embedded professional development while Adey (2004) included beliefs, experiences, and ownership as additional factors. Clarke and Hollingsworth's non-linear model (2002) conceptualizes professional development through key domains visualized as the External Domain, Domain of Practice, Domain of Consequence, and Personal Domain working in tandem. Opfer & Pedder's (2011) model also breaks professional learning into three domains but focuses on specific systems: the teacher, the learning system, and the school institution. This model emphasizes teacher agency and honors the ways teachers move through change idiosyncratically. The researchers advocate a shift away from assessing the

product (student achievement) and toward measuring contextual factors. More recently, Evans (2014) conceptualized professional development as a flow chart with three components: behavioral development, attitudinal development, and intellectual development with subsequent areas of change within each category. Here, professional development is less an external system or formal event and more a personal aspect of teachers' lived professional experiences (2019). While Webster-Wright (2009) also employs a holistic model, she explicitly avoids categories or domains and instead employs the use of social inquiry through a critical lens. Each of these non-linear conceptual frameworks can be operationalized with data instruments that measure teacher attitudes, beliefs, motivation, and self-efficacy. They also represent a departure from outcomes-oriented and linear models of professional development evaluation and toward teacher autonomy and personalization.

At its core, the question of "how do we assess professional development?" is as much philosophical as it is psychometric. Each conceptual framework presents a different set of values and presuppositions that determine the instruments used for measuring teacher self-efficacy as it relates to professional development. While the idiosyncratic and non-linear models serve as a reminder of the contextual limitations and variance between teachers, this study will focus on the Guskey Model because of the prevalence of outcomes-oriented professional development in K-12 education policy and practice. Moreover, while non-linear models are helpful in measuring professional learning at the individual teacher level, the Guskey Model measures the effectiveness of professional development at the systems level, from the first intervention through the eventual learning outcomes at the student level.

Measuring teacher self-efficacy. The current research on teacher self-efficacy is grounded in Bandura's social cognitive theory (1977), which he conceptualizes as one's perception of the ability to execute a specific task or behavior (1986, 1989). For Bandura, self-efficacy involves a reciprocal relationship between external factors, including social, cultural, and environmental interactions, with internal factors, including self-perception and self-concept (1978).

In 1982, Ashton and Webb discovered a link between self-efficacy and student achievement. Building on their quantitative data, Webb (1982) conducted an ethnographic study exploring the link between teachers' low self-efficacy and their low perceptions of student ability levels and Ashton (1984) used these insights to define criteria for norm-referenced teacher efficacy tests. A year later, researchers developed a valid and reliable instrument of teacher efficacy (Dembo & Gibson, 1985), though certain items proved invalid because of the phrasing "teachers" rather than the use of "I statements" (Guskey, 1987). Throughout the 1990's, teacher efficacy tests varied from specific to general, conceptualizing self-efficacy as either unidimensional or multidimensional (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

In 2001, Tschannen-Moran & Woolfolk Hoy introduced the Teachers' Sense of Efficacy Scale (TSES) as an instrument to measure teacher efficacy. The instrument focuses on generalized efficacy but is broken into the three domains: (a) student engagement, (b) instructional strategy, and (c) classroom management. The TSES has repeatedly demonstrated invariance at the item level (Chang & Engelhard, 2016; Ruan, et al., 2015) and has been proven

valid and reliable use in multiple countries (Klassen et al. 2009; Tsigilis, Koustelios, & Grammatikopoulos 2010).

Despite the repeated evidence for the construct validity of the TSES, researchers have discovered potential issues with the instrument's implementation. Fives and Buehl (2009) identified issues with the discriminant validity when new teachers took the short-form test because they struggled to differentiate between the categories. Subsequent studies found similar trends, suggesting newer teachers and teachers with lower content or pedagogical knowledge might also need to use the long-form for more valid results (Duffin, French, & Patrick, 2012). Another study recommended analyzing the overall teacher efficacy score rather than viewing it within the three domains (Nie, Lau, & Liau, 2012). However, this contrasts with a study that confirmed the multivariate discriminate validity of the instrument with 405 secondary teachers (Tsigilis, Koustelios, & Grammatikopoulos, 2010). Because Bandura (1997) has conceptualized self-efficacy as multi-dimensional and variable based on specific tasks rather than generalized and unidimensional, there is a concern that a singular overall self-efficacy score for any experience a teacher might have (such as a project-based professional development) might not be a valid representation of the mechanism of self-efficacy. However, there is a strong research precedence for generalized self-efficacy (Park, Dimitrov, Das, & Gichuru, 2016; Scholz, Doña, Sud, & Schwarzer 2002). Thus, the TSES has been operationalized at both the multidimensional and unidimensional level.

Researchers have used the TSES to measure teacher self-efficacy concerning project-based learning and professional development. Recently, Mahasneh & Alwan's (2018) quasi-

experimental study used the TSES to demonstrate that pre-service teachers in Jordan had a statistically significant increase in overall teaching self-efficacy after attending a PBL course. Another study employed the TSES self-efficacy survey before and after professional development, finding that workshops attendees had a higher increase in self-efficacy than those who attended multiple sessions of professional development (Bumen, 2009). A possible reason for the increased efficacy was that the extended time of a workshop allowed participants to wrestle in-depth with the ideas in PBL while also planning PBL units. This study contrasted with other studies where workshops did not lead to increased self-efficacy (Stein, Smith, & Silver, 1999). It is possible, though, that the issue is not the workshop model so much as the design of the workshops themselves. One critical report on the workshop model cited the lack of teacher planning and design embedded within workshops as a contributing component to the lack of increase in teacher self-efficacy (Choy, Chen, & Bugarin, 2006).

Researchers Choi, Kim, Lee, & Park (2016) demonstrated a correlation of PBL and teacher self-efficacy with a quasi-experimental field experiment of 109 middle school teachers using the TSES instrument. They found a statistically significant increase in teacher self-efficacy among the PBL teachers and no statistically significant increase in self-efficacy among the control group. While each of these studies focused on PBL instruction designed with teacher efficacy in mind, the shared use of a quasi-experimental design means the teachers might have been predisposed to embrace a PBL framework because they elected to be a part of the professional development. By contrast, Ross and Bruce's 2017 experimental study of the workshop model in science professional development found no increase in self-efficacy

compared to the control group, even though the professional development was explicitly designed to increase teacher efficacy.

Although social cognitive theory has existed for over half a century, researchers continue to refine the tools used to measure self-efficacy among teachers, with the TSES providing a valid and reliable method for measuring teacher efficacy among multiple grade level bands, disciplines, and cultural contexts. Because it provides an overall score but also includes specific categories, the instrument works as a bridge between theorists who view self-efficacy as unidimensional or multidimensional.

Measuring teacher motivation. While self-efficacy focuses on the perceived capabilities to complete a task (Bandura, 1986), it does not address whether one desires to complete a task. However, intrinsic desire is a key component of self-determination theory (1985). Deci and Ryan conceptualize motivation as a continuum between "nonself-determined" and "self-determined" with three lower layers of motivation, regulatory styles, and perceived locus of causality. It expands on Deci's (1975) earlier work on intrinsic motivation by emphasizing self-regulation and eventually integrating the role of autonomy and agency (Deci & Ryan, 1995). Here, motivation exists on a continuum from less autonomy to more autonomy. When there is no autonomy present, people experience amotivation, or a lack of motivation altogether. Next, as it shifts into extrinsic motivation, there is external regulation (often labeled as extrinsic motivation) which occurs when one accomplishes a task out of a sense of compliance, external pressure, or a desire to avoid a punishment or earn a reward. Further on the continuum is introjected regulation which is dominated by the desire to avoid shame or guilt

and is often associated with competition. Moving closer to intrinsic motivation is identified regulation, which involves a desire to accomplish specific goals or objectives. Next is integrated regulation, which occurs when one's desire to accomplish a task with self-awareness and self-concept. Finally, intrinsic motivation is fully autonomous and occurs when one accomplishes a task for enjoyment, fun, pleasure, or satisfaction.

Researchers have operationalized self-determination theory with the Work Tasks Motivation Scale (WTMST) for measuring teacher motivation (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). The tool includes these categories: Intrinsic Motivation, Identified Regulation, Introjected Regulation, External Regulation, Amotivation. Note that they do not included integrated regulation into their scales.

These categories are broken into six specific domains, including class preparation, teaching, evaluation of students, classroom management, administrative tasks, and complementary tasks.

Researchers first tested for variance with a mixed group of 609 K-12 teachers in Quebec, finding no variance with gender, teaching level (grade level), or teaching experience. Subsequent tests for content validity have confirmed the WTMST as a valid and reliable tool for ascertaining teacher motivation in multiple countries (Abós, Sevil, Martín-Albo, Aibar, & García-González, 2018; Gorozidis, & Papaioannou, 2012; Mohammaddost & Nodehi, 2014). The WTMST has been proven valid and reliable in use with other tools assessing teacher motivation and self-efficacy (Chan & Lay, 2018) including a study of pre-service teachers that combined the WTMST with the TSES to study "reality shock" in teacher practicum experiences between

expectations and the contextual reality of student teaching (Kim & Cho, 2014). The researchers determined that self-efficacy worked as a strong mediator for expected reality shock while intrinsic motivation worked as a moderator, with higher levels of intrinsic motivation reducing the intensity of the reality shock. While the context and experiences vary between new teachers and teachers attending a PBL workshop, many teachers implementing PBL must become novices in various aspects of teaching (Marx, et al., 1991, 1997) and experience elements of "reality shock" when implementing PBL for the first time (Hmelo-Silver, Duncan, & Chinn, 2007).

Researchers have used the WTMST to study certified K-12 teachers implementing new practices after attending a workshop (Gorozidis & Papaioannou, 2014) and to explore the relationship between self-determined teachers and self-determined learning (Roth, Assor, Kanat-Maymon & Kaplan, 2007). Furthermore, while the WTMST focuses on the individual role of the teacher, the creators of the instrument have operationalized it to measure teacher perceptions of school culture (Fernet, Guay, Senécal, & Austin, 2012).

Despite the validity and reliability of the WTMST, research on teacher motivation and professional development workshops tends to use other instruments and methods. For example, a mixed-methods study measured the increase in self-confidence and motivation (Fallik, Eylon, & Rosenfeld 2008) to compare a group of novice teachers (those who had never attended a PBL workshop) and expert teachers (those who had attended a PBLSAT workshop and had been implementing PBL for at least five years) based on self-reporting, using a survey with close-ended and open-ended responses. Researchers then broke responses down into three categories and did a quantitative analysis of the responses using histograms, finding an increase in intrinsic

motivation. Lam, Cheng, and Ma (2009) developed Teacher Motivation Inventory, modeled after Ryan and Connel's 1989 survey, to determine the relationship between student intrinsic motivation and teacher intrinsic motivation within a project-based learning program. Researchers used the same Teacher Motivation Inventory to measure self-determination with 182 Chinese teachers in Hong Kong who had attended a PBL workshop, finding an increase in intrinsic motivation and self-determination after the workshop on a pre- vs. post-administration of the instrument (Lam, Cheng, & Choy, 2010). Naizer, Sinclair, & Szabo (2017) developed a survey using a Likert scale in a mixed-methods study demonstrating that teachers who had attended a two-week workshop experienced an increase in self-efficacy, sustained motivation, and an increased rate of implementing the instructional strategies of the workshop.

Concluding thoughts. There are many conceptual frameworks for measuring the effectiveness of professional development, ranging from more linear to connective, with each model shaping the parameters for assessment. However, the outcomes-oriented approach, exemplified by the Guskey Model, does not factor in teacher efficacy or teacher motivation. Researchers have used specific instruments to measure self-efficacy and motivation as a result of professional development. Teacher self-efficacy, grounded in Bandura's Social Cognitive Theory, is often measured with the TSES. Teacher motivation has operationalized Deci and Ryan's (1985) theory of self-determination, with the most prominent instrument being the WTMST.

Although this first section focused on the variables in isolation; motivation, and self-efficacy are often interconnected. The next section addresses the connections, distinctions, and potential overlaps between the variables.

The Relationship Between Variables

This second theme focuses first on the relationship between self-efficacy and motivation and the various ways to conceptualize the mediating and moderating variables. Next, it focuses on the moderating role of demographic variables and contextual variables. Finally, it links professional development, motivation, and self-efficacy to implementation and student achievement.

The relationship between self-efficacy and motivation. Researchers differ in how to conceptualize the relationship between self-efficacy and motivation. Woolfolk Hoy (2012) views motivation as a result of teacher efficacy, grounded in Bandura's social cognitive theory. When conceptualized within academic optimism (a construct addressed later in the literature review), self-efficacy becomes a mediator for the variables of student achievement and a teacher's motivational orientation toward themselves and toward students (Bryk and Schneider, 2002; Hoy & Woolfolk Hoy, 2011). Bandura views self-efficacy as a pre-requisite to motivation (2006). In 1981, he demonstrated how self-efficacy and goal-proximity led to an increase in intrinsic interest (Bandura & Schunk, 1981). However, Zimmerman (1995) makes a slight distinction of self-efficacy as a predictor of motivation but not necessarily a cause or a pre-requisite. For Zimmerman, the two factors run parallel with a substantial overlap, but they can exist independently.

While social cognitive theory generally conceptualizes self-efficacy as a predictor or prerequisite of intrinsic motivation, self-determination theorists view motivational drives as an impetus for self-efficacy (Deci, 1975). They conceptualize self-efficacy as a nested part of motivation defined as *perceived competence* within the of the overall drive for competence. Meanwhile, intrinsic and extrinsic motivation focus on the need for autonomy rather than the perception that one can accomplish a particular task (Deci & Ryan, 1995). Self-determination theory distinguishes between motivation as a desire, defined as whether one *wants* or *has* to complete a task; while self-efficacy addresses perceived competency, defined as the belief that one *can* complete a task (Fernet, Chanal & Guay, 2017). Here, self-efficacy works as a moderator on motivation rather than a mediator or even a predictor. By contrast, in expectancy-value theory, the perceived value of a motivator leads to increased self-efficacy. Thus, the more someone wants to complete a task, the more effort they will put into it (Wigfield & Eccles, 1992).

While self-efficacy and self-determination both focus on personal agency and an internal locus, Bandura (1997) makes the distinction on the internal locus being about whether one can produce specific actions (perceived self-efficacy) rather than the belief that one's actions will lead to a particular outcome, which he views as a part of attribution theory. Bandura (1986) conceptualizes self-efficacy and attribution as a reciprocal relationship, with internally attributed successes leading to increased self-efficacy. Additional research demonstrated that participants with high self-efficacy attribute successes internally and experience increases in self-efficacy. However, they attribute failure to external factors, with no decrease in self-efficacy. By contrast,

those with low self-efficacy are likely to view failure internally and have subsequent decreases in self-efficacy (Stajkovic & Sommer, 2000).

Nonetheless, desire is still a critical factor in social cognitive theory, though the focus tends to be on human agency (the ability to influence one's behavior) rather than autonomy (the ability to self-regulate). Here, agency exists as a multivariate, dynamic interchange between the individual and the multivariate social systems with which one interacts (Bandura, 2001).

Alternatively, researchers have also conceptualized a reciprocal relationship between the variables of self-efficacy, motivation, and behavior. For example, the Reciprocal Effects Model (REM) posits a reciprocal, mutually reinforcing relationship between academic self-concept, intrinsic motivation, and academic achievement (Guay, Marsh, and Boivin, 2003; Marsh, Byrne, & Yeung, 1999; Marsh, Chanal, Sarrazin, & Bois, 2006). Researchers demonstrated this relationship using the Student Motivation and Engagement Scale, The Self-Description Questionnaire II (Short) – SDQII-S, and achievement scores (Green, Nelson, Martin, & Marsh, 2006). Within the study of self-efficacy, Williams & Williams (2010) demonstrated a reciprocal relationship between self-efficacy and performance, with success leading to increased self-efficacy, which, in turn, drove better performance. A longitudinal study demonstrated a reciprocal relationship between self-efficacy, self-regulation, and pro-sociality (Alessandri, Caprara, Eisenberg & Steca, 2009) and another study demonstrated reciprocity between self-regulation and motivation (Ning, & Downing, 2010).

Nonetheless, there is still a lack of consensus on the relationship between self-efficacy and intrinsic motivation. This distinction between whether motivation or self-efficacy works as a

predictor or as a mediator of other variables could prove problematic in determining the effects of professional development and motivation and self-efficacy through quantitative studies. However, there is precedence for including instruments that address both self-efficacy and motivation in non-experimental quantitative studies. For example, Farmer (2010) addressed both self-efficacy and teacher motivation through the Attitudes Toward Teaching Survey, which researchers operationalized in a study demonstrating a correlation between how teachers perceive school climate and their self-efficacy and motivational levels (Reaves & Cozzens, 2018).

From an operational standpoint, both intrinsic motivation and self-efficacy are multivariate with varying levels of moderating influences affecting the variables (Bandura, 1989; Deci & Ryan, 1995; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998) though self-efficacy is more likely to rate task demand as a higher moderating influence (Bandura, 2006) while intrinsic motivation might rate the quality of the perceived motivator as a stronger moderator (Ryan & Connell, 1989). Moreover, both self-efficacy and intrinsic motivation are multidimensional.

The moderating role of demographic variables on PBL implementation.

Demographic variables can potentially moderate the relationship between self-efficacy or intrinsic motivation and PBL implementation. In general, teacher demographics have been generally unexplored in project-based learning research. However, there is reason to believe they might have a moderating influence on PBL implementation based on studies in similar pedagogical models.

Teaching experience is a possible moderator between either intrinsic motivation or self-efficacy and PBL implementation, with new teachers experiencing distinct challenges. The curricular freedom within PBL can feel like a burden for new teachers. According to Van Hover & Yeager (2004), new teachers are more likely to teach from a textbook or scripted curriculum when faced with the complexity of PBL teaching. Moreover, new teachers, when overwhelmed by contextual factors, such as time or lack of administrative support, shift away from PBL toward a more teacher-centered approach (Ertmer, Ross, & Gopalakrishnan, 2000). However, veteran teachers might be reluctant to implement newer pedagogical models because of social nostalgia, especially if they do not feel a sense of ownership in the process of learning PBL (Fullan, 2016; Goodson, Moore, & Hargreaves, 2006; Hargreaves, 2005).

Currently, there is a research gap on PBL implementation and teacher race or ethnicity. However, critical theorists have posited that Latino and African-American teachers often feel less permission to innovate in their own teaching practice (Griffin, 2018; Griffin & Tackie, 2017). Teachers of color often feel under the microscope, which presents challenges when attempting new strategies such as PBL. It is possible that this could lead to risk-aversion, which might impact PBL implementation, even if self-efficacy and motivation are high. According to one qualitative study, African-American teachers felt a greater permission to take risks when working for a principal of color (Jones, 2002). However, this is not the norm in the U.S.

In terms of gender, women have often been socialized toward compliance and thus experience additional concerns when attempting a newer pedagogical model. Historically, teaching has been viewed as a “women’s profession” that emphasized compliance and

dependency on male experts rather than honoring the agency and autonomy of the female practitioner (Ingersoll, Merrill, & Stuckey, 2014). As the historians Strober and Tyack (1980) point out, from the outset, the American educational system was designed to have women fill the role of teaching while men were placed in formal leadership roles, where they made key decisions about curriculum and instruction. In the early 1900's, men known as "school men" formed male-only fraternities of principals, superintendents, and normal college presidents (Borgioli Binis, 2019). While systems have changed, and women have attained significant leadership roles, residual biases and stereotypes remain for female teachers. These biases and power dynamics can impact teacher-parent and teacher-administrator relationships, which might strengthen two of the critical barriers to PBL implementation: administrator support (Barron & Darling-Hammond, 2008, p. 3) and parent support (Schwalm & Tylek, 2012).

The research remains limited on the role of demographics and PBL implementation in particular. However, there is reason to be believe demographic variables might function as a moderator of teacher motivation, teacher self-efficacy, and PBL implementation.

The moderating role of context on PBL implementation. School context variables might have a moderating effect on the relationship between teacher self-efficacy, teacher motivation, and teacher implementation of PBL methods. For example, subject area plays a significant role in PBL implementation rates. According to Ravitz (2008), the single subject with the highest level of PBL implementation was social studies, with those who teach interdisciplinary classes having the highest rates of implementation. However, there was no statistically significant difference in PBL implementation between high school grade levels.

Because both motivation and self-efficacy are task-dependent and context-specific, these environmental factors can moderate both variables. Teachers are more likely to implement new teaching strategies when they believe that their institution will support them. School context plays a critical role in teacher efficacy when implementing new teaching strategies (Sparks, 1988). As Smylie (1988, p. 6) wrote, "teachers are more likely to adopt and implement new classroom strategies if they have confidence in their ability to control their classrooms and affect student learning."

Researchers make a distinction here between individual efficacy, or the belief that one can accomplish a given task and collective efficacy, or the belief an individual teacher has in the ability see a particular outcome in his or her environment (Bandura, 1997; Goddard, Hoy, & Hoy, 2000). Collective efficacy focuses on the individual's perceptions of whether a group is capable of accomplishing a task rather than measuring the collective efficacy within a group (Bandura, 2006). Initially, collective efficacy used a consensus approach with the group rating their efficacy through discussion and deliberation (Guzzo, Yost, Campbell, & Shea, 1993). However, Earley (1999) rejected this approach due to social persuasion, where members with more power tended to shape the group consensus.

Collective efficacy can have a moderating effect on individual teacher efficacy because the shared expectations within a group lead to social norms that emphasize the capability of success (Goddard, Hoy, & Woolfolk Hoy, 2004). Goddard, Hoy, and Woolfolk Hoy have demonstrated a positive relationship between collective efficacy and student achievement (2000), and they have conceptualized it as a critical component of academic optimism (2004), an idea

explored in the next theme. Most of the research on collective efficacy has focused on collective efficacy and academic achievement in urban schools (Smith & Hoy, 2007) including studies in elementary math (Goddard, Sweetland, & Hoy, 2000) and reading (Bevel & Mitchell, 2007). There is less of a precedence for using collective efficacy to study PBL implementation or other methodologies that require a significant change in one's teaching practice.

School context can impact teacher motivation through the introduction of extrinsic motivators. Ryan and Deci (2000) describe how "not only tangible rewards but also threats, deadlines, directives, pressured evaluations, imposed goals" (p. 70) can shift intrinsic motivation from an autonomous to controlled perspective. However, when teachers have a higher perception of institutional support for personal autonomy, they have increased rates of intrinsic motivation (Lam, et al., 2010).

Instead of using collective efficacy or the intrinsic/extrinsic continuum of motivation, research on PBL implementation has tended to use school context data to determine trends in implementation. For example, Ravitch (2008) found higher rates of PBL implementation in charter schools that focused on innovative teaching practices. However, it is unclear whether these higher rates of implementation were the result of a belief that the school environment could support PBL (a function of collective efficacy) or because teachers experienced more autonomy and curricular freedom often associated with charter schools (a function of autonomy and intrinsic motivation).

School socioeconomic status could have a moderating function on the relationship between teacher efficacy, teacher motivation, and the implementation of PBL teaching methods.

Often, there is an educational apartheid that keeps low-income students from accessing PBL. Here, experts claim that low-income students should have “the basics first” before engaging in PBL methods. In fact, Howard Gardner advocates against PBL and other “progressive education reforms” for low-SES students, including “disadvantaged children, who do not acquire literacy in the dominant culture at home,” Gardner writes, “such a prescribed curriculum helps to provide a level playing field and to ensure that future citizens enjoy a common knowledge base” (1999, p. 107). Delpit (1999) echoes similar concerns, with the criticism that PBL echoes white, middle-class assumptions about prior knowledge. However, these critiques convey a deficit mindset toward low-income students (Cheng, Lam, & Chan, 2008; Valenzuela, 1999).

A Holmes and Hwang 2016 study found that PBL implementation reduces the achievement gap between low-SES and high-SES students and between white and minority students. Similarly, a study of a project-based learning intervention in Detroit found an increase in student achievement among African-American students and a reduction in the gender gap between African-American boys and girls (Geier, et al., 2008). However, according to a Camburn and Han (2008) study, low-income students had less access to PBL instruction. This could be a result of social pressure and policies that might function as extrinsic motivators restricting implementation. Teachers in low-SES schools report a higher emphasis on standardized testing compared to higher income schools (Noguera, Darling-Hammond, & Friedlaender, 2015; Spann & Kaufman, 2015).

While it is impossible to control for context or to isolate all contextual variables, the inclusion of specific context categories could demonstrate if context plays a moderating role on teacher self-efficacy, teacher motivation, and the implementation of PBL methods.

The relationships between motivation, self-efficacy, and outcomes-oriented professional development measures. The one-day workshop model remains prevalent in K-12 professional development (Boyle, Lamprianou, & Boyle, 2005). However, for decades, researchers have questioned the efficacy of the format. While isolated workshops create awareness of new teaching strategies, teachers rarely implement the new strategies into their practice (Shields, Marsh, & Adelman 1998; Weiss, Montgomery, Ridgeway, & Bond, 1998). Furthermore, a 1994 study found that project-based science workshops did not lead to an increase in implementation at the classroom level (Krajcik et al. 1994).

However, contradictory evidence suggests that the issue may have less to do with PD format and more to do with PD content. A study commissioned by the Buck Institute for Education (BIE) found that 51% of those who attended a single-day workshop were more likely to use project-based learning (Ravitz, 2008). Unlike the project-based science workshops (Krajcik et al. 1994) which examined the implementation of scripted curriculum, the one-day BIE workshops focused on having teachers design and develop PBL units. However, the BIE study sample drew from online progressive school reform networks where teachers might be more inclined to use a PBL approach. Moreover, the teachers had voluntarily chosen to attend the workshops, meaning they might have already had a high level of self-efficacy from the outset.

More recently, researchers have conceptualized the relationship between efficacy, environment, and student achievement through the construct of academic optimism (Hoy, Tarter, & Woolfolk Hoy, 2006). Academic optimism is a reciprocal causal relationship between collective efficacy, faculty trust, and academic emphasis (Beard, Hoy, & Woolfolk Hoy, A. 2010). Using structural equation modeling, the researchers found that teacher academic optimism contributed to student achievement levels, even when controlling for students' socioeconomic status, previous academic achievement and urbanicity (Hoy, Tarter, & Woolfolk Hoy, 2006). Academic optimism takes into consideration the role of contextual factors by including faculty trust, which had previously been linked to academic achievement (Hoy & Hannum, 1997; Hoy, Sweetland, & Smith, 2002) but also included collective efficacy. The emphasis on academic achievement within the concept of academic optimism coincides with the Guskey model for measuring the efficacy of professional development. Thus, if professional development increases collective efficacy and includes institutional support, it should lead to increased mastery of learning targets at the student level and increased student achievement over time.

Researchers have primarily avoided academic optimism and collective efficacy in studying PBL implementation because most of the research in academic optimism has focused on increasing student achievement in underperforming schools rather than changing a pedagogical practice to a new framework. Because PBL can lead to moderate increases in academic achievement, it would make sense to measure academic optimism and student achievement levels. However, as Sahlberg (2006) points out, the outcomes-oriented focus of student achievement can lead teachers to risk-aversion when attempting a large-scale change in

their practice (Eisner, 1990; Moran, 2015; Sahlberg, 2006). In high-stakes environments, teachers tend to revert to more traditional practices. When teachers implement PBL for the first time, they become novices in certain areas of instruction and classroom management (Marx, et al., 1991). This can lead to a dip in student achievement levels in the early phases of implementation. Blumenfeld et al. (1991) found that early on in the PBL implementation process, lessons often lacked alignment to content standards, with students engaging in creative activities that did not help them master the content. This phenomenon can be mitigated through the use of standards-aligned essential questions or problems (Stepien and Gallagher, 1993) that lead to the construction of new knowledge (Bereiter & Scardamalia, 1999).

In addition, the focus on collective efficacy within academic optimism fails to address the role of individual self-efficacy and intrinsic motivation in implementing new teaching strategies. Like the Guskey model, academic optimism potentially minimizes the role of teacher autonomy in implementing new a new pedagogical model. It is possible, for example, that teachers might have a high sense of efficacy but feel motivated to implement PBL due to the extrinsic imposed goals of an institutional policy (Ryan & Deci, 2000). While a teacher might experience high collective efficacy and institutional support, if they are significantly extrinsically motivated, they are less likely to continue with a new strategy over time and more likely to experience burnout when faced with contextual challenges (Reichl, Wach, Spinath, Brünken, & Karbach, 2014). By isolating teachers' self-efficacy and motivation, this study can focus on the role of the teacher as a change agent within their environment.

Concluding thoughts on the relationship between variables. Researchers disagree on the relationship between self-efficacy and intrinsic motivation. Some of have conceptualized the relationship as a linear cause and effect with one variable working as a mediator (Bandura, 1997; Hoy, Sweetland, & Smith, 2002; Tschannen-Moran & Woolfolk Hoy, 2001; Deci & Ryan, 1985), while others conceptualize it as a reciprocal relationship (Green, Nelson, Martin, & Marsh, 2006). However, despite these differences, there is a consensus that motivation and self-efficacy lead to the implementation of teaching strategies and subsequent increases in academic achievement. Personal and contextual factors can work as moderators impacting the significance of self-efficacy and motivation and the subsequent implementation of teaching strategies. The next theme explores the limitations on the independent and dependent variables.

Limitations on Teacher Efficacy, Motivation, and PBL Implementation

The third theme of this literature review focuses on the limitations on the variables of teacher efficacy and intrinsic motivation. These include the variance in teacher attitudes and beliefs, the role of contextual factors, the confounding role of unidimensional factors (such as grit and growth mindset), and the challenges inherent in isolating the variables.

Variances in teacher attitudes and beliefs. The previous section explored how self-efficacy and motivation operate as predictors of implementation for teachers who participate in professional development. However, there are the additional variables of teacher attitudes and beliefs which can function as moderators, strengthening the relationship between self-efficacy or motivation on implementation of teaching strategies.

In the field of organizational leadership, self-efficacy has worked as a moderator on attitudes and beliefs, including an Indian study on the role of collective and self-efficacy as a moderator of work-related attitudes (Walumbwa, Lawler, Avolio, Wang, & Shi, 2005). In addition, Sari's study (2016) of 293 adolescents in Turkey demonstrated a moderating role of self-efficacy on the relationship between peace and hope attitudes. Thus, self-efficacy strengthening the relationship between attitudes and beliefs. However, other studies have demonstrated how attitude can work as a moderating variable on self-efficacy (Linnenbrink & Pintrich, 2003; Margolis & McCabe, 2003).

In behavioral health studies, researchers have operationalized the relationship between self-efficacy, motivation, and attitudes through the Integrative Model of Behavior Prediction (IMBP) (Fishbein, 2000; Fishbein & Yzer, 2003). They conceptualize self-efficacy and perceived control as two components that make up personal agency, which combines with attitudes and perceived norms to mediate behavior. Educational researchers have operationalized IMBP to study the implementation of technology integration (Admiraal, Lockhorst, Smit, & Weijers, 2013; Van Acker, Van Buuren, Kreijns, & Vermeulen, 2013). In professional development, if attitude is a stronger predictor of behavior, instructional designers need to focus on outcome beliefs. However, if self-efficacy is a stronger mediator of implementation, instructional designers need to focus on the acquisition of new skills (Fishbein, 2000; Van Acker, et al., 2013).

Hagger, Chatzisarantis, and Harris's (2006) model combined the IMBP approach with self-determination theory to conceptualize psychological needs at the global level, leading to

self-determined motivation at the contextual level, and the three IBPM factors at the situational level. A study of 1,273 Dutch teachers used this model to determine the role of intrinsic motivation at the task level and attitudes at a global level (Kreijns, Vermeulen, Van Acker, & Van Buuren, 2014). The researchers used a Chi-Square test to determine a fit between Hagger, Chatzisarantis, and Harris's model and teacher's use of digital learning materials. They discovered a mediating relationship of self-efficacy and intrinsic motivation in implementation. However, local norms did not mediate or moderate the effects of self-efficacy or intrinsic motivation on implementation.

Teacher attitudes and beliefs play a critical role in the implementation of project-based learning. According to Ertmer and Simons (2006), teachers must experience a change in basic assumptions from being a director of learning to a facilitator of learning in a problem-based or project-based environment. Similarly, researchers have found that the implementation of student-centered pedagogical approaches is dependent on a teacher's willingness to let go of control (Kolodner, et al., 2003). Grant and Hill (2006) found that teacher risk-aversion, especially in a high-stakes environment, can cause teachers who were otherwise highly motivated and had a high self-efficacy, to abandon the PBL process. Studies on teacher attitudes, beliefs, and roles have been predominantly qualitative (Hertzog, 2007; Rogers et al., 2011; Tal, Krajcik, & Blumenfeld, 2006; Tamim & Grant, 2013) with a few studies using a mixed-methods approach to measure self-efficacy at a quantitative level and interviews to gain a deeper understanding of attitudes and beliefs (Cook & Weaver, 2015).

While self-determination theory and social cognitive theory tend to focus on immediate tasks tied to specific contexts, PBL is an integrated, hierarchical model impacting tasks and sub-tasks in multiple domains of education (Blumenfeld, Krajcik, Marx, & Soloway, 1994; Pellegrino & Hilton, 2012). PBL is often a new pedagogical approach which teachers perceive as challenging to implement (Mergendoller & Thomas, 2000). The complex, integrative elements of PBL can lead to confusion and disequilibrium. A study of 27 STEM teachers in Israel found that teachers experienced an increase in cognitive load and confusion, leading to the development of PBL units that were not well-aligned to the standards or the curriculum (Rosenfeld, Scherz, Breiner, & Carmeli, 1998). Furthermore, Ertmer (2005) has demonstrated that PBL professional development must address teacher beliefs with implementation, often involving specific paradigm shifts. Here, teachers not only need to have self-efficacy but must believe in the efficacy of the PBL approach or pedagogy.

Researchers have explored the relationship between teacher attitudes, beliefs, and project-based learning through qualitative studies (Tamim & Grant, 2013; Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011). A qualitative three-teacher study focused on the influence of teacher beliefs and PBL implementation. Teachers who focused on standardized tests and achievement were less likely to implement PBL compared to those who focused on 21st Century skills (Rogers et al., 2011). Meanwhile, other qualitative researchers have focused on how teacher perceptions of student abilities shaped their teaching. For example, one study found that teachers with higher perceptions student efficacy were more likely to implement PBL (Tal, Krajcik, & Blumenfeld, 2006). A study by Hertzog (2007) found that when a teacher

demonstrated a deficit mindset toward student capabilities, they were less likely to implement PBL.

Beliefs, attitudes, and orientations often operate as moderators for teacher self-efficacy or intrinsic motivation and the implementation of teaching strategies. However, studies on teacher attitudes and beliefs within PBL tend to be qualitative, and there remains a strong precedent for isolating teacher efficacy and motivation despite the potential limitations of attitudes and beliefs.

The confounding role of unidimensional factors. Another challenge is the role of more global, unidimensional factors that are not tied to specific tasks. While this study focuses on the multidimensional functionality of motivation and self-efficacy, a recent study by Fernet, Chanal, and Guay (2017) on teacher burnout challenge the notion of task-specificity in teacher motivation. This suggests teachers might have a more generalized self-determination level with task-specific subdomains that respond in a nested hierarchy. Moreover, this emphasis on task specificity ignores the role of a more globalized, unidimensional mindset or disposition toward self-efficacy, conceptualized by Duckworth's theory of grit (Duckworth & Quinn, 2009; Duckworth & Gross, 2014) and Dweck's theory of fixed versus growth mindsets (Dweck, 2008).

While studies have linked growth mindset interventions to increases in self-efficacy and motivation (Rhew, Piro, Goolkasian, & Cosentino, 2018), a research gap remains between the mechanisms themselves. Furthermore, the extent to which growth mindset and grit are task-dependent remains unclear. Grit, for example, can be domain-specific (Duckworth & Quinn, 2009), but it is unclear whether teaching is a set of tasks or an overarching domain with sub-tasks as a nested hierarchy. Furthermore, these global dimensions focus less on self-efficacy and more

on attribution theory, goal-orientation, and persistence. Duckworth and Gross (2014) view grit and self-control (a component of self-determination theory) as highly related but separable determinants of the successful completion of tasks.

Variance in school contextual factors. Both intrinsic motivation and self-efficacy are context-specific and measured at the individual, rather than collective, level (Bandura, 1997; Deci & Ryan, 1985). Thus, a study on teacher self-efficacy and motivation does not necessarily address the collective work as a whole, including school culture or school support. Even collective efficacy is defined as a teacher's individual belief in the institution's ability to accomplish a task rather than a combined group measurement of efficacy. While the early instruments of teacher efficacy included a perception of teachers as a group (Dembo & Gibson, 1985) Guskey (1987) demonstrated flaws in the internal validity of these instruments and subsequent instruments have remained focused on the individual.

However, teaching is inherently social and multidimensional, with systems, policies, and school culture influencing the implementation of teaching strategies. Teachers often face contextual challenges in implementing project-based learning (Hofman, Jansen, & Spijkerboer, 2011; Marx, et al. 2001). Contextual factors, including institutional support and school culture, can impact teacher efficacy and motivation. According to Ravitch (2008), charter schools that specifically focused on PBL as an initiative had the highest rates of implementation. In other words, teachers not only attended PBL workshops, but they also worked within a system designed explicitly for PBL implementation, including parental support, administrative support,

and physical space designed for collaborative projects (Alfeld, Charner, Johnson, & Watts, 2013; English, 2013; Lattimer & Riordan, 2011; Ravitch, 2008).

These contextual and systemic factors might impact both teacher efficacy and implementation. Often, innovation-focused charter schools adhere to a different set of less bureaucratic policies compared to traditional public schools; especially Title One schools. In the case of High Tech High and other "schools of choice," students must opt into the program, and often there is a waiting list (Beauregard, 2015). These policy differences might enable teachers to experience increased autonomy within their work or a greater sense of collective efficacy because of a trust that the institution will support innovation. According to a Lam et al. (2009) survey, when teachers perceive school support for teacher autonomy, they are more likely to implement PBL strategies and design PBL units.

Most PBL implementation researchers have opted for qualitative studies of teacher perceptions of the contextual challenges faced in implementing project-based learning. Grant and Hill (2006) used a mixed-methods survey to explore the relationship between teacher efficacy and high stakes accountability in PBL implementation. In a qualitative study, Tamim and Grant (2013) found that teachers face confusion about whether they are implementing PBL with fidelity to the construct. Other qualitative studies identified key contextual challenges, such as time management (Cook & Weaver, 2015; Ravtiz, 2008; Toolin, 2004), classroom management (Rosenfeld, Scherz, Breiner, & Carmeli, 1998) and alignment to standards (Toolin, 2004). Researchers in the Netherlands found similar trends in a longitudinal study on the challenges teachers face when implementing PBL (Hofman, Jansen, & Spijkerboer, 2011). The top concerns

were a perceived lack of time, a “conservative mindset in teaching,” money, and administrative support.

While these perceived barriers could be viewed through the lens of collective efficacy, they are more closely aligned to attribution theory rather than social cognitive theory, because they address the locus of causality, the stability of the environment to support goal attainment, and the controllability over success (Stajkovic & Sommer, 2000). However, given the reciprocal role of attribution and self-efficacy, it is possible that contextual factors that impact success could lead to increases or decreases in teacher self-efficacy based on previous efficacy levels. This points to the importance of including contextual variables as moderators on the relationship between teacher self-efficacy and implementation.

A highly motivated and efficacious teacher might view these systemic barriers as opportunities for problem-solving and innovation. However, there is a danger in emphasizing individual efficacy or motivation while minimizing systemic barriers to PBL implementation. Research has demonstrated that class size and school policy impact the effectiveness of PBL implementation (Blumenfeld, Krajcik, Marx, & Soloway, 1994). Edelson, Gordon, and Pea’s (1999) research on contextual factors includes the previous factors but also add school schedules, resources, and access to adequate technology. These challenges can be reframed as evidence of systemic injustice rather than a teacher’s individual challenges within a context. This is why researchers have emphasized the contextual role of enabling structures, such as teacher collaboration, collegiality, encouraging collective problem-solving, and framing challenges as opportunities (Sinden, Hoy, & Sweetland, 2004; Sweetland & Hoy, 2000).

Although context can influence self-efficacy and motivation, researchers can control for this effect by choosing a large enough sample of multiple schools from a similar context. Because both motivation and self-efficacy are context-specific, there is a recognition that context will inevitably play a role in individual efficacy and motivation levels. However, by including the extrinsic motivation as a discriminant variable, researchers can address the role of external factors on a teacher's individual motivation.

The challenge in isolating the variables. Professional development functions within a complex network of systems with multiple confounding and extraneous variables, which presents challenges in the attempt to isolate a PBL workshop as a single indicator for increased self-efficacy and motivation.

Professional development is not a singular event but an ongoing process (Capraro, et al., 2016). Teachers are continually learning through personal and environmental interactions that impact the way they conceptualize the PBL concepts and implement the PBL process. On a formal level, schools often provide coaching, online learning, and resources that can work as a moderating influence on motivation and implementation of new teaching strategies (Garet, Porter, Desimone, Birman, & Yoon, 2001). A study by Watson (2006) found an increase in self-efficacy when teachers participated in an online course after attending a workshop.

Moreover, teachers are not passive agents in their professional learning. While this study focuses on the institutional role of formal professional development, the term *professional learning* better captures the ongoing, idiosyncratic way that teachers engage in sense-making through storytelling and conversation (Weick, Sutcliffe, & Obstfeld, 2005). According to Ravitz

(2008), teachers who are the most professionally engaged in independent learning had the highest rates of PBL implementation.

Consider the emergence of Personal Learning Networks (alternatively Professional Learning Networks) in the last decade (Warlick, 2009). Rooted in Connectivist theory, teachers use social media for self-directed, unsanctioned professional learning (Siemens, 2008). One study of 76 educators in a PLN found an increase in self-regulation, learner motivation, and self-actualization (Conradie, 2014). While the experiences and platforms vary (including participation in Twitter chats, content curation on Pinterest, and blogging on Wordpress), PLNs can play a moderating role by increasing self-efficacy after a professional development workshop. While a PLN might function as a confounding variable, the voluntary nature of a PLN suggests it is the result, not the cause, of increased motivation (Sie, Pataraia, Boursinou, Rajagopal, Margaryan, Falconer, & Sloep, 2013).

In addition, it can be challenging to isolate self-efficacy and motivation as variables in response to professional development. A study of professional development among high school teachers found that goal orientation and self-efficacy both had a strong mediating relationship to experimenting with new educational strategies. However, personality, extroversion, and openness can play a positive moderating role participation in experimenting with new pedagogies (Van Daal, Donche, & De Maeyer, 2014). Thus, goal orientation (often conceptualized as a part of self-efficacy rather than a separate domain) can play a reciprocal mediating effect on self-efficacy and personality can have a moderating effect as well. As

previously addressed, attitudes, beliefs, and contextual factors can also impact teacher efficacy and motivation.

Time can also play a moderating role in changes in self-efficacy and motivation. Two experimental studies have demonstrated a “shadow side” to self-efficacy over a more extended timeframe (Vancouver, et al., 2002). Here, high self-efficacy can lead to overconfidence and underperformance, which reduces performance levels and goal attainment. In the first study, 84 participants played an analytical game that increased self-efficacy toward problem-solving. Over time, they experienced increased self-efficacy but lower motivation and decreased performance. A follow-up experiment in the same study found similar results with 104 participants (Vancouver, Thompson, & Williams, 2001). Here participants exhibited false confidence and complacency. This complacency could potentially impact teacher motivation over time. If a task becomes “too easy,” intrinsic motivation might actually decrease. However, Bandura and Locke (2003) claim that both experiments conflate self-efficacy with expectancy-value theory because participants focused on the potential success of the task rather than their ability to perform the task. Other researchers have found that prior performance and progression toward success both have a moderating effect on self-efficacy (Schmidt & DeShon, 2009). Thus, a teacher who perceives a lack of progress toward a goal might experience decreased self-efficacy during the implementation of PBL. This could be problematic given the fact that teachers often become neophytes in specific domains of teaching when first implementing PBL (Marx, et al., 1991, 1997).

Concluding thoughts on the limitations. Teaching is inherently idiosyncratic and social. Although certain studies have been experimental, it is nearly impossible to isolate all variables, control for context, and determine definitively whether PBL workshops will cause an increase in intrinsic motivation, teacher efficacy, and implementation. The real work of teaching does not happen in a sterile lab but, instead, in a messy room with messy people and complicated humans. For this reason, this study will focus on correlations rather than causation and address the limitations of variables, timing, and context by administering the survey to teachers who have attended the same PBL workshops.

Chapter Three

Methodology

This non-experimental quantitative survey study was designed to determine if an association exists between teacher self-efficacy, teacher intrinsic motivation, and teacher implementation of project-based learning. It also examined if there was a correlation between contextual variables or demographic variables and project-based learning (PBL) implementation.

Variables

The first variable was teacher self-efficacy. Researchers have primarily defined teacher self-efficacy through self-reported surveys grounded in social cognitive theory (Bandura, 1977). In the present study, this interval variable was operationalized through the TSES, a self-reported survey of teacher self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001). This survey measures the mean of the scores in each of the following categories: efficacy in student engagement, efficacy in instructional strategies, efficacy in classroom management (Fernet, Senécal, Guay, Marsh, & Dowson, 2008).

The second independent variable was teacher intrinsic motivation, measured by a self-reported survey grounded in self-determination theory (Deci, 1975; Deci & Ryan, 1985). This interval variable was operationalized as the mean of the intrinsic motivation scores toward the following work tasks: class preparation, teaching, evaluation of students, and administrative tasks. Extrinsic motivation and amotivation were used as discriminant constructs to determine the extent to which external factors have influenced teacher intrinsic motivation. This allowed

for the possibility that teachers might implement PBL methods for extrinsic factors such as compensation, compliance, or social pressure. This is why the survey includes extrinsic factors within the WTMST.

This study also examined the potential association of teacher demographic variables potentially and teacher implementation of PBL methods. The categorical variables of teacher race/ethnicity and teacher gender have been largely unexplored in research on PBL implementation. However, there was reason to believe that they might have a moderating role on the relationship between teacher efficacy, teacher motivation, and teacher implementation of PBL methods. Race/ethnicity will be operationalized with the categories: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, and White. While Critical Race theorists have pointed out flaws in these demographic categories – including the use of language versus culture, the use of entire continents as singular races, the origins in scientific racism, and operational challenges of intersectionality – these categories have a strong precedence in the U.S. Census Bureau (2011), the National Institute of Health (2015), and the U.S. Department of Education (National Center for Education Statistics, 2002). The final variable, teaching experience, will be operationalized as ratio data of years taught.

This study also explored the potential relationship between school context variables and teacher implementation of PBL methods. The categorical variable of subject area was operationalized as Math, English Language Arts (ELA), Science, Social Studies, Electives, and Multisubject. According to the research, social studies teachers have been the most likely to

implement PBL methods while math teachers are the least likely to do so (Ravitz, 2008). Given that the pressure to perform well on the test is a top barrier to teacher implementation of PBL methods, math and ELA may have lower implementation rates than non-tested subjects (Marx, et al., 1991; Parker, et al., 2011). In addition, these subject areas have been the most likely to require a prescribed curriculum (Kauffman, 2005).

Furthermore, because PBL implementation requires additional planning time (Simons, Klein, & Brush, 2004), multisubject teachers might be less likely to implement PBL methods. However, multisubject teachers do tend to have more flexibility in designing daily schedules for their students and more opportunities for multidisciplinary units, which, according to Ravitz (2008) have the highest rate of PBL implementation. Grade level was operationalized as K-12 with an additional category of multi-grade. School socioeconomic status was operationalized as either Title One or not Title One. While this dichotomous variable did not account for variance within the categories, Title One status was significant due to issues around policy and funding.

Table 1

Variables and Research Questions

Variables	Operationalized	Research Question
Teacher Self-efficacy (Teacher Efficacy)	(Continuous) The additive mean in each of the self-efficacy scales: Efficacy in Instructional Strategies Efficacy in Classroom Management Efficacy in Instructional Strategies on the TSES (Teachers Sense of Efficacy Scale)	1
Teacher Motivation: Intrinsic Motivation	(Continuous) The additive mean in each of the intrinsic motivation scales: Classroom Preparation Teaching Evaluation of Students Classroom Management Administrative Tasks Classroom Management on the Work Tasks Motivation Scale for Teachers (WTMST)	1
Teacher Motivation: Identified Regulation	(Continuous) The additive mean in each of the identified regulation scales: Classroom Preparation Teaching Evaluation of Students Classroom Management Administrative Tasks Classroom Management on the Work Tasks Motivation Scale for Teachers (WTMST)	1
Teacher Motivation: Introjected Motivation	(Continuous) The additive mean in each of the introjected regulation scales: Classroom Preparation Teaching Evaluation of Students Classroom Management Administrative Tasks Classroom Management on the Work Tasks Motivation Scale for Teachers (WTMST)	1
Teacher motivation: Extrinsic Motivation	(Continuous) The additive mean in each of the extrinsic motivation scales: Classroom Preparation Teaching Evaluation of Students Classroom Management	1

	Administrative Tasks Classroom Management on the Work Tasks Motivation Scale for Teachers (WTMST)	
Teacher Motivation: Amotivation	(Continuous) The additive mean in each of the amotivation scales: Classroom Preparation Teaching Evaluation of Students Classroom Management Administrative Tasks Classroom Management on the Work Tasks Motivation Scale for Teachers (WTMST)	1
Gender	(Dichotomous) Woman Man Gender minority: Transwoman, Transman, Genderqueer, Another identity	2
Race / Ethnicity	(Dichotomous) American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, and White	2
Teaching Experience	(Dichotomous) Completed full-time years teaching	2
Subject Area	(Dichotomous) Math, ELA, Science, Social Studies, Electives, Multi-Subject	3
Grade Level	(Dichotomous) K-12	3
Socioeconomic Status of School	(Dichotomous) Title One status with yes/no data based on official U.S. Department of Education school district data	3

This study examined the association of self-efficacy, motivation, and contextual variables with the teacher implementation of PBL methods. This variable was operationalized by teachers' self-reporting of how often their students experience project-based learning. This was defined as time spent using specific PBL strategies during a semester rather than frequency of use. Because

PBL projects can vary in time and depth, but the strategies remain consistent throughout each project, time was a more accurate measure than frequency of use. A teacher could implement fewer projects but actually spend more time using specific PBL strategies. Here, instructional strategies included: worked on multidisciplinary projects; researched topics deeply enough to become subject matter experts; decided how to present what they had learned; collected, organized and analyzed information and data; solved real-world problems; participated in community-based projects or internships; and evaluated and defended their ideas or views orally presented their work to peers, staff, parents, or others.

Table 2

PBL Implementation Variables

Variables	Operationalized	Research Questions
Teacher implementation of PBL methods: general perception of implementation	(Continuous) The mean of the scores for teachers defining themselves as using PBL with the categories "I don't do this," "I do this and call it PBL," and "I do this but I don't call this PBL."	1, 2, 3
Teacher implementation of PBL methods: data collection and analysis	(Continuous) The mean of the scores for the frequency of implementation in the category: collected, organized and analyzed information and data	1, 2, 3
Teacher implementation of PBL methods: solving real world problems	(Continuous) The mean of the scores for the frequency of implementation in the category: solved real world problems	1, 2, 3
Teacher implementation of PBL methods: deciding how to present views	(Continuous) The mean of the scores for the frequency of implementation in the category: decided how to present what they had learned evaluated and defended their ideas or views	1, 2, 3

Teacher implementation of PBL methods: presenting to an audience	(Continuous) The mean of the scores for the frequency of implementation in the category: orally presented their work to peers, staff, parents, or others	1, 2, 3
Teacher implementation of PBL methods: multidisciplinary projects	(Continuous) The mean of the scores for the frequency of implementation in the category: worked on multidisciplinary projects	1, 2, 3
Teacher implementation of PBL methods: students as researchers	(Continuous) The mean of the scores for the frequency of implementation in the category: researched topics deeply enough to become subject matter experts	1, 2, 3
Teacher implementation of PBL methods: work-based projects	(Continuous) The mean of the scores for the frequency of implementation in the category: participated in community- or work-based projects or internships	1, 2, 3

Design and Sample

This study was a non-experimental survey design with a proposed sample of teachers who have attended district-mandated PBL workshops conducted by the Buck Institute for Education. It was unclear how many teachers have attended PBL training in the U.S. within the last year. The Buck Institute for Education keeps this data private. For this reason, it was not feasible to randomize the target population. Thus, the study used a non-probability convenience sample. A non-stratified, single-stage sampling procedure was used to select the sample.

The inclusion criteria were limited to teachers who had attended a Buck Institute for Education PBL 101 training within three years prior to completing the survey. These criteria were chosen to limit the variable of elapsed time after attending a PBL workshop. The sample included teachers from a large urban and a large suburban school district, as defined by the

National Association for Educational Progress (NAESP). The use of a large district increased the likelihood of a larger sample size to maximize variability in the demographic data. This was also designed to help ensure a sample size that could enable the researcher to differentiate between low-SES and high-SES schools.

Instruments

The instrument used to measure teacher self-efficacy was the Teachers' Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001). The TSES has broken teacher efficacy into the three domains: student engagement, instructional strategy, and classroom management. Its scales have repeatedly demonstrated invariance at the item level (Chang & Engelhard, 2016; Ruan, et al., 2015) and have been shown to produce valid inferences and reliable scores in studies of teachers in multiple countries (Klassen et al. 2009; Tsigilis, Koustelios, & Grammatikopoulos 2010).

Researchers throughout the world have used the TSES (Appendix A) to measure teacher self-efficacy concerning project-based learning and professional development. Recently, Mahasneh & Alwan's (2018) quasi-experimental study demonstrated that pre-service teachers in Jordan had a statistically significant increase in self-efficacy after attending a PBL course while the control group did not experience an increase in self-efficacy. Another study required teachers to use the TSES self-efficacy survey before and after professional development and found that teachers who attended workshops scored higher than those who attended multiple session professional development, with the PBL workshop leading to the highest increase in teacher self-efficacy (Bumen, 2009).

Researchers have operationalized motivation, grounded in self-determination theory, with the Work Tasks Motivation Scale (WTMST) for measuring teacher motivation (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). The tool includes the categories: intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation in six separate domains. In order to reduce survey fatigue, the WTMST is designed to allow researchers to select a single domain as long as the scale remains intact. In other words, they could select Motivation in Teaching Tasks or Classroom Management and have thirty rather than ninety items. However, this particular study uses the entire instrument in order to avoid breaking the scale.

Although there has been a weak research precedence for using the WTMST (Appendix B) to assess teachers' motivation related to professional development, the instrument can be adapted at the job-specific and task-specific level (Fernet, Chanal, & Guay, 2017) to measure motivation. Because it has demonstrated invariance at the item level and demonstrated multivariate invariance, researchers can analyze the relationship between motivation at the task level while also measuring overall teacher motivation.

To measure teacher implementation of PBL methods, this current study used the instrument developed by the Buck Institute for Education (Ravitz, 2008) based on items selected from the American Institute for Research's Spring 2005 Teacher Survey.

Data Collection Procedures

The following procedures were used to administer the instruments:

1. Received permission from the from Ravitz (2008) to use the PBL implementation instrument.

2. District approval sought from two school districts. One district provided consent through the committee.
3. Defended the dissertation proposal.
4. Obtained IRB approval from George Fox University.
5. Obtained formal district approval from the school district.
6. Created an online survey combining demographic questions along with the PBL implementation instrument, the WTMST, and the TSES.
7. A formal letter of invitation was sent to the respective district office leadership of the participating school district.
8. Piloted the survey with seven colleagues to assist in checking for time, reducing survey fatigue, and finding errors. The average survey time was just over fifteen minutes.
9. Distributed the survey to the sample through email. The survey included informed consent prior to accessing the survey. It also included a description of the survey and the permission to opt-out at any time during the survey. By clicking on the link, each participant provided active consent to participate in the survey. The email also included the optional incentive to opt-in for a chance to win one of five $50 Amazon gift cards at the close of the survey.
10. Participants had one month from the initial survey invitation to complete the survey. This was chosen because it matched the time protocol of the original Ravitz 2008 PBL survey. During this period, the researcher was unable to send any additional

follow-up emails to participants with the same consent information, and survey description.

11. Once the survey window was closed, data from Survey Monkey was transferred into statistical spreadsheets and analyzed.

Data Analysis

This current study used multiple correlations to determine the correlation between teacher self-efficacy, teacher intrinsic motivation, teacher implementation of PBL methods, teacher demographic variables, and school context variables. The Pearson's correlation coefficient was calculated to determine the association between each of the variables. This method was chosen because the data was interval or ratio type. Negative correlations are stronger as they approach -1 and positive correlations are stronger as they approach 1. A 2-tailed t-test was also calculated to determine the significance of the correlation coefficient.

There are specific assumptions when using a Pearson's correlation coefficient (Field, Miles, & Field, 2012). The first assumption of a Pearson's correlation is both variables need to be continuous. While the survey contained categorical data, numeric values were assigned and means were calculated between survey items, additive scales, context variables, and demographic variables. This ensured that all variables were continuous. In addition, a Pearson correlation must contain related pairs, which means participants need to have completed both aspects of the survey. Also, the variables need to be linearly related. They need to demonstrate homoscedasticity, which is why the variance was calculated. Finally, a Pearson correlation must avoid outliers.

Research Ethics

Because this current study involved human subjects, IRB was obtained through George Fox University (Appendix C). There were minimal risks to participants, including loss of time and the psychological burden of completing a survey associated with motivation and self-efficacy. Participation in this non-experimental survey design was entirely voluntary with access to the survey granted after participants have provided informed consent (Appendix D). In addition, participants had the option to exit the survey should they wish to cease participation in the study. The survey was conducted individually to reduce any undue social pressure to complete the survey. While this was impossible to guarantee, the survey was sent to individual email addresses with text instructing teachers to fill out the survey individually. Completion of the survey was not tied to any professional evaluation, professional development credits, or compensation, and district personnel will not have access to the data; all of this was communicated to participants.

All survey data was saved in a secure online server, where it will remain for five years before being permanently deleted. A duplication of the data was housed on a secure flash drive kept in a secure and locked file drawer for five years before being destroyed. Each participant's identity was protected by keeping the survey anonymous. After finishing the survey, participants had the option to enter a drawing for one of five $50 Amazon gift cards.

Potential Implications of the Research

On a practical level, failing to address teacher self-efficacy and motivation in the design and assessment of PBL professional development could potentially lead to a lack of PBL

implementation, a misuse of district resources, and an inaccurate evaluation of the effectiveness of PBL professional development. Furthermore, because the Guskey Model has been operationalized within academic research on professional development, an association between implementation, efficacy, and motivation could provide a critique of the model as a conceptual framework. Thus, this study could provide insights for educational leaders and professional development designers on the design, implementation, and evaluation of PBL professional development.

Chapter Four

Results

The purpose of this study was to determine the association between teacher self-efficacy, teacher motivation, and project-based learning (PBL) teaching methods. The study was comprised of a composite of three separate valid and reliable surveys. These included two items from Ravitz's 2008 survey on PBL teaching methods, the long-form version of the Teachers Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) to determine self-reported teacher efficacy, and the 90-question Works Tasks Management Scale (Fernet, Senécal, Guay, Marsh, & Dowson, 2008) to determine self-reported teacher motivation grounded in Self-Determination Theory. The survey also included teacher demographic and school context questions. This chapter reports on the data collected in the PBL, TSES, WTMST surveys; as well as the school context and demographic questions.

After receiving both IRB approval and district review board approval, the survey was sent out to 255 participants at the close of the first semester. Of the population, only 16 participants began the survey and only 9 of them completed the entire survey. A misunderstanding about district policy on oversight meant the researcher was unable to send follow-up emails to increase the response rate. In addition, the researcher had to send the survey through a district intermediary. Two weeks prior, the researcher had piloted the survey with a general online PBL audience. The initial 7% completion rate increased to 43% after two follow-up emails that included a time reminder and a reminder of the gift card raffle. As a result of this district policy, the total response rate was far lower than expected. However, the data still

provided sufficient opportunity to conduct an exploratory data analysis on the variables within this study.

Collection and Data Screening

At the close of the survey, data was transferred from Survey Monkey to IBM SPSS. Due to the lack of racial diversity, race was dichotomized as white and non-white, with 100% of the participants being white. Gender was dichotomized as female and male and coded as 1 for female and 2 for male. Grade level bands were aggregated into three categories, lower elementary (grades K-4), middle grades (grades 5-8) and high school (grades 9-12). This categorical data was coded as 1-3, respectively. Similarly, the first PBL question was coded from 1-3, with a 1 representing "I do nothing like this," a 2 representing "I do this and call this project-based learning," and a 3 being "I do this but call this by another name."

The three separate indexes of the TSES and the thirty indexes (based on five motivational constructs in six different tasks) of the WTMST were computed using additive scales. Internal consistency of both the TSES and the WTMST were determined using Cronbach's alpha. Descriptive statistics were computed at the item level for PBL methods and at both the additive level and item level for the TSES and WTMST. Finally, correlations were run between each variable (including PBL methods, teacher self-efficacy, motivation, school context variables, and demographic variables) to answer the research questions.

Participant Demographics

Of the sixteen participants in the survey, nine completed the demographic and school context questions. Table 3 shows the frequency and percentage for race and gender. Even after

dichotomizing for race, every participant identified as white. This was not representative of the teaching profession as a whole or the district demographics. Seven of the nine participants identified as women, which is representative of the overall K-12 gender demographics, where 77% were women (National Center for Educational Statistics, 2018).

Table 3

Demographic Data of Survey Participants

Category	Frequency	Percent
Race		
White	9	100
Non-White	0	0
Gender		
Woman	7	77.8
Man	2	22.2
Gender Minority	0	0

Table 4 shows the breakdown for school context variables. Because the sample was not large enough to analyze individual academic subjects, the data was broken down into single academic subjects and multiple academic subjects, with 55.6% being single academic subject and 44.4% being multiple academic subjects. This was largely reflective of the larger teaching population. For grade level, 11.1% surveyed were early elementary with both middle grades and high school being 44.4% each. The largest percentage of the participants did not teach at a Title One school.

Table 4

School Context Data of Survey Participants

Category	Frequency	Percent
Title One Status		
Yes	1	11.1
No	8	88.9
Grade Level		
Early Elementary (K-4)	1	11.1
Middle Grades (5-8)	4	44.4
High School (9-12)	4	44.4
Subject		
Single Subject	5	55.6
Multiple Subjects	4	44.4

For the purpose of formatting, abbreviations were used in presenting the results. Table 5 represents the abbreviations used for survey items and scales.

Table 5

Abbreviations for Survey Items and Scales

Item	Abbreviation
PBL Implementation: This survey defines Project Based Learning (PBL) as an approach to instruction that: a. engages students in an extended investigation b. requires inquiry into a topic in depth c. includes some student self-direction or choice, and d. requires presentation of findings, results or conclusions	PBL1
PBL Implementation: collected, organized and analyzed information and data	PBL2
PBL Implementation: solved real world problems	PBL3
PBL Implementation: decided how to present what they had learned evaluated and defended their ideas or views	PBL4
PBL Implementation: orally presented their work to peers, staff, parents, or others	PBL5
PBL Implementation: worked on multidisciplinary projects	PBL6
PBL Implementation: researched topics deeply enough to become subject matter experts	PBL7
PBL Implementation: participated in community- or work-based projects or internships	PBL8
Additive Student Engagement Scale from TSES	TSES-SE
Additive Classroom Management Scale from TSES	TSES-CM
Additive Instructional Strategies Scale from TSES	TSES-IS
Additive Complementary Tasks – Intrinsic Motivation Scale from WTMST	WTMST: CO-IN
Additive Complementary Tasks – Amotivation Scale from WTMST	WTMST: CO-AM
Additive Complementary Tasks – Extrinsic Motivation Scale from WTMST	WTMST: CO-EX
Additive Complementary Tasks – Identified Regulation Scale from WTMST	WTMST: CO-ID
Additive Complementary Tasks – Introjected Regulation Scale from WTMST	WTMST: CO-IJ
Additive Classroom Management – Intrinsic Motivation Scale from WTMST	WTMST: CM-IN
Additive Classroom Management – Extrinsic Motivation Scale from WTMST	WTMST: CM-EX
Additive Classroom Management – Amotivation Scale from WTMST	WTMST: CM-AM
Additive Classroom Management – Introjected Regulation Scale from WTMST	WTMST: CM-IJ

Item	Abbreviation
Additive Classroom Management – Identified Regulation Scale from WTMST	WTMST: CM-ID
Additive Administrative Tasks – Intrinsic Motivation Scale from WTMST	WTMST: AD-IN
Additive Administrative Tasks – Amotivation Scale from WTMST	WTMST: AD-AM
Additive Administrative Tasks – Identified Regulation Scale from WTMST	WTMST: AD-ID
Additive Administrative Tasks – Introjected Regulation Scale from WTMST	WTMST: AD-IJ
Additive Administrative Tasks – Extrinsic Motivation Scale from WTMST	WTMST: AD-EX
Additive Administrative Tasks – Identified Regulation Scale from WTMST	WTMST: AD-ID
Additive Evaluation of Students – Extrinsic Motivation Scale from WTMST	WTMST: EV-EX
Additive Evaluation of Students – Amotivation Scale from WTMST	WTMST: EV-AM
Additive Evaluation of Students – Introjected Regulation Scale from WTMST	WTMST: EV-IJ
Additive Evaluation of Students – Intrinsic Motivation Scale from WTMST	WTMST: EV-IN
Additive Teaching – Identified Regulation Scale from WTMST	WTMST: TE-ID
Additive Teaching – Extrinsic Motivation Scale from WTMST	WTMST: TE-EX
Additive Teaching – Amotivation Scale from WTMST	WTMST: TE-AM
Additive Teaching – Intrinsic Motivation Scale from WTMST	WTMST: TE-IN
Additive Teaching – Introjected Regulation Scale from WTMST	WTMST: TE-IJ
Additive Classroom Preparation – Introjected Regulation Scale from WTMST	WTMST: PR-IJ
Additive Classroom Preparation – Extrinsic Motivation Scale from WTMST	WTMST: PR-EX
Additive Classroom Preparation – Identified Regulation Scale from WTMST	WTMST: PR-ID
Additive Classroom Preparation – Amotivation Scale from WTMST	WTMST: PR-AM
Additive Classroom Preparation – Intrinsic Motivation Scale from WTMST	WTMST: PR-IN

Descriptive Results

The following table presents the initial survey results, including the descriptive statistics for PBL implementation as well as the descriptive statistics for the additive TSES scales and WTMST scales.

Table 6

Descriptive Statistics of PBL Items, Teacher Self-Efficacy, and Teacher Motivation

	N	Range	Minimum	Maximum	Mean	SD	Standard Deviation	Variance
PBL1	16	2	1	3	2.19	0.136	0.544	0.296
PBL2	16	3	2	5	3.31	0.270	1.078	1.163
PBL3	16	3	2	5	3.25	0.233	0.931	0.867
PBL4	16	4	1	5	3.19	0.277	1.109	1.229
PBL5	16	2	2	4	2.88	0.221	0.885	0.783
PBL6	16	4	1	5	2.88	0.301	1.204	1.450
PBL7	16	2	2	4	2.88	0.239	0.957	0.917
PBL8	16	3	1	4	1.63	0.287	1.147	1.317
TSES-SE	15	8	43	51	46.93	0.581	2.251	5.067
TSES-CM	15	11	45	56	48.93	0.796	3.081	9.495
TSES-IS	15	11	44	55	49.13	0.675	2.615	6.838
WTMST: CO-IN	9	12	6	18	10.78	1.460	4.381	19.194
WTMST: CO-AM	9	11	4	15	7.89	1.218	3.655	13.361
WTMST: CO-EX	9	13	5	18	9.00	1.312	3.937	15.500
WTMST: CO-ID	9	12	6	18	11.78	1.498	4.494	20.194
WTMST: CO-IJ	9	10	6	16	11.11	1.148	3.444	11.861
WTMST: CM-IN	8	8	10	18	15.33	0.913	2.739	7.500
WTMST: CM-EX	9	15	3	18	11.78	1.690	5.069	25.694
WTMST: CM-AM	9	9	3	12	7.33	1.027	3.082	9.500
WTMST: CM-IJ	9	13	3	16	10.67	1.462	4.387	19.250
WTMST: CM-ID	9	8	10	18	14.11	1.060	3.180	10.111
WTMST: AD-IN	8	10	6	16	9.75	1.221	3.454	11.929
WTMST: AD-AM	9	15	3	18	8.78	1.570	4.711	22.194
WTMST: AD-ID	9	9	9	18	13.33	0.986	2.958	8.750
WTMST: AD-IJ	9	15	3	18	12.11	1.369	4.106	16.861
WTMST: AD-EX	9	15	3	18	15.00	1.528	4.583	21.000
WTMST: AD-ID	10	4	14	18	16.40	0.452	1.430	2.044
WTMST: EV-EX	10	13	3	16	11.60	1.231	3.893	15.156
WTMST: EV-AM	10	10	3	13	7.10	0.924	2.923	8.544
WTMST: EV-IJ	10	15	3	18	12.40	1.621	5.125	26.267
WTMST: EV-IN	10	8	8	16	12.70	0.775	2.452	6.011
WTMST: TE-ID	10	5	13	18	16.40	0.542	1.713	2.933
WTMST: TE-EX	10	13	3	16	10.90	1.233	3.900	15.211
WTMST: TE-AM	10	9	3	12	6.70	0.731	2.312	5.344
WTMST: TE-IN	10	7	11	18	15.60	0.945	2.989	8.933
WTMST: TE-IJ	10	15	3	18	10.20	1.583	5.007	25.067
WTMST: PR-IJ	11	13	3	16	9.82	1.313	4.355	18.964
WTMST: PR-EX	11	6	10	16	13.18	0.736	2.442	5.964
WTMST: PR-ID	11	9	9	18	15.91	0.836	2.773	7.691
WTMST: PR-AM	11	7	5	12	7.91	0.639	2.119	4.491
WTMST: PR-IN	10	9	9	18	14.60	0.872	2.757	7.600
Valid N (listwise)	7							

Reliability of the Scales

Before analyzing the correlations, it was important to determine the internal consistency of the scales for the TSES and the WTMST. Cronbach's alpha was conducted for each of the additive scales. A score of .5 or higher represents a fair level of internal consistency while a .7 or higher indicates a good level of consistency and a .9 or higher denotes an excellent internal consistency. For the TSES, both the Classroom Management Scale and Instructional Strategies Scale demonstrated a good level of internal consistency. However, the student engagement scale was .258, suggesting a poor internal consistency.

For the WTMST, the Complementary Tasks – Intrinsic Motivation Scale, the Complementary Tasks – Amotivation Scale, the Classroom Management – Intrinsic Motivation Scale, the Administrative Tasks – Extrinsic Motivation Scale, and the Additive Classroom Preparation – Introjected Regulation Scale all scored at the excellent level of internal consistency. Four scales, the Administrative Tasks – Intrinsic Motivation Scale for the WTMST, the Administrative Tasks – Identified Regulation Scale for the WTMST, the Classroom Preparation – Extrinsic Motivation Scale, and the Classroom Preparation – Amotivation Scale demonstrated fair reliability. All other scales demonstrated a good level of internal consistency. Table 7 contains the Cronbach's alpha scores on the additive level while Table 8 and Table 9 contain the item-level reliability scores of the TSES and WTMST respectively.

Table 7

Reliability of TSES Scales and WTMST Scales at the Additive Level

Scale	Number of Items	Cronbach's Alpha
TSES-ES	8	.258
TSES-CM	8	.853
TSES-IS	8	.813
WTMST: CO-IN	3	0.94
WTMST: CO-AM	3	0.96
WTMST: CO-EX	3	0.879
WTMST: CO-ID	3	0.957
WTMST: CO-IJ	3	0.85
WTMST: CM-IN	3	0.922
WTMST: CM-EX	3	0.819
WTMST: CM-AM	3	0.860
WTMST: CM-IJ	3	0.950
WTMST: CM-ID	3	0.766
WTMST: AD-IN	3	0.570
WTMST: AD-AM	3	0.941
WTMST: AD-IJ	3	0.629
WTMST: AD-IJ	3	0.959
WTMST: AD-EX	3	0.942
WTMST: EV-ID	3	0.750
WTMST: EV-EX	3	0.869
WTMST: EV-AM	3	0.878
WTMST: EV-IJ	3	0.947
WTMST: EV-IN	3	0.810
WTMST: TE-ID	3	0.864
WTMST: TE-EX	3	0.790
WTMST: TE-AM	3	0.960
WTMST: TE-IN	3	0.821
WTMST: TE-IJ	3	0.979
WTMST: PR-IJ	3	0.952
WTMST: PR-EX	3	0.627
WTMST: PR-ID	3	0.890
WTMST: PR-AM	3	0.559
WTMST: PR-IN	3	0.776

The data was broken up at the item level within each scale. The first scale was the Self-Efficacy in Instructional Strategies for the TSES.

Table 8

Reliability for TSES – Instructional Strategies at the Item Level

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TSES-IS	How well can you respond to difficult questions from your students?	6.00	0.378	15	43.13	6.552	0.074	0.841
TSES-IS	How much can you gauge student comprehension of what you have taught?	6.27	0.458	15	42.87	5.552	0.499	0.796
TSES-IS	To what extent can you craft good questions for your students?	6.07	0.458	15	43.07	5.352	0.603	0.783
TSES-IS	How much can you do to adjust your lessons to the proper level for individual students?	6.13	0.516	15	43.00	5.000	0.680	0.769
TSES-IS	How much can you use a variety of assessment strategies?	6.20	0.676	15	42.93	4.495	0.658	0.774
TSES-IS	To what extent can you provide an alternative explanation or example when students are confused?	6.27	0.458	15	42.87	5.410	0.573	0.787
TSES-IS	How well can you implement alternative	6.13	0.516	15	43.00	5.000	0.680	0.769

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
	strategies in your classroom?							
TSES-IS	How well can you provide appropriate challenges for very capable students?	6.07	0.458	15	43.07	5.638	0.456	0.802

At the item level, the items for Student Engagement had a low Cronbach's alpha score, including "How much can you do to get students to believe they can do well in school?" which had a -.006. These scores contrasted sharply with the scores for instructional strategies and classroom management. However, it is possible that this was due to a low sample size. As Yurdugul (2008) points out, a sample size of less than thirty can create lower Cronbach alpha scores.

Table 9

Reliability for TSES – Student Engagement at the Item Level

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TSES-SE	How much can you do to get through to the most difficult students?	5.80	0.775	15	41.13	4.838	-0.109	0.365
TSES-SE	How much can you do to help your students think critically?	6.00	0.535	15	40.93	4.781	0.000	0.279
TSES-SE	How much can you do to motivate students who show low interest in school?	5.60	0.828	15	41.33	3.524	0.276	0.095
TSES-SE	How much can you do to get students to believe they can do well in school?	6.07	0.458	15	40.87	3.695	0.660	-.006[a]
TSES-SE	How much can you do to help your students value learning?	5.87	0.915	15	41.07	3.781	0.126	0.215
TSES-SE	How much can you do to foster student creativity?	6.00	0.535	15	40.93	5.067	-0.119	0.329
TSES-SE	How much can you do to improve the understanding of a student who is failing?	5.93	0.458	15	41.00	5.429	-0.268	0.368

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TSES-SE	How much can you assist families in helping their children do well in school?	5.67	0.900	15	41.27	3.210	0.325	0.035

Finally, the Cronbach's alpha was computed at the item level within the Classroom Management scale. All of the items had a high item-total correlation.

Table 10

Reliability for TSES – Classroom Management at the Item Level

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TSES-CM	How much can you do to control disruptive behavior in the classroom?	5.93	0.704	15	43	6.429	0.721	0.819
TSES-CM	To what extent can you make your expectations clear about student behavior?	6.47	0.640	15	42.47	7.267	0.527	0.846
TSES-CM	How well can you establish routines to keep activities running smoothly?	6.40	0.507	15	42.53	8.267	0.333	0.863
TSES-CM	How much can you do to get children to follow classroom rules?	5.93	0.594	15	43	7.429	0.530	0.844
TSES-CM	How much can you do to calm a student who is disruptive or noisy?	5.93	0.458	15	43	7.571	0.681	0.828
TSES-CM	How well can you establish a classroom management system with each group of students?	6.07	0.458	15	42.87	7.41	0.753	0.82
TSES-CM	How well can you keep a few problem students from ruining an entire lesson?	6.07	0.594	15	42.87	7.267	0.586	0.836

Scale	Scale Item	M	SD	N	Scale M if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
TSES-CM	How well can you respond to defiant students?	6.13	0.352	15	42.8	7.743	0.832	0.822

After conducting the Cronbach's Alpha for each of the TSES scales, the same process was used for each of the 30 scales within the WTMST at the item level. The following table is the reliability at the item level for the Classroom Preparation domain with all five sub-scales and the corresponding items.

Table 11

Reliability for WTMST – Classroom Preparation at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: PR-IN	Because it is pleasant to carry out this task	4.90	0.994	10	9.70	4.011	0.653	0.665
WTMST: PR-IN	Because I like doing this task.	4.70	1.418	10	9.90	2.100	0.849	0.423
WTMST: PR-IN	Because I find this task interesting to do.	5.00	0.816	10	9.60	5.156	0.479	0.836
WTMST: PR-ID	Because I find this task important for the academic success of my students.	5.55	0.820	11	10.36	4.455	0.740	0.898
WTMST: PR-ID	Because it is important for me to carry out this task.	5.36	0.924	11	10.55	3.873	0.815	0.826
WTMST: PR-ID	Because this task allows me to attain work objectives that I consider important.	5.00	1.265	11	10.91	2.491	0.902	0.774
WTMST: PR-IJ	Because I would feel guilty not doing it.	3.36	1.690	11	6.45	7.473	0.935	0.910
WTMST: PR-IJ	Because if I don't carry out this task, I will feel bad.	3.45	1.572	11	6.36	8.055	0.945	0.894
WTMST: PR-IJ	To not feel bad if I don't do it.	3.00	1.265	11	6.82	10.364	0.860	0.972
WTMST: PR-EX	Because my work demands it.	5.64	0.674	11	7.55	4.073	0.528	0.518
WTMST: PR-EX	Because the school obliges me to do it.	4.36	1.120	11	8.82	2.964	0.453	0.503
WTMST: PR-EX	Because I'm paid to do it.	3.18	1.328	11	10.00	2.400	0.437	0.576

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: PR-AM	I don't know, I don't always see the relevance of carrying out this task.	3.45	1.368	11	4.45	1.673	0.267	0.870
WTMST: PR-AM	I used to know why I was doing this task, but I don't see the reason anymore.	2.36	0.674	11	5.55	3.073	0.408	0.462
WTMST: PR-AM	I don't know, sometimes I don't see its purpose.	2.09	0.701	11	5.82	2.564	0.640	0.184

Next, the same process was used for the teaching scale at the item level. The following table is the reliability at the item level for the Teaching domain with all five sub-scales and the corresponding items.

Table 12

Reliability for WTMST – Teaching at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: TE-IN	Because I find this task interesting to do.	4.80	1.619	10	10.80	2.844	0.635	1.000
WTMST: TE-IN	Because it is pleasant to carry out this task.	5.40	0.843	10	10.20	5.067	0.831	0.684
WTMST: TE-IN	Because I like doing this task.	5.40	0.843	10	10.20	5.067	0.831	0.684
WTMST: TE-ID	Because it is important for me to carry out this task.	5.40	0.699	10	11.00	1.333	0.688	0.867
WTMST: TE-ID	Because I find this task important for the academic success of my students.	5.60	0.516	10	10.80	1.733	0.686	0.872
WTMST: TE-ID	Because this task allows me to attain work objectives that I consider important.	5.40	0.699	10	11.00	1.111	0.905	0.640
WTMST: TE-IJ	Because if I don’t carry out this task, I will feel bad.	3.60	1.776	10	6.60	10.711	0.963	0.963
WTMST: TE-IJ	To not feel bad if I don’t do it.	3.20	1.687	10	7.00	11.333	0.959	0.965
WTMST: TE-IJ	Because I would feel guilty not doing it.	3.40	1.647	10	6.80	11.733	0.942	0.977
WTMST: TE-EX	Because the school obliges me to do it.	3.33	1.581	9	7.78	9.194	0.513	0.834
WTMST: TE-EX	Because my work demands it.	4.67	1.936	9	6.44	6.278	0.678	0.690

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: TE-EX	Because I'm paid to do it.	3.11	1.269	9	8.00	9.000	0.788	0.611
WTMST: TE-AM	I don't know, sometimes I don't see its purpose.	2.20	0.789	10	4.50	2.500	0.891	0.960
WTMST: TE-AM	I used to know why I was doing this task, but I don't see the reason anymore.	2.20	0.789	10	4.50	2.500	0.891	0.960
WTMST: TE-AM	I don't know, I don't always see the relevance of carrying out this task.	2.30	0.823	10	4.40	2.267	0.968	0.902

Afterward, the Cronbach's alpha was computed for the next scale. The following table is the reliability at the item level for the Evaluation domain with all five sub-scales and the corresponding items.

Table 13

Reliability for WTMST – Evaluation at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: EV-IN	Because I find this task interesting to do.	4.60	0.966	10	8.10	2.989	0.625	0.773
WTMST: EV-IN	Because it is pleasant to carry out this task.	3.90	0.994	10	8.80	2.844	0.649	0.750
WTMST: EV-IN	Because I like doing this task.	4.20	0.919	10	8.50	2.944	0.705	0.694
WTMST: EV-ID	Because I find this task important for the academic success of my students.	5.60	0.516	10	10.80	1.067	0.667	0.583
WTMST: EV-ID	Because this task allows me to attain work objectives that I consider important.	5.40	0.516	10	11.00	1.111	0.612	0.640
WTMST: EV-ID	Because it is important for me to carry out this task.	5.40	0.699	10	11.00	0.889	0.506	0.800
WTMST: EV-IJ	Because I would feel guilty not doing it.	4.20	1.619	10	8.20	12.844	0.930	0.900
WTMST: EV-IJ	To not feel bad if I don’t do it.	4.20	1.687	10	8.20	12.622	0.901	0.915
WTMST: EV-IJ	Because if I don’t carry out this task, I will feel bad.	4.00	2.055	10	8.40	10.489	0.868	0.958
WTMST: EV-EX	Because I’m paid to do it.	3.00	1.247	10	8.60	8.711	0.664	0.893
WTMST: EV-EX	Because the school obliges me to do it.	4.10	1.595	10	7.50	6.056	0.835	0.734
WTMST: EV-EX	Because my work demands it.	4.50	1.509	10	7.10	6.767	0.778	0.788

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: EV-AM	I don’t know, sometimes I don’t see its purpose.	2.50	1.269	10	4.60	3.156	0.838	0.775
WTMST: EV-AM	I used to know why I was doing this task, but I don’t see the reason anymore.	2.50	1.080	10	4.60	3.822	0.842	0.756
WTMST: EV-AM	I don’t know, I don’t always see the relevance of carrying out this task.	2.10	0.876	10	5.00	5.111	0.674	0.913

The following table is the reliability at the item level for the Administrative Tasks domain with all five sub-scales and the corresponding scale items.

Table 14

Reliability for WTMST – Administrative Tasks at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: AD-IN	Because I like doing this task.	3.38	1.685	8	6.38	4.839	0.573	0.118
WTMST: AD-IN	Because I find this task interesting to do.	3.38	1.685	8	6.38	7.982	0.116	0.859
WTMST: AD-IN	Because it is pleasant to carry out this task.	3.00	1.309	8	6.75	6.500	0.556	0.253
WTMST: AD-ID	Because I find this task important for the academic success of my students.	4.44	1.130	9	8.89	4.611	0.589	0.349
WTMST: AD-ID	Because it is important for me to carry out this task.	5.11	0.928	9	8.22	5.944	0.430	0.579
WTMST: AD-ID	Because this task allows me to attain work objectives that I consider important.	3.78	1.716	9	9.56	3.278	0.407	0.695
WTMST: AD-IJ	Because if I don't carry out this task, I will feel bad.	3.78	1.394	9	8.33	7.750	0.923	0.932
WTMST: AD-IJ	Because I would feel guilty not doing it.	4.44	1.424	9	7.67	7.750	0.893	0.953
WTMST: AD-IJ	To not feel bad if I don't do it.	3.89	1.453	9	8.22	7.444	0.921	0.933
WTMST: AD-EX	Because my work demands it.	5.11	1.691	9	9.89	9.361	0.848	0.944
WTMST: AD-EX	Because the school obliges me to do it.	5.22	1.641	9	9.78	9.194	0.915	0.888
WTMST: AD-EX	Because I'm paid to do it.	4.67	1.500	9	10.33	10.250	0.885	0.916

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: AD-AM	I don't know, sometimes I don't see its purpose.	3.44	1.667	9	5.33	10.000	0.893	0.900
WTMST: AD-AM	I used to know why I was doing this task, but I don't see the reason anymore.	2.33	1.500	9	6.44	11.528	0.826	0.954
WTMST: AD-AM	I don't know, I don't always see the relevance of carrying out this task.	3.00	1.803	9	5.78	8.944	0.927	0.876

The following table is the reliability at the item level for the Classroom Management domain with all five sub-scales and the corresponding scale items.

Table 15

Reliability for WTMST – Classroom Management at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: CM-IN	Because I like doing this task.	5.22	0.972	9	10.11	3.361	0.896	0.843
WTMST: CM-IN	Because I find this task interesting to do.	5.33	0.866	9	10.00	4.000	0.794	0.931
WTMST: CM-IN	Because it is pleasant to carry out this task.	4.78	1.093	9	10.56	3.028	0.862	0.881
WTMST: CM-ID	Because it is important for me to carry out this task.	5.00	0.707	9	9.11	7.111	0.663	0.750
WTMST: CM-ID	Because I find this task important for the academic success of my students.	4.78	1.202	9	9.33	4.750	0.748	0.526
WTMST: CM-ID	Because this task allows me to attain work objectives that I consider important.	4.33	1.732	9	9.78	3.194	0.633	0.783
WTMST: CM-IJ	Because if I don't carry out this task, I will feel bad.	3.67	1.732	9	7.00	7.500	0.922	0.919
WTMST: CM-IJ	To not feel bad if I don't do it.	3.44	1.424	9	7.22	9.694	0.849	0.963
WTMST: CM-IJ	Because I would feel guilty not doing it.	3.56	1.424	9	7.11	9.111	0.944	0.896
WTMST: CM-EX	Because the school obliges me to do it.	3.78	1.716	9	8.00	13.250	0.760	0.683
WTMST: CM-EX	Because I'm paid to do it.	4.11	2.205	9	7.67	13.250	0.472	0.973

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: CM-EX	Because my work demands it.	3.89	1.965	9	7.89	10.861	0.847	0.563
WTMST: CM-AM	I don't know, sometimes I don't see its purpose.	2.56	1.424	9	4.78	3.694	0.690	0.902
WTMST: CM-AM	I used to know why I was doing this task, but I don't see the reason anymore.	2.33	1.000	9	5.00	5.250	0.709	0.836
WTMST: CM-AM	I don't know, I don't always see the relevance of carrying out this task.	2.44	1.014	9	4.89	4.611	0.887	0.687

Finally, the Cronbach's alpha was computed for the last of the WTMST scales. The following table is the reliability at the item level for the Complementary Tasks domain with all five sub-scales and the corresponding scale items.

Table 16

Reliability for WTMST – Complementary Tasks at the Item Level

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: CO-EX	Because the school obliges me to do it .	3.22	1.641	9	5.78	7.194	0.637	0.965
WTMST: CO-EX	Because I'm paid to do it.	2.89	1.364	9	6.11	7.111	0.897	0.719
WTMST: CO-EX	Because my work demands it.	2.89	1.364	9	6.11	7.611	0.801	0.803
WTMST: CO-ID	Because I find this task important for the academic success of my students.	3.67	1.658	9	8.11	8.361	0.947	0.91
WTMST: CO-ID	Because this task allows me to attain work objectives that I consider important.	3.89	1.453	9	7.89	10.111	0.863	0.973
WTMST: CO-ID	Because it is important for me to carry out this task.	4.22	1.563	9	7.56	9.028	0.928	0.923
WTMST: CO-AM	I don't know, sometimes I don't see its purpose.	3.33	1.658	9	4.56	4.528	0.862	0.957
WTMST: CO-AM	I used to know why I was doing this task, but I don't see the reason anymore.	1.89	1.054	9	6.00	7.000	0.941	0.857
WTMST: CO-AM	I don't know, I don't always see the relevance of carrying out this task.	2.67	1.118	9	5.22	6.944	0.877	0.888
WTMST: CO-IN	Because I like doing this task.	3.89	1.453	9	6.89	9.611	0.829	0.948

Scale	Scale Item	Mean	Standard Deviation	N	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
WTMST: CO-IN	Because I find this task interesting to do.	3.44	1.590	9	7.33	8.5	0.881	0.908
WTMST: CO-IN	Because it is pleasant to carry out this task.	3.44	1.590	9	7.33	8.25	0.922	0.875
WTMST: CO-IJ	Because if I don't carry out this task, I will feel bad.	3.89	1.453	9	7.22	5.194	0.688	0.834
WTMST: CO-IJ	To not feel bad if I don't do it.	3.67	1.225	9	7.44	5.528	0.839	0.683
WTMST: CO-IJ	Because I would feel guilty not doing it.	3.56	1.236	9	7.56	6.278	0.655	0.850

Correlations for Research Question 1

The following section identifies the correlations between PBL methods, teacher self-efficacy, and teacher motivation.

The correlation between PBL methods. Table 11 examines the correlations between PBL methods with other PBL methods. There is a strong correlation between "collected, organized, and analyzed data information" with "solve real world problems" (.714), "decided how to present what they learned" (.840), "orally presented their work to their peers" (.742), and "worked on multi-disciplinary projects" (.700). This is not surprising, as data collection, problem-solving, and presenting findings are all considered integrated components of PBL (Ertmer, Ottenbreit-Leftwich, & Tondeur, 2014; Ravitz, Hixson, English, & Mergendoller, 2012). However, there was a weak correlation (.295) between "researched topics deeply enough to become subject matter experts" and "orally presented their work to peers, staff, parents, or

others." This was surprising because in PBL literature, the purpose of presenting to one's peers is to demonstrate one's subject matter expertise (Larmer, Mergendoller, & Boss, 2015; Markham, Mergendoller, Larmer & Ravitz, 2003). This could be a function of the phrasing of the question. It is possible that "become an expert" was a higher perceived threshold of knowledge acquisition than "develop subject matter expertise." Finally, there was a weak correlation between "participated in community- or work-based projects or internships" (.263). This is likely due to the structure of PBL within the district as being oriented around core subjects while community partnerships and internships are integrated into the high school CTE program.

Table 17

Correlations of PBL Methods

		PBL1	PBL2	PBL3	PBL4	PBL5	PBL 6	PBL7	PBL8
PBL 1	Pearson's r	1	.121	.165	.159	.467	.242	-.080	.441
	Sig. (2-tailed)		.656	.542	.557	.068	.367	.768	.088
	N	16	16	16	16	16	16	16	16
PBL2	Pearson's r	.121	1	.714	.840	.742	.700	.557	.263
	Sig. (2-tailed)	.656		.002	.000	.001	.003	.025	.326
	N	16	16	16	16	16	16	16	16
PBL3	Pearson's r	.165	.714	1	.727	.526	.387	.561	.031
	Sig. (2-tailed)	.542	.002		.001	.036	.139	.024	.909
	N	16	16	16	16	16	16	16	16
PBL4	Pearson's r	.159	.840	.727	1	.705	.568	.526	.216
	Sig. (2-tailed)	.557	.000	.001		.002	.022	.036	.421
	N	16	16	16	16	16	16	16	16
PBL5	Pearson's r	.467	.742	.526	.705	1	.485	.295	.213
	Sig. (2-tailed)	.068	.001	.036	.002		.057	.267	.428
	N	16	16	16	16	16	16	16	16
PBL6	Pearson's r	.242	.700	.387	.568	.485	1	.390	.253
	Sig. (2-tailed)	.367	.003	.139	.022	.057		.135	.344
	N	16	16	16	16	16	16	16	16
PBL7	Pearson's r	-.080	.557	.561	.526	.295	.390	1	.076
	P	.768	.025	.024	.036	.267	.135		.780
	N	16	16	16	16	16	16	16	16
PBL8	Pearson's r	.441	.263	.031	.216	.213	.253	.076	1
	Sig. (2-tailed)	.088	.326	.909	.421	.428	.344	.780	
	N	16	16	16	16	16	16	16	16

The correlation between teacher efficacy and PBL methods. There was no correlation between teacher self-efficacy in student engagement (TSES-SE) and any of the PBL methods. In fact, “orally presented their work to peers, staff, parents, or others” (-.002) and worked on multidisciplinary projects” (-.268) both had a negative correlation with self-efficacy in student engagement. However, given the low Cronbach’s alpha score, the low correlation could be a function of low reliability.

Several correlations existed between teacher self-efficacy in classroom management and PBL methods. The correlation was a strong association between self-efficacy in classroom management and “collected, organized and analyzed information and data” (.611), as well as “worked on multidisciplinary projects” (.572) and “researched topics deeply enough to be content experts” (.577). The strongest correlation existed between “decided how to present what they had learned/evaluated and defended their ideas or views” and self-efficacy in classroom management (.692). It is possible that a higher sense of efficacy is required in classroom management when asking students to self-select how they present and how they assess their work. Teachers sometimes experience uncertainty when letting go of control to allow for increased student choice (Morgan & Slough, 2013). However, student choice is also a component of learner-centered behavior management, which can lead to fewer behavioral disruptions (Freiberg & Lamb, 2009).

Table 18

Correlations of Teacher Self-Efficacy and PBL Methods

		TSES-SE	TSES-CM	TSES-IS
PBL1	Pearson's r	0.238	0.091	0.029
	Sig. (2-tailed)	0.394	0.747	0.918
	N	15	15	15
PBL2	Pearson's r	0.095	.611	0.401
	Sig. (2-tailed)	0.736	0.016	0.139
	N	15	15	15
PBL3	Pearson's r	0.438	0.392	0.127
	Sig. (2-tailed)	0.102	0.148	0.652
	N	15	15	15
PBL4	Pearson's r	0.116	.692	.515
	Sig. (2-tailed)	0.680	0.004	0.050
	N	15	15	15
PBL5	Pearson's r	-0.002	0.365	0.437
	Sig. (2-tailed)	0.993	0.180	0.103
	N	15	15	15
PBL6	Pearson's r	-0.268	.572	0.145
	Sig. (2-tailed)	0.334	0.026	0.607
	N	15	15	15
PBL7	Pearson's r	0.196	.577	0.458
	Sig. (2-tailed)	0.484	0.024	0.086
	N	15	15	15
PBL8	Pearson's r	0.045	0.033	-0.124
	Sig. (2-tailed)	0.873	0.907	0.660
	N	15	15	15
TSES-SE	Pearson's r	1	0.143	0.196
	Sig. (2-tailed)		0.610	0.484
	N	15	15	15
TSES-CM	R	0.143	1	.560
	Sig. (2-tailed)	0.610		0.030
	N	15	15	15
TSES-IS	R	0.196	.560	1
	Sig. (2-tailed)	0.484	0.030	
	N	15	15	15

The correlation between teacher motivation and PBL methods. There was also a strong negative correlation between identified regulation of administrative tasks and both "decided how to present what they had learned evaluated and defended their ideas or views" and "orally presented their work to peers, staff, parents, or others." This could point a contrast between teachers who implement PBL and the administrative tasks required of the system. In

qualitative studies, teachers implementing PBL have described a disconnect between the administrative tasks required of a traditional system and the larger purpose and goals of PBL (Hofman, Jansen, & Spijkerboer, 2011).

While there was merely a weak positive correlation between intrinsic motivation within teaching and PBL methods, there was a strong correlation association between identified regulation and both “solved real world problems” (.578) and “decided how to present what they learned/evaluated and defended their ideas or views” (.574). This contrasted with the weak negative correlation between extrinsic motivation in teaching and the strong negative correlation between amotivation in teaching and many of the PBL implementation methods.

Table 19

Correlation of Teacher Motivation and PBL Methods

		PBL1	PBL2	PBL3	PBL4	PBL5	PBL6	PBL7	PBL8
WTMST	Pearson's r	0.404	-0.197	-0.238	-0.295	-0.228	0.351	0.110	0.560
CO-IN	Sig. (2-tailed)	0.281	0.611	0.538	0.441	0.555	0.355	0.779	0.117
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	0.063	0.351	0.319	0.285	0.479	-0.168	-0.171	-0.279
CO-AM	Sig. (2-tailed)	0.873	0.354	0.402	0.457	0.192	0.666	0.660	0.468
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.476	0.058	0.127	0.095	0.159	-0.365	-0.110	-0.559
CO-EX	Sig. (2-tailed)	0.195	0.882	0.745	0.807	0.683	0.334	0.778	0.118
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	0.227	-0.218	-0.260	-0.287	-0.334	0.293	0.139	0.464
CO-ID	Sig. (2-tailed)	0.557	0.574	0.500	0.453	0.380	0.445	0.721	0.208
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.284	-0.539	-.702	-.811	-0.581	-0.624	-0.615	-0.157
CO-IJ	Sig. (2-tailed)	0.458	0.135	0.035	0.008	0.101	0.072	0.078	0.687
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.183	-.905	-0.548	-.776	-.730	-0.579	-0.105	-0.290
MG-INT	Sig. (2-tailed)	0.638	0.001	0.127	0.014	0.025	0.103	0.787	0.449
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.464	-0.328	-0.625	-0.575	-0.395	-0.330	-.873	-0.167
MG-EX	Sig. (2-tailed)	0.208	0.388	0.072	0.105	0.293	0.386	0.002	0.668
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	0.020	0.383	0.284	0.365	0.243	-0.155	0.047	-0.168
MG-AM	Sig. (2-tailed)	0.959	0.308	0.459	0.334	0.528	0.690	0.905	0.665
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.100	-0.269	-0.313	-0.142	-0.342	-0.092	-0.296	-0.132
MG-IJ	Sig. (2-tailed)	0.799	0.483	0.412	0.715	0.368	0.813	0.439	0.734
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.544	-0.332	-0.642	-0.485	-0.393	-0.085	-.711	-0.026
MG-ID	Sig. (2-tailed)	0.130	0.383	0.062	0.186	0.295	0.828	0.032	0.948
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	0.300	-0.322	-0.581	-.760	-0.449	-0.068	-0.397	0.409
AD-IN	Sig. (2-tailed)	0.471	0.437	0.131	0.029	0.265	0.872	0.331	0.314
	N	8	8	8	8	8	8	8	8
WTMST	Pearson's r	-0.221	0.545	0.469	0.469	0.451	-0.120	-0.051	-0.413

		PBL1	PBL2	PBL3	PBL4	PBL5	PBL6	PBL7	PBL8
AD-AM	Sig. (2-tailed)	0.568	0.129	0.203	0.203	0.223	0.759	0.896	0.270
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-.676	-.683	-0.634	-.845	-.845	-0.648	-0.439	-0.392
AD-ID	Sig. (2-tailed)	0.046	0.043	0.067	0.004	0.004	0.059	0.237	0.296
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.193	-0.480	-0.375	-0.375	-0.518	-0.281	-0.656	-0.399
AD-IJ	Sig. (2-tailed)	0.619	0.191	0.319	0.319	0.154	0.463	0.055	0.287
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	-0.450	-0.175	-0.191	-0.136	-0.273	-0.483	-0.472	-0.560
AD-EX	Sig. (2-tailed)	0.224	0.653	0.623	0.726	0.478	0.188	0.199	0.117
	N	9	9	9	9	9	9	9	9
WTMST	Pearson's r	0.025	0.113	0.617	0.493	0.188	-0.116	0.240	-0.484
ED-ID	Sig. (2-tailed)	0.946	0.756	0.057	0.147	0.604	0.750	0.505	0.156
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-0.325	-0.275	-0.088	-0.014	-0.270	-0.542	-0.190	-0.516
EV-EX	Sig. (2-tailed)	0.360	0.442	0.808	0.969	0.451	0.106	0.600	0.127
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-.673	-0.349	-0.486	-0.416	-0.493	-.757	-0.252	-0.283
EV-AM	Sig. (2-tailed)	0.033	0.323	0.155	0.232	0.148	0.011	0.482	0.428
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-0.302	-0.402	-0.080	-0.062	-0.362	-0.536	-0.242	-0.547
EV-IJ	Sig. (2-tailed)	0.397	0.250	0.827	0.866	0.304	0.110	0.501	0.102
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	0.043	0.136	-0.149	-0.102	0.169	-0.160	0.365	0.427
EV-IN	Sig. (2-tailed)	0.906	0.708	0.681	0.779	0.641	0.658	0.299	0.219
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	0.123	0.389	0.578	0.574	0.287	-0.157	0.277	-0.207
TE-ID	Sig. (2-tailed)	0.735	0.266	0.080	0.082	0.421	0.665	0.439	0.566
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-0.441	-0.282	-0.243	-0.093	-0.347	-0.387	-0.385	-0.372
TE-EX	Sig. (2-tailed)	0.202	0.430	0.499	0.799	0.326	0.269	0.272	0.290
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-.638	-0.424	-0.484	-0.470	-0.498	-.662	-0.581	-0.387
TE-AM	Sig. (2-tailed)	0.047	0.222	0.156	0.171	0.143	0.037	0.078	0.269
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	0.223	0.351	0.317	0.385	0.209	-0.083	-0.026	-0.051
TE-IN	Sig. (2-tailed)	0.535	0.320	0.373	0.272	0.562	0.820	0.942	0.889

		PBL1	PBL2	PBL3	PBL4	PBL5	PBL6	PBL7	PBL8
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-0.470	-0.226	-0.288	-0.133	-0.263	-0.202	-0.532	-0.246
TE-IJ	Sig. (2-tailed)	0.170	0.530	0.420	0.713	0.462	0.575	0.114	0.493
	N	10	10	10	10	10	10	10	10
WTMST	Pearson's r	-0.442	-0.314	-0.238	-0.175	-0.467	-0.476	-0.165	-0.299
PR-IJ	Sig. (2-tailed)	0.173	0.346	0.481	0.607	0.148	0.139	0.627	0.372
	N	11	11	11	11	11	11	11	11
WTMST	Pearson's r	-0.225	0.187	0.150	0.311	0.008	0.011	0.095	-0.143
PR-EX	Sig. (2-tailed)	0.507	0.582	0.660	0.351	0.982	0.975	0.780	0.674
	N	11	11	11	11	11	11	11	11
WTMST	Pearson's r	0.573	0.560	0.556	0.549	0.493	0.329	0.288	0.219
PR-ID	Sig. (2-tailed)	0.065	0.073	0.076	0.081	0.123	0.324	0.391	0.518
	N	11	11	11	11	11	11	11	11
WTMST	Pearson's r	-0.199	0.302	0.004	0.120	0.095	0.201	-0.544	-0.010
PR-AM	Sig. (2-tailed)	0.557	0.368	0.990	0.726	0.780	0.554	0.084	0.976
	N	11	11	11	11	11	11	11	11
WTMST	Pearson's r	.669	0.491	0.161	0.259	0.556	0.332	0.150	0.527
PR-IN	Sig. (2-tailed)	0.034	0.150	0.657	0.471	0.095	0.349	0.679	0.118
	N	10	10	10	10	10	10	10	10

There was a strong correlation (.889) between "introjected regulation for teaching" and "extrinsic motivation for teaching." Similarly, there was a high correlation (.921) between "introjected regulation for classroom preparation" and "extrinsic motivation for teaching." This suggests teachers who are motivated by external punishments and rewards are also more likely to be motivated by guilt avoidance. Teachers with a high motivation to teach were also highly correlated with amotivation for classroom management.

There was also a strong correlation between intrinsic motivation for teaching and identified regulation for teaching (.838) and identified regulation for class preparation. This suggests that teachers who find inherent enjoyment in teaching also engage in classroom preparation and teaching in order to accomplish an objective and fulfill a specific purpose. The

following table addresses the relationship between “motivation for classroom management” at the additive level with other additive classroom management scales on the WTMST.

Table 20

The Correlation of Additive Complementary Tasks Scales with Other WTMST Scales

		WTMST CO-IN	WTMST CO-AM	WTMST CO-EX	WTMST CO-ID	WTMST CO-IJ
WTMST CO-IN	Pearson's r	1	-0.72	-0.681	0.956	-0.040
	Sig. (2-tailed)		0.029	0.043	0.000	0.919
	N	9	9	9	9	9
WTMST CO-AM	Pearson's r	-0.72	1	.738	-.854	0.249
	Sig. (2-tailed)	0.029		0.023	0.003	0.518
	N	9	9	9	9	9
WTMST CO-EX	Pearson's r	-0.681	.738	1	-.707	0.184
	Sig. (2-tailed)	0.043	0.023		0.033	0.635
	N	9	9	9	9	9
WTMST CO-ID	Pearson's r	0.956	-.854	-.707	1	-0.103
	Sig. (2-tailed)	0.000	0.003	0.033		0.792
	N	9	9	9	9	9
WTMST CO-IJ	Pearson's r	-0.040	0.249	0.184	-0.103	1
	Sig. (2-tailed)	0.919	0.518	0.635	0.792	
	N	9	9	9	9	9
WTMST MG-IN	Pearson's r	0.267	-0.196	-0.058	0.179	0.526
	Sig. (2-tailed)	0.487	0.614	0.882	0.644	0.146
	N	9	9	9	9	9
WTMST MG-EX	Pearson's r	-0.250	0.289	0.407	-0.255	.775
	Sig. (2-tailed)	0.516	0.451	0.277	0.508	0.014
	N	9	9	9	9	9
WTMST MG-AM	Pearson's r	-0.642	0.392	0.000	-0.554	-0.016
	Sig. (2-tailed)	0.062	0.297	1.000	0.122	0.968
	N	9	9	9	9	9
WTMST MG-IJ	Pearson's r	-0.069	0.005	0.058	0.040	0.309
	Sig. (2-tailed)	0.859	0.989	0.882	0.918	0.419
	N	9	9	9	9	9
WTMST MG-ID	Pearson's r	-0.025	-0.053	0.330	0.028	0.455
	Sig. (2-tailed)	0.949	0.893	0.387	0.943	0.218

		WTMST CO-IN	WTMST CO-AM	WTMST CO-EX	WTMST CO-ID	WTMST CO-IJ
	N	9	9	9	9	9
WTMST AD-IN	Pearson's r	0.733	-0.373	-0.572	0.649	0.598
	Sig. (2-tailed)	0.039	0.363	0.139	0.082	0.118
	N	8	8	8	8	8
WTMST AD-AM	Pearson's r	-0.717	.746	.748	-.670	-0.014
	Sig. (2-tailed)	0.030	0.021	0.020	0.048	0.972
	N	9	9	9	9	9
WTMST AD-ID	Pearson's r	0.151	-0.355	0.000	0.241	0.597
	Sig. (2-tailed)	0.698	0.349	1.000	0.532	0.090
	N	9	9	9	9	9
WTMST AD-IJ	Pearson's r	-0.179	0.118	0.147	-0.120	0.547
	Sig. (2-tailed)	0.645	0.763	0.706	0.758	0.127
	N	9	9	9	9	9
WTMST AD-EX	Pearson's r	-0.691	0.463	0.464	-0.583	0.475
	Sig. (2-tailed)	0.039	0.210	0.208	0.100	0.196
	N	9	9	9	9	9
WTMST EV-ID	Pearson's r	-0.272	0.326	0.493	-0.288	-0.138
	Sig. (2-tailed)	0.479	0.392	0.178	0.453	0.723
	N	9	9	9	9	9
WTMST EV-EX	Pearson's r	-0.519	0.447	0.512	-0.470	0.558
	Sig. (2-tailed)	0.152	0.228	0.159	0.202	0.119
	N	9	9	9	9	9
WTMST EV-AM	Pearson's r	-0.377	0.069	0.145	-0.295	0.647
	Sig. (2-tailed)	0.318	0.860	0.710	0.441	0.060
	N	9	9	9	9	9
WTMST EV-IJ	Pearson's r	-0.367	0.309	0.442	-0.352	0.601
	Sig. (2-tailed)	0.332	0.419	0.234	0.353	0.087
	N	9	9	9	9	9
WTMST EV-IN	Pearson's r	0.205	0.142	0.074	0.081	0.242
	Sig. (2-tailed)	0.597	0.715	0.851	0.835	0.531
	N	9	9	9	9	9
WTMST TE-ID	Pearson's r	-0.404	0.467	0.244	-0.351	0.118
	Sig. (2-tailed)	0.281	0.205	0.527	0.354	0.763

		WTMST CO-IN	WTMST CO-AM	WTMST CO-EX	WTMST CO-ID	WTMST CO-IJ
	N	9	9	9	9	9
WTMST TE-EX	Pearson's r	-0.297	0.233	0.500	-0.211	0.597
	Sig. (2-tailed)	0.437	0.547	0.170	0.586	0.090
	N	9	9	9	9	9
WTMST TE-AM	Pearson's r	-0.391	0.179	0.286	-0.370	.718
	Sig. (2-tailed)	0.298	0.645	0.455	0.327	0.029
	N	9	9	9	9	9
WTMST TE-IN	Pearson's r	-0.358	0.417	0.011	-0.310	0.278
	Sig. (2-tailed)	0.345	0.265	0.977	0.417	0.469
	N	9	9	9	9	9
WTMST TE-IJ	Pearson's r	-0.172	0.193	0.576	-0.130	0.525
	Sig. (2-tailed)	0.657	0.618	0.105	0.739	0.147
	N	9	9	9	9	9
WTMST PR-IJ	Pearson's r	-0.032	0.078	0.388	0.048	0.646
	Sig. (2-tailed)	0.935	0.842	0.302	0.903	0.060
	N	9	9	9	9	9
WTMST PR-EX	Pearson's r	-0.059	-0.161	0.181	0.169	-0.095
	Sig. (2-tailed)	0.879	0.679	0.641	0.664	0.807
	N	9	9	9	9	9
WTMST PR-ID	Pearson's r	0.122	0.214	-0.164	0.110	-0.153
	Sig. (2-tailed)	0.754	0.580	0.674	0.779	0.695
	N	9	9	9	9	9
WTMST PR-AM	Pearson's r	-0.376	0.027	-0.040	-0.237	-0.029
	Sig. (2-tailed)	0.319	0.944	0.918	0.538	0.941
	N	9	9	9	9	9
WTMST PR-IN	Pearson's r	0.047	0.159	-0.472	-0.030	-0.086
	Sig. (2-tailed)	0.912	0.707	0.237	0.943	0.839
	N	8	8	8	8	8

Next, the correlations were computed between the Classroom Management scale and all other WTMST scales. Note that the correlation between Classroom Management and

Complementary Tasks can be found in Table 20. It was not included in the following table in order to avoid redundancy.

Table 21

The Correlation of Additive Motivation for Classroom Management Scales with Other WTMST Scales

		WTMST MG-IN	WTMST MG-EX	WTMST MG-AM	WTMST MG-IN	WTMST MG-ID
WTMST	Pearson's r	1	0.168	-0.459	-0.010	0.081
MG-IN	Sig. (2-tailed)		0.666	0.214	0.979	0.835
	N	9	9	9	9	9
WTMST	Pearson's r	0.168	1	-0.075	0.362	.855
MG-EX	Sig. (2-tailed)	0.666		0.849	0.339	0.003
	N	9	9	9	9	9
WTMST	Pearson's r	-0.459	-0.075	1	0.213	-0.387
MG-AM	Sig. (2-tailed)	0.214	0.849		0.583	0.304
	N	9	9	9	9	9
WTMST	Pearson's r	-0.010	0.362	0.213	1	0.343
MG-IJ	Sig. (2-tailed)	0.979	0.339	0.583		0.365
	N	9	9	9	9	9
WTMST	Pearson's r	0.081	.855	-0.387	0.343	1
MG-ID	Sig. (2-tailed)	0.835	0.003	0.304	0.365	
	N	9	9	9	9	9
WTMST	Pearson's r	0.410	0.301	-0.318	-0.082	0.168
AD-IN	Sig. (2-tailed)	0.313	0.469	0.443	0.847	0.691
	N	8	8	8	8	8
WTMST	Pearson's r	-0.585	0.212	0.479	0.165	0.052
AD-AM	Sig. (2-tailed)	0.098	0.583	0.192	0.671	0.894
	N	9	9	9	9	9
WTMST	Pearson's r	0.555	0.539	-0.302	-0.010	0.514
AD-ID	Sig. (2-tailed)	0.120	0.134	0.430	0.980	0.157
	N	9	9	9	9	9
WTMST	Pearson's r	0.263	0.620	0.135	.835	0.468
AD-IJ	Sig. (2-tailed)	0.494	0.075	0.729	0.005	0.204
	N	9	9	9	9	9
WTMST	Pearson's r	-0.060	0.597	0.575	.684	0.343
AD-EX	Sig. (2-tailed)	0.879	0.089	0.105	0.042	0.366
	N	9	9	9	9	9
WTMST	Pearson's r	0.224	-0.154	-0.099	0.070	-0.214
EV-ID	Sig. (2-tailed)	0.563	0.692	0.799	0.858	0.580
	N	9	9	9	9	9
WTMST	Pearson's r	0.292	0.486	0.322	.722	0.242
EV-EX	Sig. (2-tailed)	0.445	0.184	0.398	0.028	0.531
	N	9	9	9	9	9
WTMST	Pearson's r	0.302	0.525	0.321	-0.012	0.291
EV-AM	Sig. (2-tailed)	0.430	0.147	0.399	0.975	0.447
	N	9	9	9	9	9
WTMST	Pearson's r	0.567	0.511	0.064	0.568	0.289
EV-IJ	Sig. (2-tailed)	0.111	0.160	0.871	0.111	0.451
	N	9	9	9	9	9

		WTMST MG-IN	WTMST MG-EX	WTMST MG-AM	WTMST MG-IN	WTMST MG-ID
WTMST	Pearson's r	0.100	-0.071	-0.178	-0.448	-0.133
EV-IN	Sig. (2-tailed)	0.798	0.856	0.647	0.227	0.732
	N	9	9	9	9	9
WTMST	Pearson's r	-0.187	-0.122	0.644	0.357	-0.446
TE-ID	Sig. (2-tailed)	0.630	0.754	0.061	0.345	0.229
	N	9	9	9	9	9
WTMST	Pearson's r	0.212	.724	0.021	.794	0.646
TE-EX	Sig. (2-tailed)	0.584	0.028	0.957	0.011	0.060
	N	9	9	9	9	9
WTMST	Pearson's r	0.406	.754	0.094	-0.043	0.520
TE-AM	Sig. (2-tailed)	0.279	0.019	0.809	0.913	0.152
	N	9	9	9	9	9
WTMST	Pearson's r	-0.302	0.112	.791	0.585	-0.246
TE-IN	Sig. (2-tailed)	0.430	0.775	0.011	0.098	0.523
	N	9	9	9	9	9
WTMST	Pearson's r	0.153	.837	-0.312	0.539	.886
TE-IJ	Sig. (2-tailed)	0.694	0.005	0.414	0.134	0.001
	N	9	9	9	9	9
WTMST	Pearson's r	0.355	0.569	-0.127	.723	0.511
PR-IJ	Sig. (2-tailed)	0.348	0.110	0.745	0.028	0.160
	N	9	9	9	9	9
WTMST	Pearson's r	-0.415	0.119	0.143	0.654	0.297
PR-EX	Sig. (2-tailed)	0.266	0.760	0.713	0.056	0.438
	N	9	9	9	9	9
WTMST	Pearson's r	-0.450	-0.353	0.395	0.340	-0.504
PR-ID	Sig. (2-tailed)	0.224	0.352	0.292	0.371	0.167
	N	9	9	9	9	9
WTMST	Pearson's r	-0.591	0.414	0.468	0.140	0.384
PR-AM	Sig. (2-tailed)	0.094	0.268	0.204	0.719	0.308
	N	9	9	9	9	9
WTMST	Pearson's r	-0.483	-0.339	0.595	-0.228	-0.615
PR-IN	Sig. (2-tailed)	0.225	0.412	0.120	0.587	0.104
	N	8	8	8	8	8

The correlations were computed between the additive Administrative Tasks scale and all other WTMST scales. Note that the correlation between Administrative Tasks and Complementary Tasks can be found in Table 20. The correlations between Administrative Tasks and Classroom Management can be found in Table 21. These correlations were not included in the following table in order to avoid redundancy.

Table 22

The Correlation of Additive Motivation for Administrative Tasks Scales with Other WTMST Scales

		WTMST AD-IN	WTMST AD-AM	WTMST AD-ID	WTMST AD-IJ	WTMST AD-EX
WTMST AD-IN	Pearson's r	1	-0.539	0.625	0.071	-0.282
	Sig. (2-tailed)		0.168	0.098	0.867	0.499
	N	8	8	8	8	8
WTMST AD-AM	Pearson's r	-0.539	1	-0.254	0.111	0.562
	Sig. (2-tailed)	0.168		0.509	0.776	0.116
	N	8	9	9	9	9
WTMST AD-ID	Pearson's r	0.625	-0.254	1	0.295	0.175
	Sig. (2-tailed)	0.098	0.509		0.441	0.652
	N	8	9	9	9	9
WTMST AD-IJ	Pearson's r	0.071	0.111	0.295	1	.777
	Sig. (2-tailed)	0.867	0.776	0.441		0.014
	N	8	9	9	9	9
WTMST AD-EX	Pearson's r	-0.282	0.562	0.175	.777	1
	Sig. (2-tailed)	0.499	0.116	0.652	0.014	
	N	8	9	9	9	9
WTMST EV-ID	Pearson's r	-0.436	0.354	-0.035	0.257	0.200
	Sig. (2-tailed)	0.281	0.350	0.930	0.505	0.605
	N	8	9	9	9	9
WTMST EV-EX	Pearson's r	-0.238	0.401	0.184	.803	.880
	Sig. (2-tailed)	0.571	0.285	0.636	0.009	0.002
	N	8	9	9	9	9
WTMST EV-AM	Pearson's r	0.302	0.038	.678	0.176	0.470
	Sig. (2-tailed)	0.468	0.922	0.045	0.650	0.201
	N	8	9	9	9	9
WTMST EV-IJ	Pearson's r	-0.090	0.170	0.395	.822	.732
	Sig. (2-tailed)	0.832	0.663	0.293	0.007	0.025
	N	8	9	9	9	9
WTMST EV-IN	Pearson's r	0.323	-0.056	-0.005	-0.609	-0.422
	Sig. (2-tailed)	0.435	0.887	0.989	0.082	0.258
	N	8	9	9	9	9
WTMST TE-ID	Pearson's r	-0.242	0.623	-0.173	0.309	0.545
	Sig. (2-tailed)	0.563	0.073	0.656	0.418	0.129
	N	8	9	9	9	9
WTMST TE-EX	Pearson's r	-0.075	0.347	0.382	.862	.810
	Sig. (2-tailed)	0.860	0.360	0.310	0.003	0.008
	N	8	9	9	9	9
WTMST TE-AM	Pearson's r	0.406	0.039	.757	0.352	0.492
	Sig. (2-tailed)	0.318	0.921	0.018	0.352	0.178
	N	8	9	9	9	9
WTMST TE-IN	Pearson's r	-0.032	0.490	-0.235	0.498	.674
	Sig. (2-tailed)	0.941	0.181	0.542	0.172	0.046
	N	8	9	9	9	9

		WTMST AD-IN	WTMST AD-AM	WTMST AD-ID	WTMST AD-IJ	WTMST AD-EX
WTMST	Pearson's r	-0.004	0.300	0.441	.674	0.559
TE-IJ	Sig. (2-tailed)	0.993	0.433	0.234	0.047	0.118
	N	8	9	9	9	9
WTMST	Pearson's r	0.127	0.219	0.476	.714	0.607
PR-IJ	Sig. (2-tailed)	0.765	0.571	0.195	0.031	0.083
	N	8	9	9	9	9
WTMST	Pearson's r	-0.263	0.453	0.080	0.379	0.444
PR-EX	Sig. (2-tailed)	0.529	0.221	0.837	0.315	0.231
	N	8	9	9	9	9
WTMST	Pearson's r	0.083	0.360	-0.548	0.081	0.075
PR-ID	Sig. (2-tailed)	0.846	0.341	0.127	0.835	0.848
	N	8	9	9	9	9
WTMST	Pearson's r	-0.075	0.322	0.113	0.246	0.438
PR-AM	Sig. (2-tailed)	0.861	0.398	0.772	0.524	0.239
	N	8	9	9	9	9
WTMST	Pearson's r	0.261	0.015	-0.486	-0.379	-0.192
PR-IN	Sig. (2-tailed)	0.571	0.972	0.222	0.354	0.649
	N	7	8	8	8	8

The correlations were computed between the additive Evaluation of Students scales and all other WTMST scales. Note that the correlation between Evaluation of Students and Complementary Tasks can be found in Table 20. The correlations between Evaluation of Students and Classroom Management can be found in Table 21. The correlations between Evaluation of Students and Administrative Tasks can be found in Table 22. These correlations were not included in the following table in order to avoid redundancy.

Table 23

The Correlation of Additive Motivation for Evaluation of Students Scales with Other WTMST Scales

		WTMST EV-ID	WTMST EV-EX	WTMST EV-AM	WTMST EV-IJ	WTMST EV-IN
WTMST	Pearson's r	1	0.511	-0.170	.658	-0.279
EV-ID	Sig. (2-tailed)		0.131	0.638	0.039	0.435
	N	10	10	10	10	10
WTMST	Pearson's r	0.511	1	0.375	.922	-0.247
EV-EX	Sig. (2-tailed)	0.131		0.286	0.000	0.492
	N	10	10	10	10	10
WTMST	Pearson's r	-0.170	0.375	1	0.360	0.237
EV-AM	Sig. (2-tailed)	0.638	0.286		0.306	0.509
	N	10	10	10	10	10
WTMST	Pearson's r	.658	.922	0.360	1	-0.299
EV-IJ	Sig. (2-tailed)	0.039	0.000	0.306		0.402
	N	10	10	10	10	10
WTMST	Pearson's r	-0.279	-0.247	0.237	-0.299	1
EV-IN	Sig. (2-tailed)	0.435	0.492	0.509	0.402	
	N	10	10	10	10	10
WTMST	Pearson's r	.699	0.610	0.124	0.562	-0.048
TE-ID	Sig. (2-tailed)	0.025	0.061	0.732	0.091	0.896
	N	10	10	10	10	10
WTMST	Pearson's r	0.406	.883	0.332	.842	-0.271
TE-EX	Sig. (2-tailed)	0.244	0.001	0.348	0.002	0.449
	N	10	10	10	10	10
WTMST	Pearson's r	-0.027	0.393	.876	0.490	0.022
TE-AM	Sig. (2-tailed)	0.941	0.262	0.001	0.151	0.953
	N	10	10	10	10	10
WTMST	Pearson's r	0.302	0.625	0.170	0.454	-0.155
TE-IN	Sig. (2-tailed)	0.397	0.054	0.638	0.187	0.670
	N	10	10	10	10	10
WTMST	Pearson's r	0.314	0.615	0.226	.646	-0.194
TE-IJ	Sig. (2-tailed)	0.378	0.059	0.530	0.044	0.592
	N	10	10	10	10	10
WTMST	Pearson's r	0.376	.804	0.326	.773	-0.040
PR-IJ	Sig. (2-tailed)	0.284	0.005	0.358	0.009	0.913
	N	10	10	10	10	10
WTMST	Pearson's r	0.352	0.440	-0.001	0.319	-0.260
PR-EX	Sig. (2-tailed)	0.318	0.204	0.997	0.370	0.467
	N	10	10	10	10	10
WTMST	Pearson's r	0.330	0.191	-0.402	0.055	-0.005
PR-ID	Sig. (2-tailed)	0.352	0.596	0.250	0.880	0.990
	N	10	10	10	10	10
WTMST	Pearson's r	-0.264	-0.031	0.257	-0.113	-0.473
PR-AM	Sig. (2-tailed)	0.460	0.933	0.474	0.757	0.168
	N	10	10	10	10	10

		WTMST EV-ID	WTMST EV-EX	WTMST EV-AM	WTMST EV-IJ	WTMST EV-IN
WTMST PR-IN	Pearson's r	-0.329	-0.324	-0.010	-0.450	0.363
	Sig. (2-tailed)	0.387	0.395	0.980	0.225	0.337
	N	9	9	9	9	9

The correlations were computed between the additive Motivation for Teaching scales and all other WTMST scales. Note that the correlation between Motivation for Teaching and Complementary Tasks can be found in Table 20. The correlations between Motivation for Teaching and Classroom Management can be found in Table 21. The correlations between Motivation for Teaching and Administrative Tasks can be found in Table 22. The correlation between Motivation for Teaching and Evaluation of Students can be found in Table 23. These correlations were not included in the following table in order to avoid redundancy.

Table 24

The Correlation of Additive Motivation for Teaching Scales with Other WTMST Scales

		WTMST TE-ID	WTMST TE-EX	WTMST TE-AM	WTMST TE-IN	WTMST TE-IJ
WTMST	Pearson's r	1	0.439	0.006	.838	0.158
TE-ID	Sig. (2-tailed)		0.204	0.988	0.002	0.663
	N	10	10	10	10	10
WTMST	Pearson's r	0.439	1	0.428	0.454	.889
TE-EX	Sig. (2-tailed)	0.204		0.218	0.188	0.001
	N	10	10	10	10	10
WTMST	Pearson's r	0.006	0.428	1	0.029	0.457
TE-AM	Sig. (2-tailed)	0.988	0.218		0.937	0.184
	N	10	10	10	10	10
WTMST	Pearson's r	.838	0.454	0.029	1	0.117
TE-IN	Sig. (2-tailed)	0.002	0.188	0.937		0.747
	N	10	10	10	10	10
WTMST	Pearson's r	0.158	.889	0.457	0.117	1
TE-IJ	Sig. (2-tailed)	0.663	0.001	0.184	0.747	
	N	10	10	10	10	10
WTMST	Pearson's r	0.442	.921	0.328	0.393	.786
PR-IJ	Sig. (2-tailed)	0.200	0.000	0.355	0.262	0.007
	N	10	10	10	10	10
WTMST	Pearson's r	0.548	0.625	-0.126	0.471	0.510
PR-EX	Sig. (2-tailed)	0.101	0.053	0.729	0.170	0.132
	N	10	10	10	10	10
WTMST	Pearson's r	.719	0.087	-0.548	.758	-0.135
PR-ID	Sig. (2-tailed)	0.019	0.812	0.101	0.011	0.710
	N	10	10	10	10	10
WTMST	Pearson's r	-0.017	0.126	0.338	0.243	0.191
PR-AM	Sig. (2-tailed)	0.962	0.728	0.340	0.499	0.598
	N	10	10	10	10	10
WTMST	Pearson's r	0.270	-0.462	-0.227	0.487	-0.602
PR-IN	Sig. (2-tailed)	0.482	0.211	0.557	0.183	0.086
	N	9	9	9	9	9

Finally, the correlations were computed between the additive Classroom Preparation scales and all other WTMST scales. Note that the correlation between Classroom Preparation and Complementary Tasks can be found in Table 20. The correlations between Classroom Preparation and Classroom Management can be found in Table 21. The correlations between Classroom Preparation and Administrative Tasks can be found in Table 22. The correlation between Classroom Preparation and Evaluation of Students can be found in Table 23. The

correlation between Classroom Preparation and Motivation for Teaching can be found in Table 24. These correlations were not included in the following table in order to avoid redundancy.

Table 25

The Correlation of Additive Classroom Preparation Scales with Other WTMST Scales

		WTMST PR-IJ	WTMST PR-EX	WTMST PR-ID	WTMST PR-AM	WTMST PR-IN
WTMST PR-IJ	Pearson's r	1	.605	0.156	-0.143	-0.480
	Sig. (2-tailed)		0.048	0.647	0.675	0.161
	N	11	11	11	11	10
WTMST PR-EX	Pearson's r	.605	1	0.446	0.255	-0.151
	Sig. (2-tailed)	0.048		0.170	0.450	0.677
	N	11	11	11	11	10
WTMST PR-ID	Pearson's r	0.156	0.446	1	-0.070	0.517
	Sig. (2-tailed)	0.647	0.170		0.839	0.126
	N	11	11	11	11	10
WTMST PR-AM	Pearson's r	-0.143	0.255	-0.070	1	0.178
	Sig. (2-tailed)	0.675	0.450	0.839		0.622
	N	11	11	11	11	10
WTMST PR-IN	Pearson's r	-0.480	-0.151	0.517	0.178	1
	Sig. (2-tailed)	0.161	0.677	0.126	0.622	
	N	10	10	10	10	10

The correlation between teacher motivation and teacher self-efficacy. There was a strong positive association (.727) between teacher amotivation for classroom management and teacher self-efficacy for instructional strategies, which echoes the trend of teacher amotivation for classroom management and intrinsic motivation for teaching.

There was a strong negative correlation between self-efficacy in classroom management and intrinsic motivation for administrative tasks (-.873) as well as identified regulation for administrative tasks (-.873). This suggests that those who have the strongest perception of their

ability to manage a classroom are also the least likely to find enjoyment or see the purpose in engaging in administrative tasks. Finally, there was a moderate association between self-efficacy in teaching strategies and both intrinsic motivation (.511) and identified regulation (.560) in teaching.

Table 26

The Correlation Between Teacher Efficacy and Motivation

		TSES-SE	TSES-CM	TSES-IS
WTMST CO-IN	Pearson's r	-0.339	-0.340	-0.557
	Sig. (2-tailed)	0.372	0.371	0.120
	N	9	9	9
WTMST CO-AM	Pearson's r	0.464	0.494	0.427
	Sig. (2-tailed)	0.209	0.177	0.251
	N	9	9	9
WTMST CO-EX	Pearson's r	0.029	0.296	0.116
	Sig. (2-tailed)	0.941	0.439	0.767
	N	9	9	9
WTMST CO-ID	Pearson's r	-0.457	-0.396	-0.565
	Sig. (2-tailed)	0.216	0.291	0.113
	N	9	9	9
WTMST CO-IJ	Pearson's r	0.018	-0.566	-0.057
	Sig. (2-tailed)	0.963	0.112	0.884
	N	9	9	9
WTMST MG-IN	Pearson's r	0.090	-0.461	-0.105
	Sig. (2-tailed)	0.818	0.212	0.789
	N	9	9	9
WTMST MG-EX	Pearson's r	-0.338	-0.452	-0.351
	Sig. (2-tailed)	0.374	0.222	0.354
	N	9	9	9
WTMST MG-AM	Pearson's r	0.466	0.276	.727
	Sig. (2-tailed)	0.206	0.473	0.026
	N	9	9	9
WTMST MG-IJ	Pearson's r	-0.521	0.138	-0.108
	Sig. (2-tailed)	0.150	0.723	0.783
	N	9	9	9
WTMST MG-ID	Pearson's r	-.729	-0.453	-0.618
	Sig. (2-tailed)	0.026	0.221	0.076
	N	9	9	9
WTMST AD-IN	Pearson's r	-0.022	-.873	-0.395
	Sig. (2-tailed)	0.959	0.005	0.332
	N	8	8	8
WTMST AD-AM	Pearson's r	0.166	0.488	0.266
	Sig. (2-tailed)	0.670	0.183	0.489
	N	9	9	9
WTMST AD-ID	Pearson's r	-0.166	-.870	-0.387
	Sig. (2-tailed)	0.669	0.002	0.303
	N	9	9	9
WTMST AD-IJ	Pearson's r	-0.316	-0.049	-0.257
	Sig. (2-tailed)	0.407	0.900	0.504
	N	9	9	9
WTMST	Pearson's r	-0.049	0.064	0.221

		TSES-SE	TSES-CM	TSES-IS
AD-EX	Sig. (2-tailed)	0.899	0.871	0.568
	N	9	9	9
WTMST	Pearson's r	0.366	0.572	0.174
EV-ID	Sig. (2-tailed)	0.298	0.084	0.631
	N	10	10	10
WTMST	Pearson's r	0.063	0.207	0.312
EV-EX	Sig. (2-tailed)	0.862	0.567	0.380
	N	10	10	10
WTMST	Pearson's r	0.199	-0.613	0.340
EV-AM	Sig. (2-tailed)	0.582	0.060	0.336
	N	10	10	10
WTMST	Pearson's r	0.122	0.109	0.161
EV-IJ	Sig. (2-tailed)	0.736	0.765	0.657
	N	10	10	10
WTMST	Pearson's r	0.233	-0.217	0.322
EV-IN	Sig. (2-tailed)	0.518	0.547	0.364
	N	10	10	10
WTMST	Pearson's r	0.516	0.515	0.560
TE-ID	Sig. (2-tailed)	0.127	0.128	0.092
	N	10	10	10
WTMST	Pearson's r	-0.307	0.027	-0.061
TE-EX	Sig. (2-tailed)	0.388	0.942	0.866
	N	10	10	10
WTMST	Pearson's r	0.136	-0.595	0.035
TE-AM	Sig. (2-tailed)	0.709	0.070	0.924
	N	10	10	10
WTMST	Pearson's r	0.358	0.399	0.511
TE-IN	Sig. (2-tailed)	0.310	0.253	0.131
	N	10	10	10
WTMST	Pearson's r	-0.476	-0.080	-0.365
TE-IJ	Sig. (2-tailed)	0.164	0.825	0.299
	N	10	10	10
WTMST	Pearson's r	-0.312	-0.131	-0.100
PR-IJ	Sig. (2-tailed)	0.351	0.702	0.769
	N	11	11	11
WTMST	Pearson's r	-0.346	0.257	-0.008
PR-EX	Sig. (2-tailed)	0.298	0.445	0.982
	N	11	11	11
WTMST	Pearson's r	0.273	0.596	0.280
PR-ID	Sig. (2-tailed)	0.417	0.053	0.404
	N	11	11	11
WTMST	Pearson's r	-0.162	-0.120	-0.142
PR-AM	Sig. (2-tailed)	0.634	0.725	0.676
	N	11	11	11
WTMST	Pearson's r	0.537	0.246	.670
PR-IN	Sig. (2-tailed)	0.110	0.493	0.034
	N	10	10	10

Correlations for Research Question 2

The second research question focused on the correlations between teacher self-efficacy, teacher motivation, PBL methods, and demographic variables. All nine participants identified as white, which meant it was impossible to gather sufficient data on the relationship between race / ethnicity and PBL implementation, teacher self-efficacy, and teacher motivation. Gender was related to “solved real world problems” such that male teachers more often encouraged students to solve real world problems while female teachers less often did so. However, there was a stronger correlation for women (-.369) in “participated in community- or work-based projects or internships.” There was a strong correlation (.671) for men in teacher efficacy in student engagement. However, both of the male teachers also had the lowest teaching experience and there was a negative correlation (-0.377) between years taught and efficacy in student engagement.

Men also had a higher correlation (0.354) to teaching for identified regulation while women had a higher correlation to teaching for introjected regulation (-0.354). In other words, men were more closely associated with teaching out of a sense of purpose while women were more closely associated with teaching out of a sense of guilt.

Table 27

The Correlation Between Self-Efficacy, Motivation, PBL Methods, and Demographics

		Race / Ethnicity	Gender	Teaching Experience
PBL1	Pearson's r	.[a]	0.236	0.142
	Sig. (2-tailed)		0.541	0.715
	N	9	9	9
PBL2	Pearson's r	.[a]	0.403	.673
	Sig. (2-tailed)		0.282	0.047
	N	9	9	9
PBL3	Pearson's r	.[a]	0.661	0.463
	Sig. (2-tailed)		0.052	0.210
	N	9	9	9
PBL4	Pearson's r	.[a]	0.378	.676
	Sig. (2-tailed)		0.316	0.045
	N	9	9	9
PBL5	Pearson's r	.[a]	0.283	.700
	Sig. (2-tailed)		0.460	0.036
	N	9	9	9
PBL6	Pearson's r	.[a]	0.028	0.661
	Sig. (2-tailed)		0.943	0.052
	N	9	9	9
PBL7	Pearson's r	.[a]	-0.109	0.288
	Sig. (2-tailed)		0.780	0.453
	N	9	9	9
PBL8	Pearson's r	.[a]	-0.369	0.330
	Sig. (2-tailed)		0.328	0.385
	N	9	9	9
Race / Ethnicity	Pearson's r	.[a]	.[a]	.[a]
	Sig. (2-tailed)			
	N	9	9	9
Gender	Pearson's r	.[a]	1	-0.188
(Male / Female)	Sig. (2-tailed)			0.627
	N	9	9	9
Teaching Experience	Pearson's r	.[a]	-0.188	1
(Years)	Sig. (2-tailed)		0.627	
	N	9	9	9
Single or Multiple Subjects	Pearson's r	.[a]	-0.447	0.384
	Sig. (2-tailed)		0.267	0.348
	N	8	8	8
Grade Level	Pearson's r	.[a]	0.134	.705
	Sig. (2-tailed)		0.732	0.034
	N	9	9	9
Title One Status	Pearson's r	.[a]	0.189	0.249
	Sig. (2-tailed)		0.626	0.518
	N	9	9	9
TSES-SE	Pearson's r	.[a]	.671	-0.377
	Sig. (2-tailed)		0.048	0.318

		Race / Ethnicity	Gender	Teaching Experience
	N	9	9	9
TSES-CM	Pearson's r	.[a]	0.239	0.505
	Sig. (2-tailed)		0.536	0.166
	N	9	9	9
TSES-IS	Pearson's r	.[a]	0.140	-0.221
	Sig. (2-tailed)		0.719	0.568
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.295	0.014
CO-IN	Sig. (2-tailed)		0.441	0.972
	N	9	9	9
WTMST	Pearson's r	.[a]	0.250	0.094
CO-AM	Sig. (2-tailed)		0.517	0.810
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.072	0.283
CO-EX	Sig. (2-tailed)		0.854	0.460
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.287	0.018
CO-ID	Sig. (2-tailed)		0.453	0.962
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.183	-0.641
CO-IJ	Sig. (2-tailed)		0.638	0.063
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.276	-.685
MG-IN	Sig. (2-tailed)		0.472	0.042
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.199	-0.234
MG-EX	Sig. (2-tailed)		0.608	0.544
	N	9	9	9
WTMST	Pearson's r	.[a]	0.491	-0.239
MG-AM	Sig. (2-tailed)		0.180	0.536
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.280	-0.154
MG-IJ	Sig. (2-tailed)		0.466	0.692
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.466	0.101
MG-ID	Sig. (2-tailed)		0.207	0.796
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.045	-0.471
AD-IN	Sig. (2-tailed)		0.916	0.239
	N	8	8	8
WTMST	Pearson's r	.[a]	0.328	0.373
AD-AM	Sig. (2-tailed)		0.389	0.323
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.064	-0.545
AD-ID	Sig. (2-tailed)		0.870	0.129
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.015	-0.448
AD-IJ	Sig. (2-tailed)		0.969	0.227
	N	9	9	9

		Race / Ethnicity	Gender	Teaching Experience
WTMST	Pearson's r	.[a]	0.124	-0.337
AD-EX	Sig. (2-tailed)		0.751	0.376
	N	9	9	9
WTMST	Pearson's r	.[a]	0.386	-0.010
EV-ID	Sig. (2-tailed)		0.305	0.980
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.073	-0.431
EV-EX	Sig. (2-tailed)		0.853	0.246
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.041	-0.618
EV-AM	Sig. (2-tailed)	9	0.917	0.076
	N	.[a]	9	9
WTMST	Pearson's r		-0.013	-0.571
EV-IJ	Sig. (2-tailed)		0.974	0.108
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.390	0.096
EV-IN	Sig. (2-tailed)		0.300	0.805
	N	9	9	9
WTMST	Pearson's r	.[a]	0.532	-0.228
TE-ID	Sig. (2-tailed)		0.140	0.555
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.268	-0.224
TE-EX	Sig. (2-tailed)		0.485	0.563
	N	9	9	9
WTMST	Pearson's r	.[a]	0.052	-0.589
TE-AM	Sig. (2-tailed)		0.895	0.095
	N	9	9	9
WTMST	Pearson's r	.[a]	0.395	-0.306
TE-IN	Sig. (2-tailed)		0.293	0.424
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.354	0.049
TE-IJ	Sig. (2-tailed)		0.350	0.900
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.364	-0.274
PR-IJ	Sig. (2-tailed)		0.335	0.475
	N	9	9	9
WTMST	Pearson's r	.[a]	-0.103	0.295
PR-EX	Sig. (2-tailed)		0.793	0.441
	N	9	9	9
WTMST	Pearson's r	.[a]	0.347	0.155
PR-ID	Sig. (2-tailed)		0.360	0.690
	N	9	9	9
WTMST	Pearson's r	.[a]	0.386	0.075
PR-AM	Sig. (2-tailed)		0.305	0.848
	N	9	9	9
WTMST	Pearson's r	.[a]	0.316	-0.032
PR-IN	Sig. (2-tailed)		0.445	0.940
	N	8	8	8

	Race / Ethnicity	Gender	Teaching Experience

a. Cannot be computed because at least one of the variables is constant.

Correlations for Research Question 3

The third research question explored the correlation between teacher self-efficacy, teacher motivation, PBL methods, and school context variables. There was a moderate correlation (-.337) between single subject teachers and "collected, organized and analyzed information and data." Likewise, there was a significant positive correlation between grade levels and "collected, organized and analyzed information and data," (.701), "solved real world problems" (.707), and "decided how to present what they learned, evaluated and defended their ideas or views" (.884). Single subject teachers also had a higher correlation with identified regulation for teaching (-.821) and for intrinsic motivation in teaching (-.963). In general, the positive correlations of single subjects with PBL implementation methods also coincided with the positive correlations between grade level and PBL implementation. This is not surprising, given the fact that most of the single subject teachers also teach at the middle school and high school levels.

Because there was only one person who taught at a Title I school, there is not a sufficient enough sample to draw conclusions about the correlation between socioeconomic status and other key variables.

Table 28

The Correlation Between Teacher Self-Efficacy, Teacher Motivation, PBL Methods, and School Context Variables

		Single or Multiple Subjects	Grade Level	Title One Status
PBL1	Pearson's r	-0.293	0.354	.687
	Sig. (2-tailed)	0.482	0.351	0.041
	N	8	9	9
PBL2	Pearson's r	-0.337	.701	0.419
	Sig. (2-tailed)	0.414	0.035	0.261
	N	8	9	9
PBL3	Pearson's r	-0.200	.707	0.500
	Sig. (2-tailed)	0.635	0.033	0.170
	N	8	9	9
PBL4	Pearson's r	-0.200	.884	0.500
	Sig. (2-tailed)	0.635	0.002	0.170
	N	8	9	9
PBL5	Pearson's r	-0.174	.884	0.375
	Sig. (2-tailed)	0.680	0.002	0.320
	N	8	9	9
PBL6	Pearson's r	0.115	0.573	0.479
	Sig. (2-tailed)	0.785	0.106	0.192
	N	8	9	9
PBL7	Pearson's r	0.038	0.408	0.289
	Sig. (2-tailed)	0.929	0.275	0.451
	N	8	9	9
PBL8	Pearson's r	0.000	0.173	0.244
	Sig. (2-tailed)	1.000	0.657	0.526
	N	8	9	9
TSES-SE	Pearson's r	-0.425	0.187	-0.019
	Sig. (2-tailed)	0.294	0.630	0.962
	N	8	9	9
TSES-CM	Pearson's r	-0.258	.790	0.607
	Sig. (2-tailed)	0.537	0.011	0.083
	N	8	9	9
TSES-IS	Pearson's r	-0.556	0.310	-0.017
	Sig. (2-tailed)	0.152	0.417	0.966
	N	8	9	9
WTMST	Pearson's r	0.315	-0.377	0.323
CO-IN	Sig. (2-tailed)	0.448	0.318	0.396
	N	8	9	9
WTMST	Pearson's r	-0.516	0.403	-0.011
CO-AM	Sig. (2-tailed)	0.190	0.282	0.977
	N	8	9	9
WTMST	Pearson's r	0.303	0.269	-0.286
CO-EX	Sig. (2-tailed)	0.466	0.483	0.456
	N	8	9	9
WTMST	Pearson's r	0.295	-0.446	0.315

		Single or Multiple Subjects	Grade Level	Title One Status
CO-ID	Sig. (2-tailed)	0.478	0.229	0.409
	N	8	9	9
WTMST	Pearson's r	-0.226	-.736	-0.315
CO-IJ	Sig. (2-tailed)	0.591	0.024	0.410
	N	8	9	9
WTMST	Pearson's r	0.336	-0.581	-0.365
MG-IN	Sig. (2-tailed)	0.416	0.101	0.334
	N	8	9	9
WTMST	Pearson's r	0.026	-0.465	-0.460
MG-EX	Sig. (2-tailed)	0.952	0.207	0.212
	N	8	9	9
WTMST	Pearson's r	-.849	0.172	0.162
MG-AM	Sig. (2-tailed)	0.008	0.658	0.677
	N	8	9	9
WTMST	Pearson's r	-0.385	-0.322	0.399
MG-IJ	Sig. (2-tailed)	0.346	0.398	0.288
	N	8	9	9
WTMST	Pearson's r	0.408	-0.352	-0.459
MG-ID	Sig. (2-tailed)	0.315	0.353	0.214
	N	8	9	9
WTMST	Pearson's r	-0.058	-.737	.[a]
AD-IN	Sig. (2-tailed)	0.901	0.037	0.000
	N	7	8	8
WTMST	Pearson's r	-0.555	0.363	0.142
AD-AM	Sig. (2-tailed)	0.153	0.337	0.716
	N	8	9	9
WTMST	Pearson's r	0.286	-.837	-0.592
AD-ID	Sig. (2-tailed)	0.493	0.005	0.093
	N	8	9	9
WTMST	Pearson's r	-0.275	-0.488	0.101
AD-IJ	Sig. (2-tailed)	0.510	0.183	0.795
	N	8	9	9
WTMST	Pearson's r	-0.516	-0.231	-0.082
AD-EX	Sig. (2-tailed)	0.191	0.549	0.834
	N	8	9	9
WTMST	Pearson's r	0.115	0.144	0.204
EV-ID	Sig. (2-tailed)	0.785	0.711	0.598
	N	8	9	9
WTMST	R	-0.394	-0.317	0.000
EV-EX	Sig. (2-tailed)	0.334	0.406	1.000
	N	8	9	9
WTMST	Pearson's r	-0.181	-0.556	-.705
EV-AM	Sig. (2-tailed)	0.669	0.120	0.034
	N	8	9	9
WTMST	Pearson's r	-0.122	-0.446	-0.145
EV-IJ	Sig. (2-tailed)	0.774	0.228	0.710
	N	8	9	9
WTMST	Pearson's r	0.053	-0.023	-0.177
EV-IN	Sig. (2-tailed)	0.901	0.954	0.648
	N	8	9	9

		Single or Multiple Subjects	Grade Level	Title One Status
WTMST	Pearson's r	-.821	-0.045	0.512
TE-ID	Sig. (2-tailed)	0.012	0.908	0.159
	N	8	9	9
WTMST	Pearson's r	-0.116	-0.456	-0.065
TE-EX	Sig. (2-tailed)	0.785	0.217	0.869
	N	8	9	9
WTMST	Pearson's r	0.040	-0.532	-.803
TE-AM	Sig. (2-tailed)	0.925	0.141	0.009
	N	8	9	9
WTMST	Pearson's r	-.963	-0.123	0.522
TE-INT	Sig. (2-tailed)	0.000	0.752	0.149
	N	8	9	9
WTMST	Pearson's r	0.277	-0.348	-0.246
TE-IJ	Sig. (2-tailed)	0.507	0.358	0.523
	N	8	9	9
WTMST	Pearson's r	-0.099	-0.630	0.036
PR-IJ	Sig. (2-tailed)	0.816	0.069	0.926
	N	8	9	9
WTMST	Pearson's r	-0.189	-0.168	0.373
PR-EX	Sig. (2-tailed)	0.653	0.666	0.322
	N	8	9	9
WTMST	Pearson's r	-.730	0.142	.932
PR-ID	Sig. (2-tailed)	0.040	0.716	0.000
	N	8	9	9
WTMST	Pearson's r	-0.271	0.025	-0.176
PR-AM	Sig. (2-tailed)	0.516	0.949	0.651
	N	8	9	9
WTMST	Pearson's r	-0.720	0.230	0.345
PR-IN	Sig. (2-tailed)	0.068	0.584	0.403
	N	7	8	8

Summary

This chapter provided an analysis of the results of the teacher survey of teacher self-efficacy, teacher motivation, and PBL implementation. First, basic statistics were determined for the PBL items and the additive scales of the TSES and WTMST. Next, an exploratory factor analysis determined the inter-item reliability by calculating the Cronbach's alpha. Most scales demonstrated strong internal reliability, with the exception being the TSES Self-Efficacy Scale. Afterward, the correlational analysis answered research question one, two, and three. The next

chapter explores the practical and research implications of the findings as well as the recommendations for future research.

Chapter Five

Discussion and Conclusions

The primary purpose of this study was to explore the potential correlation between teacher self-efficacy, teacher motivation, and teacher implementation of PBL teaching methods. In addition, this study analyzed the demographic and contextual associations with the aforementioned variables. The survey study operationalized the Teachers Sense of Efficacy Scale (TSES) to measure teacher efficacy, the Work Tasks Motivation Scale (WTMST) for teacher motivation and two questions from Ravitz's 2008 PBL survey to measure teacher-reported PBL implementation.

Currently, outcomes-oriented professional development assessment systems, exemplified by the Guskey Model (2005), do not factor in teacher motivation and self-efficacy. By understanding if a correlation exists between teacher self-efficacy, teacher motivation, and the implementation of PBL methods, school leaders and professional development designers could more effectively design, implement, and assess PBL professional development.

This chapter discusses the key results mentioned in chapter four, as well as the limitations of the research, and the recommendation for future study.

Discussion of Findings

The following section discusses applicable findings to the research questions of the study. These research questions were:

1. Is there a correlation between teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?

2. Is there a correlation between teacher demographic variables (gender, race/ethnicity, teaching experience) and teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?
3. Is there a correlation between school context variables (subject area, grade level, and school socioeconomic status) and teacher self-efficacy, intrinsic motivation, and teacher implementation of project-based learning (PBL) methods?

The relationship between self-efficacy, motivation, and PBL implementation. Both motivation and self-efficacy are multidimensional. For this reason, there was no single correlation between teacher self-efficacy, motivation, and the implementation within this study. Instead, correlations were computed using additive scales of the TSES and WTMST. In terms of self-efficacy, there was no correlation between teacher efficacy in student engagement and the implementation of PBL strategies. This was surprising, given the research on the relationship between project-based learning and higher levels of student engagement (Ahlfeldt, Mehta, & Sellnow, 2005; Johnson & Delawsky, 2013; Robinson, 2013). However, this does not prove a lack of student engagement so much as an association in teacher's perceptions of their ability to engage students.

There were many moderate correlations between teacher efficacy in instructional methods and the implementation of PBL strategies. However, the strongest correlations occurred between efficacy in classroom management and PBL methods. In research, classroom management concerns are a key barrier to PBL implementation (Marx, et al., 1997). So, it would make sense that those who feel the most confident in their ability to manage a class would be

more likely to implement PBL. However, there was also a strong positive correlation between teacher amotivation for classroom management and teacher self-efficacy for instructional strategies. It is unclear why amotivation in classroom management correlates so strongly with these variables. It could be that a lack of motivation for classroom management reveals a tolerance for the "controlled chaos" that can exist in PBL classrooms as they move toward a facilitator role (Blumenfeld, et. al, 1991; Ertmer & Simons, 2006; Mergendoller, Markham, Ravitz, & Larmer, 2006). Another possibility is that the amotivation is not so much a loss of motivation for classroom management as it is viewing classroom management as an afterthought. Amotivation, in a sense of "giving up,"often coincides with low efficacy in classroom management (Walker, Greene, & Mansell, 2006). However, in this survey teachers who engaged in PBL were amotivated by classroom management while also feeling highly capable in their abilities to manage a class.

Intrinsic motivation had a small positive correlation with each of the PBL teaching method items. However, identified regulation had a strong correlation with many of the PBL teaching methods. Initially, these results seemed surprising. This study sought to explore the relationship between intrinsic motivation and self-efficacy in PBL implementation. However, project-based learning often requires a paradigm shift rather than merely the acquisition of new skills. This study suggests that teachers who make this paradigm shift and who implement PBL are teaching with a focus on specific outcomes and a sense of purpose in the task rather than the task being enjoyable or interesting. Note that this doesn't mean that the reason for implementing PBL is a sense of purpose. Nor does this mean implementing PBL leads to an increased sense of

purpose. It could be that those with higher identified regulation in teaching might be more drawn toward PBL to begin with.

There was also a strong correlation between intrinsic motivation for teaching with both identified regulation for teaching and identified regulation for class preparation. This suggests that teachers who find inherent enjoyment in teaching also engage in classroom preparation and teaching in order to accomplish an objective and fulfill a specific purpose. On the other hand, there is a strong negative correlation with extrinsic motivation within teaching and the implementation of PBL methods, suggesting that teachers who are the most likely to implement project-based learning are the least likely to do so because of external pressures, policies, rewards, or punishments. There is also a less significant negative correlation between PBL teaching methods and both introjected regulation and amotivation. This suggests that teachers who implement PBL are less likely to be teaching out of a sense of guilt or from a place where they feel no motivation whatsoever.

There was also a strong negative correlation between identified regulation of administrative tasks several of the items for PBL methods. This could point a contrast between teachers who implement PBL and the administrative tasks required of the system. In qualitative studies, teachers implementing PBL have described a disconnect between the administrative tasks required of a traditional system and the larger purpose and goals of PBL.

The relationship between self-efficacy, motivation, PBL implementation, and demographic variables. Only nine of the sixteen participants who filled out the survey completed the demographic questions. All nine of the participants identified as white. For this

reason, it was impossible to determine the relationship between race / ethnicity and PBL implementation, teacher self-efficacy, and teacher motivation.

In general, there was a strong correlation between PBL implementation and years taught. This contradicts the conventional wisdom that veteran teachers are less likely to embrace new pedagogical practices (Zimmerman, 2006). Years taught also moderately correlated with efficacy in classroom management. This is not surprising, given the fact that time and experience are often necessary to gain a sense of efficacy in classroom management. However, years taught had a slight negative correlation with self-efficacy in instructional strategies. While this might not qualify as a statistically significant correlation, years taught generally has a strong correlation with teacher efficacy in instructional strategies. Over time, teachers with mastery experiences develop a higher sense of efficacy (Woolfolk Hoy & Spero, 2006). However, Klassen and Chiu (2010) have demonstrated that teacher efficacy often increases from early to mid-career followed by a gradual decline. Still, the overall efficacy score was lower than expected. This gap between the expected results in self-efficacy and results within this study could coincide with the disequilibrium teachers experience as they become novices in teaching through PBL (Mergendoller & Thomas, 2000).

Most of the PBL categories had a stronger correlation for men than for women. However, this could be a function of school context variables. Because all of the men surveyed were also single subject middle school and high school teachers, the correlation might relate to the differences in context rather than gender. The association with grade level increases as the grade level increases, being strongest at the high school level. This could be a function of the

complexity of the tasks required of PBL. While project-based learning is considered a K-12 pedagogical framework, tasks such as “record and analyze data” might align more closely with the middle school and high school curriculum. In addition, there was a stronger correlation between PBL implementation and single subject teachers. This might be a function of grade level (where single subject is the most common) or it might be an issue of planning time and workload for single subject versus multiple subject teachers. As Simons, Klein and Brush (2004) point out, one of the challenges to PBL implementation is sufficient planning time.

While there was not a significant gender difference in the intrinsic motivation to teach, men had a higher correlation to teaching for identified regulation while women had a higher correlation to teaching for introjected regulation. This might be the function of contextual differences in grade level and subject area. It could also be the result of school culture. Other studies have examined the relationship between teacher guilt and school leadership (Acker, 1995; Brown, 2006; Chang, 2009; Hargreaves & Tucker, 1991). In other words, school culture could be moderating introjected regulation for teachers at the elementary level, where the population has a higher percentage of women compared to men.

Still, the strong correlation between introjected regulation and gender remains. This corresponds with the feminist critique of teaching as a “helping profession” and the role of guilt as a motivating factor for women in particular (Acker, 1995; Bartky, 1996; Chang, 2009; Stearns & Stearns, 2017).

The relationship between self-efficacy, motivation, PBL implementation, and school context variables. With regards to school context variables, the sample size was too small to

determine a relationship between socioeconomic status and other variables. Only one of the participants taught in a Title One school. However, there was a negative correlation between single subject teachers and several of the PBL methods items. There was also a significant positive correlation between grade levels most of the PBL method items. In other words, the teachers who were most likely to use PBL methods were those who taught single subjects and who taught at the secondary level. Within this district, nearly all of the single subject teachers are at the middle grade and high school levels.

This could be a function of preparation time. Given the prep time needed for PBL, it might be easier for single subject teachers to take on the larger shift toward project-based learning compared to their multi-subject colleagues. It might also relate to the developmental level of students and the specific PBL methods. For example, collecting and analyzing data or defending one's ideas and views might align more closely with older grades compared to younger grades. By contrasting, working on multidisciplinary projects had a lower correlation with grade level and might be more feasible in a multi-subject classroom.

Practical Implications

The results of this study shed some light on a potential missing component of motivation and efficacy within the Guskey Model for professional development. The medium to high correlation between teacher efficacy in instructional strategies and specific PBL methods suggests the need to assess whether teachers believe in their abilities to implement PBL. This could have implications on the design of the workshops themselves as well as the professional development support that a district might provide. Moreover, the strong correlation between

identified regulation and PBL implementation suggests professional development needs to align with a teacher's sense of purpose and focus on outcomes. In other words, districts might want to gauge whether teachers believe that they *can* implement specific strategies but also whether teachers believe it is *necessary* to implement these strategies. Currently, these factors are not included in the Guskey model. Furthermore, it should also be noted that although the Guskey model (2005) focuses on the role of systemic support, extrinsic motivation had a negative correlation with PBL implementation. Thus, systemic support in professional development should focus less on extrinsic rewards or top-down initiatives (emphasizing compliance) and more on methods that will connect with identified regulation and self-efficacy. Professional development workshops and coaching need to align to teacher values and need to include a focus on teacher autonomy. Administrators might want to engage in meaningful focus group conversations with teachers about what they value and how PBL might align with those values. It could also include goal-setting.

Although this study did not focus on school culture, systems, or policies, the results provide some insights for district leaders designing a PBL roll-out. For example, the strong correlation between teacher efficacy in classroom management and PBL implementation strategies suggests the possibility that teachers who believe in their ability to manage a class might be more likely to implement project-based learning. It is also possible that PBL is a form of preventative classroom management and implementing it might actually increase a teacher's sense of efficacy in that domain. Either way, districts might need to consider the connection between classroom management and PBL. Often, PBL workshops, such as the BIE training that

the teachers in this sample attended, treat PBL as an instructional framework without examining the role of classroom management in PBL implementation.

The strong correlation between both single subjects and grade level and PBL implementation suggests a need to examine the role of grade level within PBL professional development. If the issue is one of workload and required time for planning, districts might need to provide additional planning time for multi-subject teachers or perhaps purchase PBL curriculum. If the issue is more about being developmentally appropriate, trainings might need to be tailored to grade level bands with a focus on vertical alignment (how students will gain additional skills as they progress through various grade levels). Research has demonstrated that teachers are more likely to implement strategies from workshops when they are tailored toward grade level and subject area (Darling-Hammond, Chung Wei, Andree, & Richardson, 2009).

Finally, this research challenges the perception that veteran teachers are more reluctant to take on innovative teaching practices. In this study, there was a strong correlation between years taught and PBL implementation. However, there was also evidence of a lower than expected correlation between efficacy in instructional strategies and teaching experience. This could be a function of PBL itself, which often requires a shift in instructional practices that can lead to fear and uncertainty (Ertmer & Simons, 2006; Grant & Hill, 2006). This fear might manifest as lower teacher efficacy. It’s important that leaders and instructional coaches address the potential dip in instructional efficacy teachers might experience while implementing PBL.

Limitations for Research

Although this study was able to explore and examine several correlations, the low response rate also resulted in a small sample size and limited both the initial findings and the generalizability of the results. Only sixteen participants filled out the survey. The factor analysis demonstrated reliability in all but one scale. The low reliability score for the additive Student Engagement scale limited the initial analysis of correlations between teacher self-efficacy, motivation, and PBL implementation. A larger sample might have increased the reliability of that particular scale. A larger response rate would have also increased the generalizability of the results. A larger sample would have also allowed for specific data on grade level and subject area rather than single subject / multiple subject or grade level bands.

Furthermore, the study sample lacked diversity. The lack of racial / ethnic diversity in the sample meant it was impossible to determine if a correlation existed between that demographic variable and self-efficacy, motivation, or PBL implementation. Further, the sample size for teachers at a Title One school was also too small for valid data. A more diverse sample would have improved the generalizability of the results.

In addition, the survey was conducted with one school district in suburban Kansas. The lack of urban and rural representation reduced the generalizability among different city populations. The inclusion of one school district limited the generalizability among other teachers in other school districts. The results were more likely to be influenced by contextual factors including regional differences and local policies and systems.

Another limitation was the role of additional variables that might influence teacher efficacy and motivation. This survey study did not include the role of unidimensional factors such as mindsets or grit. It also did not include the role of attitudes, beliefs, or perceptions, which are often studied in qualitative PBL research and could affect efficacy and motivation (Ertmer & Simons, 2006; Grant & Hill, 2006; Hertzog, 2007; Rogers et al., 2011; Tal, Krajcik, & Blumenfeld, 2006; Tamim & Grant, 2013).

A final limitation was the use of a self-reported survey. While there is a strong precedence for measuring self-efficacy and motivation with self-reported surveys, they are subject to personal biases, including social desirability bias (Ashton, 1984; Fisher & Katz, 2000). Also, the scales rank each question with the same rank while a teacher might place a higher value on a particular question within the same scale. Because self-efficacy and motivation are context specific, the results were limited to a two-week window at the close of the first semester at the start of winter break. It is possible that motivation and efficacy levels might change over the course of the schoolyear and with successes and failures in PBL implementation. Finally, the survey measured teachers' self-reporting of PBL implementation. This study did not include observations of PBL teaching for either the frequency or quality of instruction.

Suggestions for Future Research

This study was an initial exploration on the relationship between self-efficacy, motivation, and PBL implementation. An additional survey study with a larger sample from multiple districts could build on the initial findings and increase the generalizability of the results. A future sample should include multiple school districts that represent a larger variety of

population size (including rural, urban, and suburban) and a more representative sample of Title One status. In addition, it is recommended that researchers partner with districts that will provide the researcher with the email addresses of participants. Multiple correspondences between the researcher and participants would have helped improve awareness of the survey and thus increased the response rate. Policies for outside researchers should be clarified ahead of time before a formal agreement is reached.

A larger sample could help clarify the differences between PBL implementation between single and multiple subjects and between specific grade levels. This could clarify differences between PBL implementation in tested and untested subject areas. Future study may also examine the role of demographic differences, including ethnicity and gender, with both motivation and PBL implementation. A larger, more diverse sample could help control for local contextual variables that might impact the external validity of the results.

In addition, a mixed methods study could examine the role of attitudes, beliefs, and perceptions and self-reported PBL implementation, self-efficacy, and motivation. By conducting interviews, researchers could make sense out of the amotivation teachers experience toward classroom management and administrative tasks when implementing project-based learning. These interviews could also address contextual factors that affect amotivation and PBL implementation.

Further research might also address what it is like for veteran teachers who are attempting a change in practice. This could use elements of sense-making employed by Hmelo-Silver and Barrows (2006) for problem-based learning. Here, the focus would be on the in connection

between sense-making and perceptions of motivation and self-efficacy. Similarly, by interviewing teachers with less experience, researchers could examine the potential barriers to implementation for teachers who are still novices.

A further study could explore the relationship between gender and motivation for teachers who are attempting a new pedagogical practice. The current study found a correlation between women and introjected regulation and men and identified regulation. While the WTMST has demonstrated invariance with teaching levels and with gender (Fernet, Senécal, Guay, Marsh, & Dowson, 2008), the gender differences in motivational factors toward teaching was significant and might require deeper investigation.

Finally, this study was limited to one survey at a specific point in time. A further study of self-efficacy, motivation, and implementation could occur over time. For example, by filling out the survey before the professional development workshop, during PBL implementation, and further on in the year, researchers could see if self-efficacy and identified regulation are actually predictors or PBL implementation. They could also examine changes in motivational and efficacy levels of teachers in various stages of implementation. This could help clarify when self-efficacy and motivation might need to be included in a professional development assessment model.

Conclusion

This survey study examined the relationship between teacher self-efficacy, teacher motivation, and the implementation of PBL methods. In addition, the study examined both the association between demographic and school context variables with the previously mentioned

variables. While the low response rate limited the generalizability of the findings, the data provided an exploratory analysis of the associated variables. Based on these findings, teacher efficacy and identified regulation both have a strong association with the implementation of PBL methods. These findings point toward the need for future research on the relationship between efficacy and motivation as a missing element in the Guskey Model of professional development.

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Appendices

APPENDIX A

THE TEACHERS' SENSE OF EFFICACY SCALE (TSES)

APPENDIX B

THE WORK TASKS MOTIVATION SCALE FOR TEACHERS (WTMST)

Different reasons may explain why teachers engage in their work tasks. The following statements represent some of these reasons. Using the scale below, please indicate for each statement to what degree they correspond to one of the reasons for which you are doing the following work tasks.

Why are you doing this work task?

CLASS PREPARATION

(e.g., deciding on instruction topics and material, determining the presentation forms and sequences, and establishing the work procedure)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7
2.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7
3.	Because I like doing this task.	1 2 3 4 5 6 7
4.	Because my work demands it.	1 2 3 4 5 6 7
5.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
6.	Because the school obliges me to do it.	1 2 3 4 5 6 7
7.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
8.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7
9.	Because I find this task interesting to do.	1 2 3 4 5 6 7
10.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
11.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
12.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
13.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7
14.	Because I'm paid to do it.	1 2 3 4 5 6 7
15.	To not feel bad if I don't do it.	1 2 3 4 5 6 7

Why are you doing this work task?

TEACHING

(e.g., presenting instruction, answering questions, and listening to the students' needs)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because the school obliges me to do it.	1 2 3 4 5 6 7
2.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
3.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7
4.	Because I find this task interesting to do.	1 2 3 4 5 6 7
5.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
6.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7
7.	To not feel bad if I don't do it.	1 2 3 4 5 6 7
8.	Because my work demands it.	1 2 3 4 5 6 7
9.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
10.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
11.	Because I like doing this task.	1 2 3 4 5 6 7
12.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
13.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7
14.	Because I'm paid to do it.	1 2 3 4 5 6 7
15.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7

Why are you doing this work task?

EVALUATION OF STUDENTS

(e.g., constructing assessments and exams, correcting, entering marks, giving remarks to the parents)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because I'm paid to do it.	1 2 3 4 5 6 7
2.	Because I find this task interesting to do.	1 2 3 4 5 6 7
3.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
4.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7
5.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
6.	Because the school obliges me to do it.	1 2 3 4 5 6 7
7.	Because I like doing this task.	1 2 3 4 5 6 7
8.	To not feel bad if I don't do it.	1 2 3 4 5 6 7
9.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
10.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
11.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
12.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7
13.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7
14.	Because my work demands it.	1 2 3 4 5 6 7
15.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7

Why are you doing this work task?

CLASSROOM MANAGEMENT

(e.g., handling discipline, applying the rules, and managing students' interruptions and conflicts)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
2.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7
3.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7
4.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
5.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
6.	Because the school obliges me to do it.	1 2 3 4 5 6 7
7.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7
8.	To not feel bad if I don't do it.	1 2 3 4 5 6 7
9.	Because I find this task interesting to do.	1 2 3 4 5 6 7
10.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
11.	Because I like doing this task.	1 2 3 4 5 6 7
12.	Because I'm paid to do it.	1 2 3 4 5 6 7
13.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
14.	Because my work demands it.	1 2 3 4 5 6 7
15.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7

Why are you doing this work task?

ADMINISTRATIVE TASKS

(e.g., recording and transmitting absences, building disciplinary files, and participating in meetings with the parents and principals to study disciplinary cases, meetings with teachers, meetings with the administration, meetings with the union, and school assemblies)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because my work demands it.	1 2 3 4 5 6 7
2.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
3.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
4.	Because I like doing this task.	1 2 3 4 5 6 7
5.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
6.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
7.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7
8.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
9.	Because the school obliges me to do it.	1 2 3 4 5 6 7
10.	Because I'm paid to do it.	1 2 3 4 5 6 7
11.	Because I find this task interesting to do.	1 2 3 4 5 6 7
12.	To not feel bad if I don't do it.	1 2 3 4 5 6 7
13.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7
14.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7
15.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7

Why are you doing this work task?

COMPLEMENTARY TASKS

(e.g., tutorial guidance, involvement in committees, extracurricular activities, continuous improvement training, and extraclass monitoring)

Does not correspond at all	Correspond very little	Correspond a little	Correspond moderately	Correspond strongly	Correspond *very* strongly	Correspond completely
1	2	3	4	5	6	7

1.	Because it is important for me to carry out this task.	1 2 3 4 5 6 7
2.	Because I find this task important for the academic success of my students.	1 2 3 4 5 6 7
3.	I don't know, sometimes I don't see its purpose.	1 2 3 4 5 6 7
4.	Because if I don't carry out this task, I will feel bad.	1 2 3 4 5 6 7
5.	I used to know why I was doing this task, but I don't see the reason anymore.	1 2 3 4 5 6 7
6.	Because the school obliges me to do it.	1 2 3 4 5 6 7
7.	Because I like doing this task.	1 2 3 4 5 6 7
8.	Because I'm paid to do it.	1 2 3 4 5 6 7
9.	To not feel bad if I don't do it.	1 2 3 4 5 6 7
10.	Because this task allows me to attain work objectives that I consider important.	1 2 3 4 5 6 7
11.	Because I would feel guilty not doing it.	1 2 3 4 5 6 7
12.	I don't know, I don't always see the relevance of carrying out this task.	1 2 3 4 5 6 7
13.	Because my work demands it.	1 2 3 4 5 6 7
14.	Because I find this task interesting to do.	1 2 3 4 5 6 7
15.	Because it is pleasant to carry out this task.	1 2 3 4 5 6 7

APPENDIX

The 15 Items Assessing the Motivational Constructs for Each Task

Intrinsic Motivation
- Because it is pleasant to carry out this task.
- Because I find this task interesting to do.
- Because I like doing this task.

Identified Regulation
- Because it is important for me to carry out this task.
- Because this task allows me to attain work objectives that I consider important.
- Because I find this task important for the academic success of my students.

Introjected Regulation
- Because if I don't carry out this task, I will feel bad.
- Because I would feel guilty not doing it.
- To not feel bad if I don't do it.

External Regulation
- Because my work demands it.
- Because the school obliges me to do it.
- Because I'm paid to do it.

Amotivation
- I don't know, I don't always see the relevance of carrying out this task.
- I used to know why I was doing this task, but I don't see the reason anymore.
- I don't know, sometimes I don't see its purpose.

Note. For the purpose of this article, we followed the back-translation procedure described by Vallerand and Halliwell (1983) to translate the original French Canadian items into English.

APPENDIX C

IRB REQUEST FORM

Generic Sample Informed Consent

RESEARCH SUBJECT INFORMED CONSENT FORM

Prospective Research Subject: Read this consent form carefully and ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

This is a generic sample form to help you address most situations. Please adapt as appropriate for your research protocol and institution. *Pending rulemaking for classified human subject research will require additional elements of consent.*

Project Information	
Project Title: The Relationship Between Teacher Efficacy and Motivation on Project-Based Learning Implementation	Project Number:
Site IRB Number:	Sponsor:
Principal Investigator: John Spencer	Organization: George Fox University
Location: GFU-Newberg Campus	Phone: 623-414-8305

Other Investigators: Dr. Dane Joseph	Organization: George Fox University
Location: GFU-Newberg Campus	Phone: 503-554-2855

PURPOSE OF THIS RESEARCH STUDY

This study will analyze the relationship between teacher motivation, self-efficacy, and the implementation of project-based learning teaching methods for teachers who have attended a PBL workshop.

PROCEDURES

This quantitative correlational study will use teacher survey data to determine the relationship between teacher self-efficacy, motivation, and PBL implementation using a self-reported survey.

Participants will complete a survey that should take approximately 20 minutes

This is a voluntary, non-experimental survey.

POSSIBLE RISKS OR DISCOMFORT

This is a low-risk survey study

The minimal risks will involve loss of time and the psychological burden of completing a survey associated with motivation and self-efficacy.

OWNERSHIP AND DOCUMENTATION OF SPECIMENS

All survey data will be saved in a secure online server for five years before being permanently deleted. A duplication of the data will be housed on a secure flash drive kept in a secure and locked in a file drawer for five years before being destroyed.

POSSIBLE BENEFITS

The benefits of the research could be better design for professional development with teacher motivation and self-efficacy in mind. This could improve personal professional learning and the collective sense of teacher autonomy for the larger teacher population undergoing PBL professional development interventions.

FINANCIAL CONSIDERATIONS

There will be no direct financial compensation for teachers' participation in this research. However, after completing the survey, participants who have participated in at least half of the survey will be eligible to enter a drawing for one of five $50 Amazon gift cards by giving their district or personal email address if they choose.

AVAILABLE TREATMENT ALTERNATIVES

There is no experimental treatment for this study.

AVAILABLE MEDICAL TREATMENT FOR ADVERSE EXPERIENCES

This study is a non-medical study and involves medical minimal risk

CONFIDENTIALITY

Each participant's identity will be treated as confidential. *The results of the study, may be published for scientific purposes but I will not include participants' names or include any identifiable references."*

"However, any records or data obtained as a result of your participation in this study may be inspected by the sponsor, by any relevant governmental agency, by the George Fox University Institutional Review Board, or by the

persons conducting this study, (provided that such inspectors are legally obligated to protect any identifiable information from public disclosure, except where disclosure is otherwise required by law or a court of competent jurisdiction. These records will be kept private in so far as permitted by law."

All survey data will be saved in a secure online server for five years before being permanently deleted. A duplication of the data will be housed on a secure flash drive kept in a secure and locked file drawer for five years before being destroyed. Each participant's identity will be protected by keeping the survey anonymous. Furthermore, the data collection platform Survey Monkey does not collect IP addresses.

TERMINATION OF RESEARCH STUDY

Participants are free to choose whether or not to participate in this study. There will be no penalty or loss of benefits to which they are otherwise entitled if they choose not to participate. They will be provided with any significant new findings developed during the course of this study that may relate to or influence your willingness to continue participation.

AVAILABLE SOURCES OF INFORMATION

Any further questions you have about this study will be answered by the Principal Investigator: John Spencer

Phone number: 623-414-8305

Email address: jspencer@georgefox.edu

Dr. Dane Joseph

Email address: djoseph@georgefox.edu

Any questions you may have about your rights as a research subject will be answered by:

John Spencer

jspencer@georgefox.edu

In case of a research-related emergency, call:

Day Emergency Number: 623-414-8305

Night Emergency Number: 623-414-8305

AUTHORIZATION

I have read and understand this consent form, and I volunteer to participate in this research study. I understand that I will receive a copy of this form. I voluntarily choose to participate, but I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study. I further understand that nothing in this consent form is intended to replace any applicable Federal, state, or local laws.

Participant Name (Printed or Typed):

Date:

Participant Signature:

Date:

Principal Investigator Signature:

Date:

Signature of Person Obtaining Consent:

Date:

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Y HSRC INITIAL REVIEW QUESTIONNAIRE Page 6

:-12 Educators

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eeds to complete the above information on this page)

3: For Committee Use Only

rch makes adequate provision for safeguarding the health and is therefore approved.

ent of risk being questionable or being subject to change, the lly reviewed by the **HSRC** on a basis throughout the ntil otherwise notified. This requires resubmission of this ation, for each periodic review.

rch evidences some unnecessary risk to participants and o remedy the following specific area(s) on non-compliance:

rch contains serious and potentially damaging risks to subjects ed.

____ 2/21/20

er Date

APPENDIX D

CONSENT LETTER TO SURVEY PARTICIPANTS

Informed Consent

Procedures for Obtaining Informed Consent
The email listserv of potential participants (the sampling frame) will have been provided to me by the Blue Valley School K-12 School District. Potential participants will receive an initial email asking if they would like to participate in this study. The email will have been provided to me by district office leadership. This initial email will contain the following informed consent letter. Participants may opt into the survey by clicking the survey link at the end of the consent letter.

Informed Consent Letter

Title of the Study:
The Relationship Between Teacher Self-Efficacy, Intrinsic Motivation, and Project-Based Learning (PBL) Teaching Methods

Principal Researcher:
John Spencer, jspencer@georgefox.edu

Dissertation Chair/Other Investigator:
Dr. Dane Joseph, PhD, djoseph@georgefox.edu

Description of the Study:
John Spencer is a doctoral candidate at George Fox University conducting this research study as a component of the dissertation process. This study examines the potential association between teacher intrinsic motivation, teacher self-efficacy, and the implementation of project-based learning (PBL) teaching methods after attending a PBL workshop. If you agree to participate, you will participate in a survey measuring your self-reported teacher motivation, teacher self-efficacy, and the implementation of PBL teaching strategies. This survey uses three instruments. The first is a selection of questions from the National Survey of High School Reform and Project Based Learning (Ravitz, 2008). The second is the Teachers' Sense of Efficacy Scale (TSES): an instrument for measuring teacher self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001). The third component is the Work Tasks Motivation Scale (WTMST), an instrument for measuring teacher motivation grounded in self-determination theory (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). The survey will take approximately 15-20 minutes to complete. All survey data will remain anonymous and will be used to analyze the potential correlation between teacher self-efficacy, teacher motivation, and PBL implementation.

Risks/Benefits to the Participant:
Your response to this survey will help clarify the relationship between teacher self-efficacy, teacher motivation, and the implementation of PBL methods. This could potentially improve the

design and implementation of PBL professional development. There may be a minimal risk in participating in this study, including the loss of your time or the psychological burden of completing the survey. Please contact the principal investigator if you have any questions or concerns regarding the risks or benefits of participating in this study. You may also contact Dr. Chris Koch, Professor of Psychology and IRB Chair at ckoch@georgefox.edu for questions regarding the IRB or the associated risks.

Cost and Payment to the Participants:
There is no cost to participate in this research study. Participation is entirely voluntary. You will not receive payment for your participation. However, there is a chance to win one of five $50 Amazon gift cards through a random drawing. You must complete at least 50% of the survey to qualify for the drawing.

Confidentiality:
All results of this study will remain strictly confidential. All survey data will be saved in a secure online server for five years before being permanently deleted. A duplication of the data will be housed on a secure flash drive kept in a secure and locked file drawer for five years before being destroyed. To protect confidentiality, this survey will be anonymous. No school or district names will be used in the dissertation or within any journal articles or conference presentations. School district personnel will not have access to any of email addresses of the participants in this study. Furthermore, the data collection platform Survey Monkey does not collect IP addresses. Email addresses will only be used for communicating with winners of the random drawing for the Amazon gift cards for participants who choose to opt-in.

Participant's Right to Withdraw from the Study:
You have the right to refuse to participate or withdraw from the study at any point during the survey.

Consent:
I have read and fully understand the contents of this letter. If I have any remaining questions, I will ask the primary investigator. I understand that by completing this survey, I am giving my consent to participate in this study.

If you choose to participate, please click on this link to access the survey:

https://www.surveymonkey.com/r/Q8XRDQX