DOES ‘WORKING AFTER WORK’ AFFECT TEACHERS’ CONFIDENCE? EXAMINING TEACHER EFFICACY IN A PROFESSIONAL DEVELOPMENT PROGRAM

By

Scott R. Gartlan

A dissertation submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Doctor of Education in
Educational Leadership

Charlotte

2019

Approved by:

_____

Dr. Richard G. Lambert, chair

_____

Dr. Jae Hoon Lim

_____

Dr. Stella Kim

_____

Dr. Adriana Medina

ABSTRACT

SCOTT R. GARTLAN. Does 'Working After Work' Affect Teachers' Confidence? Examining Teacher Efficacy in a Professional Development Program. (Under the direction of Dr. RICHARD G. LAMBERT)

This study examined the relationship between teacher efficacy and professional development among in-service K-12 teachers. A content-rich teacher professional development program was analyzed over the course of two years using a sequential explanatory mixed-methods approach. First, in the quantitative phase (QuantP1), a total of 138 teachers were assessed using the Teacher Sense of Efficacy Scale (TSES) before and after a three-month intervention aimed at teacher intellectual growth and confidence gain. Second, in the first qualitative phase (QualP1), open-ended responses from 180 teachers on four anonymous questions were coded and categorized. Third, in the second qualitative phase (QualP2), eight teacher participants' interviews were recorded, transcribed, and analyzed to provide insights into the experiences of participating in the professional development intervention. Results from the quantitative phase of the study indicated statistically significant gains after the intervention on teacher efficacy with small to moderate effect sizes. These statistically significant main effect differences on time were found overall and on three subscales of the TSES, and on overall efficacy and on student engagement subscale when looking at the interaction of time and years of teaching experience. Results from the qualitative phase of the study indicated that teacher participants valued (1) relevant learning experiences related to content research, (2) time to interact with other K-12 teachers, and (3) support from content-expert professors. These findings relate to existing research on effective teacher professional development aimed at the importance of content knowledge, collaboration among

colleagues, and expert coaching. Implications for increasing teacher efficacy through professional development include supporting relevant research activities for teachers (cognitive mastery experiences), promoting varied interactions among K-12 teacher colleagues (vicarious experiences), and encouraging constructive, positive feedback from credible experts (verbal persuasion).

ACKNOWLEDGEMENTS

I'd like to offer my gratitude to my dissertation committee. Dr. Richard Lambert, my dissertation committee chair, has been a great mentor. His time and dedication to my success is a true example of a mentor. I'd like to thank the other members of my committee, Dr. Jae Hoon Lim and Dr. Stella Kim, for their wise and thoughtful comments throughout the process. A special thanks to committee member, Dr. Adriana Medina, for her guidance and mentorship over the years in helping hone my research skills. I am thankful for the patience and time all the committee members demonstrated to help me succeed. I'd also like to thank Dr. Cathy Howell for her ongoing positive support.

I'd like to extend a warm 'thank you' to the teachers who participated in interviews for this study. They lead incredibly busy lives so I am very grateful for extra time they put in to make this project a success. I'd also like to thank all the teachers in the professional development program who work hard every day to become better, more confident teachers of our children. Additionally, I'd like to thank a special colleague, Robin Mara, who has supported my work in countless ways over many years.

I am humbled to thank my mom, Peggy, and brothers – Chris, Bill and Tom. Your influence is without boundary. I'd like to also thank my dad, Robert H. Gartlan. If he were here today, then I'm certain he would be the happiest of all.

To my wife, Molly, your unwavering support throughout this long process has meant the world to me. I'm eternally grateful – we share this accomplishment together. To Louise and Henry, I hope you will read this for independent reading points.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Background

Very few studies have successfully employed methods designed to rigorously and reliably detect effects of teacher professional development on student academic outcomes. Only nine studies out of 1,300 have utilized experimental or quasi-experimental designs to statistically link teacher professional development with student academic outcomes (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Consequently, there was not a definitive, conclusive, single way to assess effective professional development (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Feiman-Nemser, 2001). This meant that the vast majority of studies that purported to examine the relationship between professional development and student outcomes failed to either find statistically significant results and/or used research methods that inadequately isolated the effect of teacher professional development on student academic outcomes. This established a real problem in teacher professional development research in terms of the sheer numbers of programs and approaches then required to provide a dizzying array of evaluation models. Then the question was, "Is there value in teacher professional development?" Clearly, there was a big investment in teacher professional development in schools throughout the country and world. The United States spent approximately 1.5 billion dollars annually as part of the Department of Education funding on teacher professional development ("Teacher Professional and Career Development, U.S. Department of Education," n.d.). The United States invested in professional development through states as a means to improve overall student achievement. In Finland, often regarded as one of the best

education systems in any country, it was not necessarily about the amount of money invested in teachers professional development, but more about how teachers were viewed within the system and how they were included in important educational processes that underscored their particular commitment to teachers. For example, teachers are given ultimate responsibility for selecting textbooks, student assessment policies and practice, budget allocation within a school, and evaluation of student outcomes (Sahlberg, 2007; Välijärvi et al., 2007). This approach centered on teacher decision-making was different from the United States and has been one of the ingredients in Finland's international success in education (Sahlberg, 2007). This difference between how the United States and Finland viewed teacher professional development was an example of the divergent perspectives educators, policy makers, and scholars have on this topic.

Since the 2001 Elementary and Secondary Schools Act reauthorization, the United States education policy has remained focused on three areas related to teacher quality through teacher qualifications and teacher performance: ensuring equitable student access to qualified and effective teachers, developing various measures of teacher performance, and implementing strategies to promote equitable access to qualified effective teachers (Wayne, Tanenbaum, Brown, & Boyle, 2017). Equitable access to qualified and effective teachers related to the policy direction which required states to have written plans called "equity plans" wherein they identified steps taken to ensure that students from low-income families and students of color were not taught by inexperienced or unqualified teachers at higher rates than other students. Since the 2001 ESSA reauthorization, the measurement of teacher quality has expanded to include not only teacher qualifications, but measures of teacher performance. This performance

measurement required states look at systems that included the use of multiple valid measures of teacher performance, including data on achievement growth for all students, as well as the use of other measures of professional practice to assess teachers performance (Wayne et al., 2017). Interestingly, fifteen states reported plans to use student achievement data based on non-standardized assessments as an additional measure of student achievement growth (Wayne et al., 2017). These non-standardized assessments included student work samples, end-of-course or end-of-grade tests, district tests, and classroom-based assessment. This relatively recent change in measuring and thus defining teacher quality had important implications for other measures that might align with federal education policy. Namely, the use of standardized or non-standardized assessments of students, as well as measures of teacher performance related to formal classroom observations using rubrics and trained principals or assistant principals emerged as alternatives to testing alone. However, there was no mention that this comprehensive report on using self-report teacher surveys included items related to teacher efficacy, as a well-known indicator associated with student achievement (Kim & Seo, 2018). This gap has emerged as a key area of improvement for federal guidelines to include other measures of teacher performance linked to student achievement, such as those related to teacher efficacy.

The problem of properly evaluating casual connections between teachers' participation in professional development activities and students' performance on academic assessments has been well established (Desimone, 2009; Desimone, Porter, Garet, Yoon, & Birman, 2002; Hill, Beisiegel, & Jacob, 2013; Yoon et al., 2007). The main issue involved having experimental or event quasi-experimental designs best suited

to establish casual relationships among variables, namely student achievement. Studies pointed to the limitations of conducting research using methods aimed at establishing casual relationships (Hill et al., 2013; Smith, 2004, 2009). These studies can be expensive and time-consuming, particularly for smaller programs. Additionally, Smith (2004, 2009) explained that certain programs like the Teachers Institute model of professional development, would not be suitable for randomized controlled experiments due to program design. That is, a component of the program was that teachers apply and were selected to participate by other teachers so randomly assigning teachers to participate or not participate undermined a significant element of the program itself. By employing a randomized selection and assignment approach to teachers into the seminars, any evaluation would be of a program quite different from the Teachers Institute model (Smith, 2009).

However, there has been substantial work recently to understand, among those whose research was methodologically rigorous, the critical features of effective professional development linked to student achievement. In a review of research studies conducted over the past thirty years on teacher professional development researchers identified seven widely shared features of effective professional development: content-focused, active learning, collaboration, modeling practice, coaching and support, feedback and reflection, and sustained duration (Darling-Hammond, Hyler, & Gardner, 2017). This was an important contribution to the understanding of how to structure professional development experiences such that change in teachers occurred (cognitive frameworks, beliefs, behaviors, practices) as a pathway to affecting student academic outcomes (proficiency scores, grades). The seven features of effective professional

development are briefly defined below. The first feature of effective professional development was that it was content-focused. Professional development that was focused on content meant it was discipline-specific curricula in terms of math, science, or literacy, and was framed within the context of the teachers' classrooms. This type of professional development provided teachers with the opportunity to try new curriculum with their students (Penuel, Gallagher, & Moorthy, 2011). Content-focused professional development helped to prepare teachers to design curricula that was focused on the particular instructional experiences for their students. Additionally, these content-focused professional development programs provided the teachers not just with curricular materials aligned with teaching standards, but allowed teachers the opportunity to create and design related materials that support students learning. It was this focus on the role of the teacher in content-focused professional development that was particularly important (Desimone, 2009).

The second feature of effective professional development was active learning. Active learning in the context of professional development was understood to address how teachers learn, not only what they learn. Three main themes characterized how adults, different from children, learn and develop, and that are particularly relevant for teacher professional development: (1) adults come with experiences that are built upon for new learning, (2) adults choose learning opportunities based on interest and classroom needs (if teachers), and (3) reflection and inquiry are central to learning (Trotter, 2006). Active learning was often framed in the context of non-traditional learning. That is, learning that was not entirely based on lectures and passive listening, but rather offers dynamic learning experiences aimed at engagement and interaction. This often took the

form of providing different learning environments for the adult learner, as well as ways to address the information from different perspectives. Additionally, active learning provided teachers with ways they can transform their teaching, not just to add new strategies on existing ones (Trotter, 2006). The third feature of effective professional development was the role of collaboration. Schools and districts have made collaboration a priority for professional development as greater emphasis is made on school-community partnerships (National Commission on Teaching and America's Workforce., 2016). In one study of a highly interactive model, teachers worked one-on-one with coaches over the course of 13 months. These teachers accumulated 20 hours of in-service, collaborative professional development with an assigned mentor focused on reflecting on their teaching practice, discussing short videos of teaching practice, and responding to questions from their mentor regarding their facility to engage students (Allen, Pianta, Gregory, Mikami, & Lun, 2011). These types of collaborative professional development provided teachers with regular, frequent contact with mentors and lead to gains in student achievement. Another study of a districtwide professional development program used small groups focused on inquiry-based, literacy-focused instruction to improve English learners' achievement (Lara-Alecio et al., 2012). Teachers who participated in this program received detailed instruction on upcoming lessons, discussed the content topics with teacher peers, reflected on student learning outcomes, and participated in inquiry activities as learners. This provided a strong emphasis on collaboration with peers and researchers to development new curricula and improve existing curricula.

A fourth feature of effective professional development was the use of models and modeling effective teaching practices. The use of models referred to those curricular and instructional models to help teachers sharpen their practice, such as video or written cases of teaching, demonstration lessons, and unit plans. The use of modeling behavior referred to those observations of peers in classroom settings or in other learning environments. As Darling-Hammond, et al. (2017) noted in their report on effective professional development, the role of professional learning in association with model curriculum and classroom materials should not be underestimated. In a study of 73 teachers and 1,039 students in the elementary grades on teaching science, the role of expert scaffolding and modeling was examined using an experimental design with three intervention groups and a control. The results found that students whose teachers receive expert scaffolding on instructional practices and topics fair significantly better on measures of student achievement compared to teachers who did not receive expert scaffolding. This underscored the role and importance of using models of effective instruction and curriculum materials in teacher professional development.

A fifth feature of effective professional development was known as coaching and expert support. This feature extends the role of experts mentioned above in the context of modeling as central to the teacher professional development learning process. These experts, who often utilized the learning strategies identified above, provided the necessary support on a range of topics, from strong instructional practices to collaborative analysis of student work, as well as sharing expertise about content-rich practices. A study using a multi-level HLM analysis of 48 teachers and 1,490 students examined the role that video analysis of teaching cases played in effective teacher

professional development. Among the findings, the researchers identified the importance of explicit modeling and coaching from a professional development leader, not just another teacher, as a critical factor in assisting teachers to analysis their own teaching practice (Roth et al., 2011). These professional development leaders were university scientists who helped teachers analyze teaching practice, deepen their content knowledge, and develop problem-solving activities related to their target idea. This particular model of coaching showcased the role of the university professor as expert coach in order to facilitate effective teacher professional development.

The sixth feature of effective teacher professional development was the role of feedback and reflection. Both feedback and reflection occur in mentoring and coaching models but extend beyond to a variety of other settings, including formal and informal environments. The essential element with feedback and reflection was to provide intentionally time that was built into the schedule to allow for meaningful looking back on past work, as well as receiving input from colleagues about the teaching and learning process. An experimental study of 105 high school biology teachers who participated in discipline-based literacy-focused professional development program increased use of metacognitive inquiry routines compared to a control group (Greenleaf et al., 2011). These metacognitive inquiry routines included practices of feedback and reflection after the professional development session, as well as after teaching practice lessons to students. This supported the role of feedback through collaborative small group work and reflection through think-alouds to improve science instruction and student learning. The seventh and final feature of effective professional development, according to Darling-Hammond and colleagues (2017), was that these initiatives were of a sustained

duration. Sustained duration referred to the time and quality devoted to conducting high quality professional development. Although a specific threshold for duration of effective professional development models has not been identified, studies have been clear that a single, one-off workshop was ineffective (Desimone, 2009; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Among the nine studies reviewed by Yoon, et al. (2007) using experimental or quasi-experimental designs, an average of 49 hours of professional development per year was associated with positive student achievement gains. Evidence does support the belief that more time in professional development led to greater teacher and student outcomes. This made sense given the amount of time needed to adequately devote to the previous six features of effective professional development outlined above. In order to focus on content areas, active learning models, coaching and mentoring, feedback and reflection, and collaborative teams in the context of teacher professional development, a focus on time was an essential ingredient required for all the other features to emerge.

Previous to Darling-Hammond and colleagues' (2017) recent work in effective professional development, scholars have proposed models of understanding the process of teacher development that identified teacher change as a means to student change with similar programmatic features (Borko, 2004; Desimone, 2009). In other words, programs aimed at a goal to impact student achievement needed first to understand the processes and factors that impacted teacher growth. Borko (2004) set forth to illuminate teacher professional development through a situative perspective, one focused on multiple conceptual perspectives and multiple units of analysis. This perspective included, for example, a focus on psychological and sociocultural factors that might influence teachers

and students. That is, in a psychological sense the individual teacher or student was the unit of analysis whereby these individuals' experiences are captured to understand their role in the teaching and learning process. Additionally, in a sociocultural sense the social context of the family and the classroom become relevant elements of analysis at the social level. This situative perspective was one that allowed for these different ways of meaning-making through various frameworks and thus was particularly relevant for the task of understanding and ultimately assessing outcomes of teacher professional development. The essential component of mapping the terrain of professional development research was to understand the individual focus aimed at teachers' knowledge of the subjects they teacher, student thinking related to the subjects, and instructional practices in the classrooms (Borko, 2004). It was this teacher-centered approach, common to most professional development to date, that set the foundation for conducting research into effective professional development programs.

Before Darling-Hammond and colleagues' (2017) research described above, Desimone (2009) explored the importance of a conceptual framework for studying professional development. Five core features served as critical components of effective professional development laying the foundation for future work essential to understanding how teacher professional development influences teacher change, and ultimately student change. Each of the Desimone's five features were aligned closely with Darling-Hammond and colleagues seven features. In particular, content focus, active learning, collaboration/collective participation, and sustain duration emerged as common features of both models (Darling-Hammond et al., 2017; Desimone, 2009). Now a pattern has emerged in effective professional development programs. These

programs tended to focus on content and subject knowledge of the teacher, including alignment with local, state, and national standards of K-12 curriculum. These programs tended to provide adults (teachers) with opportunities to experience different kinds of learning experiences themselves, ones that included lecture and traditional teaching elements, but moved beyond to exposure teachers to dynamic learning environments that put the teacher at the center of the growth process. These programs focused on working together through collaboration in and participation with diverse colleagues. These programs tended to provide time for discussion and reflection among teachers from different grades, subjects and schools. And perhaps most importantly, these effective professional development programs tended to emphasize long-term commitment to the growth and development process of the teacher. Knowing teachers spent nine months building relationships with students to affect change, teachers themselves needed the time and support to development their attitudes, beliefs, knowledge, skills and practice in their attention to improving student academic outcomes. Teacher change emerged as a central feature of effective teacher professional development programs.

In looking at teacher change, one of the most widely studied areas of research has been the application of Bandura's (1977, 1997) social cognitive theory to the field of education. In particular, the construct known as teacher efficacy (Bandura, 1977, 1997; Tschannen-Moran & Hoy, 2001) has emerged as a critical area of teacher-level change that influences student academic achievement (Kim & Seo, 2018; Mohamadi & Asadzadeh, 2012). This significance in research on teacher change was because Bandura described a theory of the relationship and interplay among cognitive thoughts, behavior, and the environment, that lent itself particularly well to a series of studies aimed at

examining the role of behavior change. What emerged was a theory of human behavior that emphasized not only the cognitive processes, but how individuals assessed their behaviors in the context of the environment, both in looking back at past experiences, as well as trying to predict future experiences. This inclusion of cognition and belief was particularly relevant for studying teachers in the context of professional development. In a classic example, teacher efficacy was assessed in 50 in-service teachers from a broad range of subject at three occasions – beginning, middle, and end of an 8-month professional development (J. A. Ross, 1994). The main finding as it related to professional development impact on teacher efficacy was that use of the knowledge, not the exposure to it, is what contributed to the changes in teacher efficacy. This sources of this efficacy change were the influence of vicarious experiences based on the structure of the professional development. These sessions were led by teachers who had experience in the session topic on cooperative learning. The authors concluded that it was through various experiences, having expert, experienced teachers who led these sessions, that influenced the change in teacher efficacy (Bandura, 1977; J. A. Ross, 1994). Additionally, positive feedback and affirmation of competence from those with expertise (i.e., these experienced teachers) could also have contributed to the development of efficacy through the verbal persuasion pathway. That is, when credible actors recognized success in a given area, the person may be more likely to develop greater confidence and efficacy as a result of those words within the context of competency.

Other studies have examined the role of action in relation to thought that motivated efficacy change in teachers (Glackin, 2018; Lee, Cawthon, & Dawson, 2013). Pedagogical conceptual change has been studied in teachers taking drama-based

instruction professional development to illustrate the value of drama to induce cognitive thoughts, which then lead to changes in teaching practice. An outdoor science program for teachers identified strategies as sources of efficacy growth, noting that it was the combination of sources that can be most influential. These studies pointed to a central theme related to efficacy research in the professional development context which was the relationship among teacher change, sources of efficacy, and student learning.

The Teachers Institute approach was a university-school partnership for teacher professional development developed forty years ago based on collaboration, creativity, content knowledge and curriculum development using a seminar learning model. Public school teachers participated in content-rich seminars led by university professors over the course of several months. The participating professors came from colleges of arts and sciences signaling expertise in a discipline rather than expertise in K-12 education. The participating teachers had averaged ten years of teaching experience so through educational background, district-led professional development, and experience in the classroom these teachers ranged from newer teachers to more experienced teachers. The professors came with confidence in their knowledge of their area of study (e.g., history or biology), but not much confidence at all in teaching public school students in elementary or secondary grades, while teachers came with confidence in their knowledge of teaching practice (e.g., developmentally appropriate strategies and district-school curriculum), but not much confidence in cutting edge scholarship in subject content areas. This reciprocal model of strengths and needs between professors and teachers set the stage for the interplay that occurred over the course of several months in these professional development seminars.

Research has shown teachers reported high levels of satisfaction among those who participated in seminars compared with those who don't participate in seminars (Smith, 2004, 2009). Teachers reported desires to develop materials to motivate their students, opportunities to grow professionally and intellectually, and deepen their subject content knowledge in the classroom. One study in 2004 examined four diverse sites which offered seminars related to the Teachers Institute model. At each site, teachers in these seminars were taken from all grade levels and all subject areas in order to obtain curricula suited to their and their students' needs, to increase their mastery of the subjects, and to obtain materials to motivate their students (Smith, 2004). In total, this 2004 study of the four sites included 650 teachers and 60 college faculty in 75 seminars over the course of the three-year project. This study illuminated the potential for teachers: teacher-written curriculum, with support from university professors, has the potential to motivate and educate their students, better than any available alternatives (Smith, 2004). Additionally, in a quantitative study examining teacher retention in a public school district over five years, teachers who participated in these professional development seminars were twice as likely to remain teaching in the district compared to similar teachers who did not participate in these seminars (Smith, 2009). This follow-up report on Teachers Institutes examined a five-year period to determine effects of intervention on teacher retention and student achievement using a comparison group research design. Given the promising results on teacher retention in this quantitative study, it did suggest the potential for other quantitative findings. However, in the same study using standardized tests, there were no statistically significant effects on the measures of achievement, including test scores and grades.

While initial research on the impact of Teachers Institute seminars was promising, this current study extended existing work by examining the role of teacher efficacy, including the particular sources of efficacy growth within the context of this professional development program. Many of the features of the Teachers Institute approach are consistent with effective professional development models (Borko, 2004; Darling-Hammond et al., 2017; Desimone, 2009), as well as those teacher professional development strategies studied in other teacher efficacy contexts such as drama-based instruction (Lee et al., 2013) and outdoor science education (Glackin, 2018).

This study employed both quantitative and qualitative approaches in a sequential explanatory mixed-methods design in an effort to contribute to the literature on effective teacher professional development. In particular, the purpose was to determine teacher efficacy change after professional development seminars using the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001), and qualitative data from post-seminar surveys and semi-structured interviews were analyzed for emergent themes. Taken together the aim of this study was to document pre-post seminar efficacy change and to explore sources of teacher efficacy within the context of Teachers Institute seminars.

Purpose of the Study

The purpose of this study was (1) to examine the relationship between teacher efficacy before and after a university-school district professional development program, and (2) to explore teachers' perceptions of teacher professional development that might be associated with changes in teacher efficacy.

CHAPTER 2: LITERATURE REVIEW

Teacher Professional Development

In an often-reported analysis of teacher professional development research using experimental or quasi-experimental methods, only nine out of more than 1,300 studies demonstrated a link between professional development and student achievement (Yoon et al., 2007). This finding illustrated the great challenge in designing a study that meets rigorous research standards to detect changes in student achievement attributable to professional development. Yet the main focus of the vast majority of teacher professional development program has been to ultimately affect student outcomes. However, in a recent review of 35 methodologically rigorous studies linking teacher professional development and student academic outcomes, seven features emerged as particularly important: content-focused, active learning, collaboration, modeling practice, coaching and support, feedback and reflection, and sustained duration (Darling-Hammond et al., 2017; Desimone, 2009). The authors cited a recent study examining the system-level challenges to effective professional development (Tooley & Connally, 2016). This study analyzed education policy issues related to system-level change in school districts around the country. They found four system-level obstacles are identifying professional development needs without teacher consultation, failure to examine research-based best practices, limited implementation fidelity, and little to no systems of evaluation to assess the impact of professional development. These challenges highlighted the limited focus and attention school districts place on creating a shared vision for quality professional development and communicating that message to the school level. Additionally, principals aren't as prepared as they might be to align

school needs with the appropriate professional development for teachers. A study of 1,722 literacy teachers completed questionnaires based on items related to professional development experience, teaching practice, and overall organizational climate over a four-year period (Kisa & Correnti, 2015). A key finding from this longitudinal study was that the professional development intervention was not maintained at the school level over the four years of the study (Kisa & Correnti, 2015; Penuel, Fishman, Yamaguchi, & Gallagher, 2007). Kisa and Correnti (2015) proposed explanations for these findings about the varied nature of the implementation fidelity. First, the researchers estimated effects at the school-level rather than on teaching practice. For teaching practice, they did find a slight positive, though non-significant, finding over the course of the study. Second, they raised the issue of the program design of the professional development program. To this point, the study was not sensitive enough to changes over time of implementation as it relates to the needs of individuals in schools. Perhaps as schools continue with particular interventions, the need to adjust implementation was required so school-level analysis might not detect these changes. The researchers proposed evaluation designs that were more sensitive to shifting program goals and expectations about outcomes (Kisa & Correnti, 2015). Additionally, this issue of collecting school-level measures of professional development could have been limited given the personnel changes over time in a school could necessitate these changing program goals and expectations.

Kirkpatrick (1994) developed a four-level evaluation model which he described in a series of four papers called “Techniques for Evaluating Training Programs,” published in Training and Development in 1959. In his book, Evaluating Training Programs: The

Four Levels, Kirkpatrick (1994) pulled together the elements of his theory of evaluation into a coherent form. Prior to laying out the four levels in detail and providing examples through case studies, Kirkpatrick described a ten-step process, ending with the actual evaluation piece. These proceeding steps outline the role of needs assessments, setting objectives, determining content, selecting participants, determining schedule, selecting facilities, selecting instructors, preparing audiovisual aids, coordinating the program, then lastly, evaluating the program. One suggestion related to determining needs is to establish an advisory committee of key stakeholders representing different departments within the organization (Kirkpatrick, 1994, p. 6). This advisory committee was vital to making the final decision on the priority of subjects to be offered. This committee accomplished four purposes: (1) helped to determine subject content for training programs, (2) informed committee members of the efforts of the training department to provide practical help, (3) provided empathy regarding the needs seen by their subordinates, and (4) stimulated support of the programs by involving them in the planning (Kirkpatrick, 1994, p. 6). This approach to decision-making was particularly relevant as a parallel to evaluating the program in the current study. The Teachers Institute model included an advisory committee of K-12 classroom teachers, known as the "Steering Committee," who made decisions about professional development seminars offered, selected the university professors who offer those seminars, and presented program ideas to teaching colleagues throughout the district to promote the seminars. They acted in a critical advisory capacity to ensure the seminars meet the needs of practicing classroom teachers in a variety of grade levels and subject areas.

The Kirkpatrick model's four levels are Level 1 – Reaction; Level 2 – Learning; Level 3 – Behavior; and Level 4 – Results. Reaction measured how the participants react to the program, similar to that of customer satisfaction. While satisfaction alone was not enough to ensure learning, it could have been a significant contributor. Kirkpatrick (1994) claimed positive reactions from participants did not guarantee learning and results, however, negative reactions typically did lead to reduced learning capacity. Learning encompassed a change in attitudes, knowledge, and/or skills as a result of the professional development program. This was the level in which objectives were set relative to how many of the three definitions of learning are identified. It was possible that programs identified goals in all three areas of learning, and in these cases, a time component was typically added to reflect the growth and development process. While learning could occur without behavior change, the change in behavior showed an essential element of the development process. Four conditions were required, according to Kirkpatrick (1994), for change to occur: a person must have desire to change, they must know what to do and how to do it, they must work in the right climate, and they must be rewarded for act of changing. The right climate referred to the role of the supervisor, which in the case of a school setting, would be the principal. It was also a factor in the change process to be aware of the climate of the setting in which the participants of the training will return. A neutral, or positive climate made the difference between a successful training program and one that never delivered on its promises. Results were the contributions of the participants linked to the program following positive reactions, changes in attitudes, and then behaviors. Results were more tangible such as productivity, or less concrete as in improved quality and better morale. In either

case, this level, too, required time was factored in to properly gauge the value of the results for the person and the organization.

Kirkpatrick's model provided a straightforward framework for examining the impact of training programs. Although originally designed for businesses and organizations, this model has been applied to schools settings (Lavish, et al., 2016). In the case of this study, Kirkpatrick's model provided a useful context to explore the role of the Teachers Institute in the growth and development of teacher efficacy through professional development seminars focused on content knowledge, collaboration, creativity, and leadership.

Another significant contribution to the body of work on professional development evaluation was Guskey's Five Levels approach. Written more directly about teacher professional development than Kirkpatrick (1994), Guskey (2000) advanced the field of research as it related to K-12 education by using language and examples related to teaching within the school context. However, like Kirkpatrick's contributions to evaluating training programs, Guskey (2000) provided an approach easily adaptable to other professional settings outside of education. Guskey's five-level model included: (1) Participants' reactions, (2) Participants' Learning, (3) Organization Support and Change, (4) Participants' Use of New Knowledge and Skills, and (5) Student Learning Outcomes. Similar to the logical conclusion reached by Kirkpatrick (1994), Guskey (2000) described the need to assess the immediate reactions of the participants to the particular intervention. This was accomplished by a series of questions related to the content, process, and context of the professional development experience. Similar to Kirkpatrick (1994), level 1 for Guskey was assessment of the initial satisfaction of the participants or

whether or not, the participants liked the experience. While obvious on its face, this part of both models was essential to advancing a comprehensive evaluation plan. The Guskey (2000) model emphasized the role of measuring participants' learning in level 2. Learning was defined as either cognitive pertaining to knowledge and understanding, psychomotor pertaining to skills and behaviors, and affective pertaining to attitudes and beliefs (Guskey, 2000). Goals were then required in order to establish which of these ways of defining learning were relevant to the particular professional development program. This then shaped the types of information collected in order to ensure alignment with the stated program goals. Whereas the Kirkpatrick (1994) model identified the role of "climate" within Learning (Level 2), the Guskey (2000) model set out climate-related information as its own level. Level 3 in the Guskey (2000) model described the role of organizational support in the change process. This aspect of the model extended the critical role of context in delivering and assessing a professional development experience by detailing ways in which environments, particularly the school setting in Guskey's work, acted to facilitate or undermine the change process. Principals, other teaching colleagues, and staff acted to minimize the impact of a particular professional development experience. In other words, individual reactions could have been positive to a program, and documented significant learning could have taken place on essential outcomes, yet behavior change could have failed to materialize given the social context within which a person operated. In the case of a teacher, she may have felt great about an off-site experience, for example, and showed gains in her knowledge and skills related to the training, however, returned to a school not welcoming to her newfound positivity and knowledge. In such a case, little would be expected in terms of

lasting impacts on classroom or student success outcomes. Additionally, the opposite was possible given a return to a positive, supportive culture. Level 4 in Guskey's (2000) model underscored a particularly critical element in the life of teacher practitioner: the role of action. The use of knowledge through application in the context of classroom lessons, for example, was part of the framework that signaled a direct connection of Guskey's (2000) model within K-12 education. In teacher professional development, there has often been an eagerness to ground the new knowledge or skills in application, in the experience of trying something out in the classroom with real students. Guskey (2000) outlined challenges in evaluating participants' use of new knowledge and skills through critical indicators of use, dimensions of quantity and quality, amount of time, and flexibility for adaptations. These elements helped frame an approach to collect information in order to determine if attitudes, knowledge, and/or belief developed as a result of professional development and led to behavior change. Information in this context could have taken many forms including self-reflective journals, peer observations, interviews, detailed implementation notes, videotaped teaching practice, and small group debriefing meetings.

Lastly, Guskey (2000) identified and described the final stage of teacher professional development: evidence of student learning outcomes. Studies have determined a decades-long problem of making weak links between teacher professional development and student learning at the National Science Foundation (Frechtling, et al., 1995). Guskey's (2000) level 5 on student learning outcomes provided a new perspective on insufficiencies of existing professional development, sharpened focus on common goal for professional development, allowed for contextual factors (e.g., background,

school climate, etc.) to influence professional development outcomes, and created a more inclusive approach to serving students by allowing schools and teachers to implement a variety of solutions provided they focused on the learning of the student.

In summary, Guskey (2000) provided a five-level framework for evaluating teacher professional development and, in doing so, extended the foundational work of Kirkpatrick within the field of education. These two models of evaluating training programs, and more specifically, teacher professional development programs, have set forth a body of work in the field of evaluation science that has shaped policy and practice for decades. In this particular study, these models served as frameworks to consider the types of information collected and analyzed in the context of a particular teacher professional development intervention called the Teachers Institute model.

One common element in research on teacher professional development was the commitment to understand the potential value of investing in these programs. A model was developed to evaluate teacher professional development as a means to assess the value of the particular intervention (Guskey, 2002). The model outlined five critical levels of information required to properly analysis outcomes related to teacher professional development: Level 1 – participants' reactions; Level 2 – participants' learning; Level 3 – organizational support; Level 4 – participants' use of knowledge and skills; and Level 5 – student learning outcomes. Level 1 included a focus on participants' reactions to the professional development experience. This level explored a straightforward approach and the most common form of evaluation and data collection among these programs. Information at this level could have included whether or not the participants liked the program, felt it added value overall, or found the experience to

provide useful information. The participant provided this information through self-report via questionnaires at the end of the professional development experience. These questionnaires included rating-scale items, as well as open-ended response questions to provide both quantitative and qualitative data. Level 2 focused on the participants' learning from the professional development experience. Going beyond assessing mere satisfaction, this type of information measured knowledge and skills gained as a result of the sessions. In order to properly assess learning outcomes of participants for this Level, indicators of successful learning needed to be outlined before activities begin (Guskey, 2002). This helped to ensure change is measured correctly at the participant level. Level 3 information included organizational support and structures that could have been seen to help or hurt the professional development knowledge again. For example, take a group of teachers who participated in a professional development experience aimed at literacy development through collaborative working teacher teams. These teachers' charge was to bring back this collaborative team concept to their schools to impact literacy among their students. However, if school policies didn't allow teachers time to meet and plan together, then the reality of implementing the program as indicated would be very different, thereby sacrificing potential literacy gains. While collecting this information can be a challenge, it provided critical insights into how effective teachers' new knowledge will be in the school and classroom settings. This type of information included school records, questionnaires, meeting minutes, school documents, and administrator interviews. Level 4 asked if new knowledge and skills that participants learned made a difference in their professional practice (Guskey, 2002). Unlike levels 1 and 2, information at this level could not have been collected just after the end of the

professional development session. Allowing time to pass was a critical characteristic within this level because the implementation of the new ideas and practices took time to come to fruition. Implementing new ideas into classrooms could have been an uneven and unpredictable set of activities, so much so that collecting information on multiple intervals could be beneficial. This information was collected through questionnaires or semi-structured interviews with participants and administrators, written reflections, or examination of participants' journals. Direct observation of implementation practices was useful, however, could have been limited due to the significant amount of time required to collect these types of data. Level 5 information included what Guskey called "the bottom line": collecting data to assess the effect on students. It was important when considering what types of information to collect for this level that multiple measures of student learning were used. Guskey provided an example of an intervention aimed at improving students' writing through a series of strategies. Upon analyzing the data, student scores on writing achievement, in fact, increased significantly, however, an unintended consequence was mathematics achievement declined, due to increased instructional time devoted to writing instruction. This example pointed to the need for multiple measure of student learning in the context of evaluating teacher professional development as a strategy to avoid oversimplified conclusions. Typical types of information for level 5 included cognitive indicators of student performance such as achievement tests and grades, in addition to affective outcomes such as attitudes, and psychomotor outcomes such as skills and behaviors. In summary, Guskey's five levels of evaluation provided necessary guidance as to what types of information should be

collected by which stakeholders to begin to make accurate claims about the value of a particular professional development intervention.

Borko (2004) conceptualized a framework for understanding and evaluating teacher professional development using a situative perspective. The four key elements of any professional development system included the (1) facilitators who acted as guides for the teachers through the process of learning and discovery; (2) teachers who were the learners in the system; (3) the professional development programs; and (4) the context within which the professional development took place. Then Borko (2004) explored three sequential phases researchers can use to guide practice and evaluation; Phase 1 focused on the individual professional development program with a single facilitator on one site; Phase 2 focused on a single professional development program led by more than one facilitator at more than one site; Phase 3 focused on multiple professional development programs on multiple sites by many facilitators. Phase 3 also explored the broader professional development system: facilitator, the program, teachers, and context.

Desimone (2009) presented a core conceptual framework for studying the effects of professional development on teachers and students. The model put attention on the critical features of professional development rather than the particular structure of the professional development. In doing so, the model identified five core features of effective professional development: content focus, active learning, coherence, duration, and collective participation. The five elements of Desimone's (2009) conceptual framework explored features of professional development studies through various methods. Attention to content focus in professional development has been linked to increases in teacher knowledge and skills, improved practice, and increased student

achievement (Desimone et al., 2002; Garet, Porter, Desimone, Birman, & Yoon, 2001; Kim & Seo, 2018). In the current study examining the Teachers Institute program, content focus was defined as the lead facilitators of the teaching learning who were professors in core academic disciplines (e.g., history, biology, English, physics). By placing these content experts in the position of crafting a teacher learning experience, the result was a strong focus on content and subject knowledge of the teacher. Active learning was opposed to passive learning and included observing expert teachers, interactive feedback and discussion, reviewing student and peer work, and leading discussions (Borko, 2004; Garet et al., 2001). Teachers Institute seminars were structured in a seminar-format in that they include lecture, discussion, small group work, feedback on writing and in discussion, and teacher presentations. The focus on coherence meant teacher learning was connected with teachers' knowledge and beliefs. Coherence also included consistency with school, district, and state policies with what was taught in professional development (Desimone, 2009). Teachers in the Teachers Institute model are required to write curricula aligned with local, district, and state standards and policies. This was a critical feature of the Teachers Institute that teachers create a curriculum product that was useable by that teacher, as well as other teachers who studied and taught that topic. Duration meant the professional development activities that occurred over a period of time as well as the number of hours spent on the particular activity. While research was mixed on a "tipping point" for duration, Desimone (2009) cited more than 20 hours over a semester or intensive summer institute, and Yoon, et al. (2007) indicated nearly 50 hours over the course of a year. Teachers Institute seminars spanned seven months wherein teacher accumulated more than 30

hours of continuing education in the course of researching, writing, discussing and sharing their knowledge and curriculum plans. This amount of time and span of time was consistent with findings related to the importance of duration. Another important feature of effective professional development was known as collective participation. This included participation of teachers from same school, grade, or department (Borko, 2004; Desimone, 2009). This feature of collective participation was one where the Teachers Institute model deviated slightly. That is, while teachers from the same school, grade and department participated, another valued principle for forming the seminars was diversity of participation, in addition to collective participation. This meant that teachers in these seminars spanned elementary, middle and high school, and came from a variety of subject areas that related to the overarching seminar themes.

Desimone's (2009) model was congruent with the findings of the seven core elements of a recent report that examined 35 methodologically rigorous studies (Darling-Hammond et al., 2017). This model also examined a sequential theory of change, beginning with the role of the teacher. The central importance of a teacher in the context of professional development was essential in understanding the process of change for any intervention. As Desimone (2009) suggested in a four-part model: (1) a teacher experienced effective professional development focused on five core features, then (2) she increased knowledge and changed beliefs, then (3) she, as a result of these changes in knowledge and beliefs, changed her content of instruction and/or approach to pedagogy, and finally (4) these changes in knowledge, beliefs and practice increased student learning. In this particular change cycle it was critical to begin with the teacher. It may have seemed obvious to focus on teacher change within a professional development

model yet increased focus on student performance through test scores and newer value-added models of student growth has, in some cases, effectively bypassed a true understanding of the teacher change process. Desimone (2009) emphasized change in teachers' beliefs as a precursor to meaningful change in teachers' practice, and then ultimately influenced student achievement.

The Concept of Self-Efficacy

Perhaps the most widely studied theory of social science in the past 50 years, the concept of self-efficacy was founded on the notion of human agency, that was that "people can exercise influence over what they do" (Bandura, 1997) . Self-efficacy was situated within social cognitive theory described by influential psychologist Albert Bandura (1977, 1997). His main contribution to this framework was his theory of reciprocal determinism, a complex interaction among three variables – environment, behavior, and person. In this theory, behavior was partially a function of the environment, but conversely, the environment was partially a function of behavior. The role of "person" was understood to include such cognitive factors as memory, anticipation, planning, and judging (Fiest & Fiest, 2002). These cognitive functions allowed people to influence both their environment and their own behavior. Cognition partially determined which environmental stimuli people attended to, the value they placed on these stimuli, and how they organized these stimuli for future use. Cognition, however, was not purely autonomous or independent of behavior and environment. Critical of theories that attributed human behavior to internal forces (instincts or drives), Bandura explored a three-way interaction of environment, behavior and person (or cognition) (Fiest & Fiest, 2002). It was this emphasis on the role of cognition in

generating human behavior, as well as the influence of reciprocity that set this theory of reciprocal determinism apart from other theories of human behavior.

In this system of human behavior the reciprocity of environmental and cognitive factors was at the core of understanding how people acted in a particular situation. The particular set of expectations or beliefs that individuals held in relation to whether they could or could not execute a behavior required to produce desired outcomes was known as the concept of self-efficacy. Badura made clear the difference between self-efficacy and self-esteem within the self system. Self-efficacy was concerned with judgments of personal capability, whereas self-esteem was concerned with judgments of self-worth (Bandura, 1997). This meant there was a difference between cognitive elements of oneself in the context of appraising what they are capable of doing and appraising who they are, or if they like themselves or not. This distinction was important, Bandura claimed, because people often misrepresented such differences in culture and in research.

Another important distinction in understanding the concept of self-efficacy was the difference between expectancy expectations (or efficacy beliefs) and outcome expectations. An efficacy belief was a judgment of one's ability to organize and execute given types of performances, whereas an outcome expectation was a judgement of the likely consequence of such performances will produce (Bandura, 1997). This distinction then required another distinction that was often misconstrued. The difference between performance and outcome in the context of the concept of self-efficacy had important implications for understanding efficacy beliefs and outcome expectations. Performance was an accomplishment while an outcome was something that came from it – in other words, an outcome was the consequence of a performance, not the performance itself

(Bandura, 1997). For example, consider the issue of the achievement domain. The letter grades of A, B, C, D, and F were markers of performance, however are not outcomes. Citing studies on academic achievement in different cultures (Ogbu, 1990), Bandura (1997) argued that a grade at the A level might have brought self-satisfaction and social approval in circles that valued such achievement, but brought isolation and anxiety among individuals in subgroups who devalued the same achievement. This distinction was useful in the context of the focus on efficacy belief and outcome expectations. In this current study that explored teacher efficacy within professional development settings the focus was on beliefs about performance rather than beliefs about outcomes among teachers was of critical importance. The purpose was to examine expectations about capabilities related to performance tasks, such as motivating an unmotivated student or fostering creativity, rather than on what came as a result of the increased motivation or creativity of the student. This helped to create a framework with a primary focus on teacher growth.

Teacher Efficacy

Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute that course of action required to produce given attainments (p.3). This concept emerged out of Bandura (1977) social cognitive theory which explored the complex role and interaction among beliefs, environment and behavior. In the context of teaching, efficacy was understood as the teacher's belief in her capability to complete a task that led to student learning. Efficacy was understood to be influenced by four factors: Mastery experiences, vicarious experiences, social persuasion, and physiological reaction. Mastery experiences were considered the strongest determinant of efficacy

growth. These experiences occurred when an individually successfully completed a task. Vicarious experiences, or also known as modeling, occurred when an individual observed someone else completing the task. Verbal persuasion occurred mostly through verbal communication when an individual received encouragement or discouragement related to completing a particular task. Physiological reaction referred to when a situation or a person elicited a physiological response, and that person attributed significance to that reaction.

The majority of studies in teacher efficacy have examined this construct through a quantitative lens (Kleinsasser, 2014; Tschannen-Moran & Hoy, 2001). Kleinsasser (2014) examined 12 articles in the journal *Teaching and Teacher Education* to find nine of the 12 articles employed a quantitative research approach, including one mixed-methods approach. Tschannen-Moran and Hoy (2001) referred to teacher efficacy as "an elusive construct" and therefore created a measurable 24-item scale in an attempt to capture what was hard to know. This approach was consistent with the social cognitive theory (Bandura, 1977, 1997) that purported behavior was influenced by a combination of cognitive and environmental factors. Assessing cognition through attitudes or beliefs was an approach that helped to understand significant factors of human behavior. Moreover, this approach to quantify efficacy, or one's belief in their own capacities in a particular direction and situation, provided a useful way for researchers to test Bandura's theory.

Other studies have acknowledged the need to deepen understanding for the teacher efficacy construct through qualitative methods (Labone, 2004; Wheatley, 2005). Labone (2004) took an interpretivist and critical perspective to reassess the teacher

efficacy construct in the name of education as social reconstruction. Rather than rely on the experimental, quasi-experimental, and correlation studies to inform a relatively narrow conception of teacher efficacy, this analysis expanded the context to include meaning-making (interpretivist) and cultural (critical theory). The interpretivist paradigm was concerned with the lack of consideration of the meaning perspective, according to Labone (2004). This was then more aligned with Bandura's (1997) conceptualization of efficacy as having a strong cognitive processing element to interact with the environment and behavior dimensions of learning. Additionally, critical theorist criticized the view of understanding teacher efficacy through an objectivist lens and separate from the broader social context (Labone, 2004). Earlier scales of teacher efficacy relied too heavily on instructional elements without taking into account social context, according to Labone (2004), to the detriment of a fuller understanding of the teacher efficacy construct. This led to a thorough treatment of influences on the use of efficacy information and implications for the development of teacher efficacy beliefs. For example, in terms of mastery experience, Labone (2004) identified a pre-existing self-schemata, or how teachers held beliefs about their performance and how they interpreted it, that needed to be aligned with experience. That is, there was a bias or tendency to dismiss performances that were inconsistent with existing efficacy beliefs. In the case of a teacher in a professional development setting that might have meant completing the required task satisfactorily but not appraising it accurately given a lack of confidence in one's capability of said task. Another example in the context of vicarious experience was the influence of competent mastery models on the learner. In this case, people developed teacher efficacy through hearing and seeing the facilitator share out

loud details about the process involved in mastery of the task. So it went beyond simply doing the task well, but articulating the process to complete the task that was distinct in this type of vicarious experience. In the case of a teacher in a professional development setting this occurred when a facilitator showed how a particular task was completed while simultaneously describing and appraising key elements in the task process. Lastly, in the context of verbal persuasion was the role that expertise and credibility played in the efficacy process. In order to develop efficacy, Labone (2004) claimed those giving verbal persuasion must be perceived by the recipient to have expertise and credibility in the targeted skill. In the case of a teacher in a professional development setting this occurred when the facilitator of the learning experience was perceived as expert and competent in the field, which led to perceived credibility and growth in teacher efficacy.

In an effort to reconceptualize the term "teacher efficacy" Wheatley (2005) provided an analysis of the inherent complexity in simplifying a construct so layered with interpretation. This analysis included a critique of quantitative ways of understanding teacher efficacy and reduced the teacher efficacy construct to a numerical value. Wheatley (2005) suggested a definition of teacher efficacy that was broader than the efficacy judgments of Bandura (Bandura, 1997) or the numerical scales set to organize the elusive construct (Tschannen-Moran & Hoy, 2001). This could have had a negative effect on teachers, Wheatley (2005) claimed, by misrepresenting or reifying the notion of teacher efficacy. Researchers and educators alike therefore were left to ignore the real value and utility of teacher efficacy. Stated simply, "If the goal is utility (i.e., 'consequential validity') teachers' efficacy beliefs simply cannot be communicated meaningfully by numbers" (Wheatley, 2005). The claim here was that teacher efficacy

needed to matter to teachers and that only representing these beliefs through numbers was highly inadequate. Thus future studies, the argument went, should at minimum employ a mixed-methods design and perhaps explore the value in purely descriptive or qualitative approaches. In addition to utility, another key benefit of studying teacher efficacy through an interpretive lens was the value of bettering the explanatory power. In other words, with rich descriptions of teachers' experiences in the context of teacher efficacy sources a more complete picture of teacher change was likely to be established.

Teacher Efficacy and Student Achievement

A recent meta-analysis of the results of 16 studies involving more than 4,000 teachers showed the relationship between teacher efficacy and students' academic achievement was significant (Kim & Seo, 2018). This study examined the effect sizes of research studies that used either Gibson and Dembo's scale (1984), Bandura's scale (1997), and Tschannen-Moran and Hoy's scale (2001) and found a positive correlation between teacher efficacy and students' academic achievement. Furthermore, two key findings related closely to the present study: First, the type of scale used mattered. Studies that used the scale developed by Tschannen-Moran and Hoy or Bandura's scale (Caprara, Barbaranelli, Steca, & Malone, 2006) demonstrated teacher efficacy was positively related to students' academic achievement, however in studies in which Gibson and Dembo's scale was used the results showed the relationship was not positive (Munoz, 2008). This suggested these scales measure different aspects of the teacher efficacy construct and these are important differences. In addition, there were differences in factors of the scales. Kim and Seo (2018) discovered the relationship between teacher efficacy and student' academic achievement was significant when instructional strategies

and student engagement were used, but not when classroom management was used. These results support the idea, then, that teacher efficacy was context-specific (Mohamadi & Asadzadeh, 2012). In the context of instructional strategies and student engagement, teacher efficacy was about teachers' confidence as it related to their teaching methods and their abilities to motivate and engage students, both connected to academic achievement. In the context of classroom management, teacher efficacy might be less coupled with academic achievement, more focused on student behavior and rule following than student learning. They concluded that teacher efficacy in classroom management might be less useful than instructional strategies or student engagement.

Another important finding from Kim & Seo (2018) meta-analysis was that the relationship between teacher efficacy and students' academic achievement depends on the length of the teacher's professional experience. Specifically, the researchers found the correlation between teacher efficacy and students' academic achievement was significant in the case of teachers with more than 11 years of professional experience, but not for teachers with fewer than 11 years of professional experience. This finding suggested teachers with more experience who demonstrate strong teacher efficacy beliefs are more likely to influence students' academic performance, compared with novice teachers with strong efficacy beliefs. However, this particular study did not examine how teacher efficacy growth over time among individual teachers mediated student achievement gains.

Professional Development and Teacher Efficacy

Studies have examined teacher efficacy as an outcome of teacher professional development. A recent study examined the role a professional development program

played in identifying the strategies for teacher efficacy growth among science teachers (Glackin, 2018). Six teachers participated in a two-year professional development program that focused on outdoor science education. Teachers created ten outdoor science activities and developed them over the course of the two-year period. Four themes emerged related to positively influencing teachers' self-efficacy: simulated modeling, resources and props, teachers' involvement, and theory and expertise. Simulated modeling was defined as role playing wherein effectively the teachers played the role of the students and the professional development facilitator played the role of the teacher. This put the teachers in the role of learner similar to that of their students in the classroom. This situation created opportunities for teachers to experience one of the key sources of efficacy development known as vicarious experience. Teachers in this professional development model were able to develop the cognitive mindset of empathy for how students might feel in school classroom settings. This simulated modeling approach presented teachers with the opportunity and challenge of learning information, rather than conveying information, a clear role reversal from their typical teacher-student relationship. Put simply, they were able to experience the other, less familiar side of the learning equation. Additionally, by practicing the same content and activities that their students would do, teachers were able to become more familiar with this information in a way that built confidence in them to teach their students. Another key strategy that led to efficacy growth was called teachers' involvement. In this study, Glackin (2018) defined involvement to indicate teachers working alongside other colleagues during the sessions, leading parts of the session and taking an active participation role in the activities. This particular strategy related to the source of efficacy growth known as

emotional and psychological experiences. Teachers talking to other teachers and experts led to feelings of solidarity and closeness which can translated into increased confidence and efficacy. Additionally, these intensive group discussions were an opportunity for verbal persuasion, another source of efficacy. By allowing time to discuss content and teaching practices among other teachers these teachers identified a real value in hearing from others on their practice and cited how infrequent that was in typical professional development settings.

Another study examined a university-school partnership around drama-based instruction among K-12 public school teachers. The researchers conducted a mixed-method analysis looking at elementary and secondary teacher efficacy and pedagogical conceptual change through drama-based instruction (Lee et al., 2013). There were twelve elementary school teachers and eighteen elementary teachers who participated in this study. These teachers went through a small group training sessions and one-on-one mentorship to learn the drama-based instruction techniques. Monthly site visits formed the foundation of the model which included a before visit training based on a needs assessment, a during visit facilitation by professional development staff, along with co-created lessons alongside the teacher, and an after visit evaluation focused on strengths and weaknesses of the training agenda. As a key component to this study, the notion of pedagogical conceptual change refers to a change in the cognitive framework of a teacher that influences their teaching practice. A key component in this pedagogical conceptual change was action. That is, if a teacher just has an idea about a particular instructional strategy or content topic, but has not implemented it, then pedagogical conceptual change has not occurred. It was only in the process of acting upon that new idea that this type of

change will manifest. The study found that elementary school teachers experienced greater pedagogical conceptual change compared to secondary school teachers. However, the greatest change occurred for low efficacious elementary teachers and high efficacious secondary teachers (Lee et al., 2013). Additionally, years of teaching experience negatively predicted elementary teachers' efficacy, but positively predicted secondary teachers' efficacy. The researcher concluded then that professional development should focus on novice elementary teachers who are struggling and experienced secondary teacher who are excelling.

Another study conducted a randomized field trial to determine if a professional development program increased the teacher efficacy of mathematics teachers (J. Ross & Bruce, 2007). 106 teachers participated in the study and were randomly assigned to two conditions – a treatment and control. The treatment condition focused on the four sources of efficacy information: mastery experiences, vicarious experiences, social persuasion, and physiological states (Bandura, 1997). Despite finding increases on the three constructs of teacher efficacy, only classroom management was found to be statistically significant. The authors concluded that perhaps the two non-significant constructs, teachers' confidence in their ability to engage students and to use new instructional strategies actually followed confidence in classroom management practices. However, it was also true that the professional development interventions for the teachers focused on the management of students in the classroom, rather than on the ideas of the subject matter required to be covered. Based on that professional development approach, it was reasonable to observe statistically significant differences in areas related to the intervention focus for the teachers. Whether or not confidence to manage one's

classroom comes before confidence to engage students or instruct creatively was beyond the scope of that study.

In the context of this literature on teacher professional development, teacher efficacy, and student achievement, the Teachers Institute approach provided two important opportunities for this current study. First, the Teachers Institute approach was a great example of a program that included all or most all of the features identified by researchers as essential to effective teacher professional development (Darling-Hammond et al., 2017; Desimone, 2009). While the intensity of the particular feature might vary, the Teachers Institute approach did include elements of all seven core features. However, not all of these elements have been examined in the existing research. Second, the way the Teachers Institute approach conceptualized and operationalized "content knowledge" was of particular note. Nearly all of the professors who led seminars came from college of arts and science at universities, rather than colleges of education or others. This feature set up a particular dynamic that was unique in other professional development studies. While "content expert" in other studies (Darling-Hammond et al., 2017) on professional development has been defined as expert in the field of education and teaching, the Teachers Institute approach employed a different approach. Drawing from professors in biology, chemistry, physics, English, history, art, and political science, to name a few arts and science disciplines, the Teachers Institute approach uniquely provided learning that was centered on the topic of study, and was supported by the pedagogy in the classroom. This particular shift in focus allowed the professors to act as both leaders in the seminars and learners as they stepped back when teachers shared ideas related to implementation and practice. Furthermore, this attention to provide the best

educational setting for effective professional development left the Teachers Institute approach in a position to contribute to the literature on teacher efficacy and professional development. To date, no studies have examined the role Teachers Institutes play in the development of teacher efficacy in practicing classroom teachers. This current study made exactly such a contribution.

The Teachers Institute Approach to Professional Development

Begun in 1978, the Teachers Institute approach was based on addressing teacher quality through providing public school teachers with effective professional development. Numerous studies have identified elements that make up effective professional development that have been the building blocks of the Teachers Institute approach (Darling-Hammond et al., 2017; Desimone, 2009; Desimone et al., 2002). An evaluation report of the Teachers Institute approach identified seven characteristics that foster effective professional development: focus on content knowledge linked to pedagogy; active learning; teacher leadership; sustained duration; collective and collaborative participation; alignment with curricular standards; and ongoing evaluation (Smith, 2009). Recently, a review of 35 methodologically rigorous studies concluded these characteristics were essential for effective professional development adding the use of models of effective practice and the value of providing coaching and expert support also contributed to effective professional development for teachers (Darling-Hammond et al., 2017).

The Teachers Institute approach was centered on a partnership between an institution of higher education and public schools. This approach included an annual program of professional development seminars supported by administrative staff, networks of teacher leaders in the public schools, and a group of higher education faculty members.

The professional development seminars were offered weekly over several months and were led by university faculty members on topics that teachers have selected to enhance their knowledge of what they teach (content knowledge). The seminars included teachers from different public schools teaching different subjects at different grade levels who commit to learning more about topics in the humanities and sciences in order to improve their teaching. Each teacher in the seminar worked alongside the university faculty member and her teaching colleagues to produce original curricula based on the needs of her students and her particular curricular standards. These curriculum projects were written products around twenty pages in length based on research into the topic of the seminar, with support from the faculty member, and adapted to fit the teachers' students' needs and standards. The writing process involved teachers sharing their progress in writing to their seminar faculty member who provided content feedback, as well as sharing with teaching colleagues in the seminar who provided pedagogical feedback. The seminar time was divided up evenly between a focus on improving the teachers' content knowledge and developing effective teaching strategies for their students. Public school teachers and university faculty members were paid stipends for their full participation and completion of the professional development seminars.

The Teachers Institute approach has been primarily evaluated through survey research conducted by participants after completing the professional development seminars. Two evaluation reports functioned as extant research on this particular professional development approach. The first report conducted in 2004 analyzed surveys from a national demonstration project involving institutes in four locations: Pittsburgh, Pennsylvania; Houston, Texas; Santa Ana, California; and Albuquerque, New Mexico

(Smith, 2004). Each location conducted annual evaluations of participating teachers through self-report surveys and found teachers at all sites rated these professional development seminars higher than other professional development programing in terms of knowledge growth, developing skills, enthusiasm, high expectations of students, and motivating students (Smith, 2004).

A second evaluation report conducted in 2009 examined survey data from over 1,200 teachers who participated in the four locations from 2003-2008 (Smith, 2009). Across all four sites, when asked to choose reasons for participation, teachers rated "desire for materials to motivate students," "desire for curriculum fitted to teachers' needs," "desire to increase teachers' mastery of their subjects," and "desire to exercise intellectual independence" as the top four items, respectively. Across all four site locations, high percentages of teachers reported they chose these seminars because they wanted to increase their content knowledge; to create curriculum that fit their professional needs; and to develop curriculum as a means to motivate their students (Smith, 2009). Additionally, within this 2009 report, a retrospective quantitative study examined teachers and their students who participated in seminars from 2000-2005. Using a propensity scoring matching process to compare teachers in seminars with teachers not in seminar within the same district, this quantitative study had two noteworthy results. First, it was reported teachers who participated in seminars were nearly twice as likely to remain in teachers after five years compared with those who did not take seminars (Smith, 2009). Although the design of the study did not permit a casual claim with these results this correlation between participation in seminars and teacher retention was statistically significant, and potentially practically significant. Whether or not the finding supported the idea that participation in

these seminars caused teacher retention, the fact that teachers who participated were retained at a greater rate than non-participating teachers provides evidence of the value of these seminars for overall teacher quality. This was because the Teachers Institute seminars focus on the seven aspects of effective professional development for teachers: content-focused, active learning, collaboration, modeling practice, coaching and support, feedback and reflection, and sustained duration. These aspects have independently been linked to student learning outcomes (Darling-Hammond et al., 2017; Wei et al., 2009; Yoon et al., 2007). The Teachers Institute model included all seven features of effective professional development. Through a commitment to having university professors, namely from the colleges of art and sciences, lead the professional development seminars, the focus was firmly upon expert content knowledge. Seminars in the Teachers Institute model were designed so that all participants are encouraged to contribute to the development of the seminar. Consistent with principles of adult learning and evaluation, these seminars built on the expertise of the teachers to capitalize on their own educational and experiential backgrounds in the execution of the seminar series. Additionally, professors worked to provide different learning experiences for teachers from field trips to lab demonstrations, and guest speakers to interactive group learning. Collaboration was also a top value. The seminar topics themselves were selected by practicing classroom teachers through an iterative process of feedback designed to yield the most teacher-centered seminar offering. Professors and teachers in the seminars modeled effective practice and support each other through intensive feedback processes. Professors and teachers modeled practices of not only teaching, but also of doing science, close reading a text, establishing an argument, all skills required for understanding and teaching of subject areas. Additionally, expert

professors served as a coach or mentor for each teacher in the seminar. That is, while they facilitated group discussions in weekly seminar meetings, professors also acted as curriculum guides for the teachers as they wrote dozens of pages of curriculum content. These professors then served as academic resources through the writing and research process. Writing deadlines were part of the writing process. In addition to the application essay, which served as the first part of the writing process, there were four additional writing deadlines in the seven-month fellowship. These were spread out over the course months to provide time for teachers to research and write, and for professors to review and give detailed feedback. Additionally, at two time points in the fellowship, teachers met one-on-one with professors. These meetings were to provide the teacher with detailed feedback, notes and resources that directly related to the focus of the curriculum project. This too provided examples of effective modeling in terms of the research process, as well as increased confidence of the teachers through specialized time with the professor leading the seminar. Lastly, the role of sustain duration was essential to the Teachers Institute model. The seminars ran for seven months for teacher participants. The professors spent three months prior to the start of seminar planning, discussing, and learning about the particular nature of the Teachers Institute model. Teachers completed more than 30 hours of continuing professional development in the seven-month fellowship. This significant investment in professional development hours by teachers and professors was consistent with other programs that have documented student achievement effects as a result of professional development (Yoon et al., 2007).

In addition to the link between elements of Teachers Institute seminars and effective professional development studies, results from the 2009 report of four site

locations shed light on potential value of this study's focus on teacher efficacy growth through seminars. Nearly 9 in 10 teachers who participated in seminars reported that they "agreed" or "strongly agreed" that the seminars provided "useful knowledge" and "raised their expectations of students" (Smith, 2009). Additionally, more than 96% of teachers rated the program overall as "moderately" or "great" useful in all four site locations. These data, while descriptive, post-treatment teacher survey responses only, indicated the potential for further analysis linking teacher efficacy growth, as measured by a reliable efficacy tool, with features of the Teachers Institute seminars.

There were several ways that the Teachers Institute approach was likely to foster the development of teacher efficacy through its professor-led seminars. As cited in other studies (Glackin, 2018; Lee et al., 2013), efficacy growth was associated with activities found in the Teachers Institute approach. First, the finding that teacher involvement and participation by diverse teachers in the learning experience led to efficacy growth. Seminars were highly interactive, involved teachers in the discussion of content, demonstrations of activities, and creation of the curricular plans. This emphasis on teacher agency was a central feature of the Teachers Institute approach. Second, simulated modeling, or role playing, resembled features of a Teachers Institute seminar. In other words, the seminar could likely deconstruct a teachers' cognitive mindset relative to a classroom environment by putting them in the role of a student. The professor adopted the role of teacher, while the teacher adopted the role of student. This perspective shift was essential in the development of efficacy by vicarious experience (Glackin, 2018; Lee et al., 2013).

Significance of Study

This study contributed to the knowledge and understanding of professional development programs aimed at increasing teacher efficacy, particularly those within a context similar to the Teachers Institute approach. Significant research has linked teacher efficacy and student achievement in the K-12 setting. This study has shed light on how sustained professional development can significantly impact teacher efficacy growth and identified features of professional development that might lead to changes in teacher efficacy based on teachers' perceptions of their experiences. Additionally, the particular examination of teacher efficacy change in the context of the Teachers Institute approach has not been studied. This study illuminated teachers' perceptions related to features of this approach that might lead to development of efficacy in teachers. The implications are relevant to K-12 teachers as well as those school district leaders and principals as they seek to identify effective ways to invest in teacher professional development.

Research Questions

This study examined teacher efficacy in the context of a professional development program for K-12 teachers using a mixed-methods approach. In particular, this study pursued the following four research questions:

1) To what extent is content-based professional development for in-service teachers associated with efficacy growth?

(2) Is the amount of growth in teacher efficacy demonstrated during the CTI learning experience associated with a teacher's years of experience?

(3) What critical teachers' perceptions of the professional development seminars are associated with the development of teacher efficacy?

(4) What do teachers identify as meaningful aspects of the CTI learning experience that helped them grow in their sense of teacher efficacy?

CHAPTER 3: METHODS

Methods

The Context: Professional Development Program

The context of this study was a seven-month, intensive professional development program focused on content-based seminars for elementary (Kindergarten through fifth grade) and secondary (sixth through twelfth grade) teachers in a public school district in the southeastern United States. The program for both elementary and secondary teachers was designed to encourage confidence change over the course of the seven-month seminar program led by university faculty. Eight seminars were led by a university faculty member typically in the liberal arts and sciences each year; sixteen seminars over two years of this study. The annual seminar cycle began the end of April and ran through November for a total of 12 two-hour seminar meetings (three meetings in spring and nine meetings in fall) adding up to 30 hours of continuing professional development time, including research and curriculum writing. The faculty served as content knowledge experts and facilitate the learning of the material, as well as the writing process. Each teacher in the seminar was required to complete an original curriculum project aimed at class and subject objectives and students in the classroom. Each seminar was composed of 10-12 teachers led by a university professor.

Research Design

Teacher efficacy has been studied widely in the social sciences (Bandura, 1997; T. R. Guskey, 1988; Kim & Seo, 2018; Tschannen-Moran & Hoy, 2001; Tschannen-Moran & McMaster, 2009). The research design in this study was a mixed-methods

sequential explanatory approach (Ivankova, Creswell, & Stick, 2006). Mixed-methods approaches have been used in studies to examine the efficacy construct through scaled surveys, as well as through interviews to capture process changes (Ivankova et al., 2006; Kim & Seo, 2018; Klassen et al., 2008; Lee et al., 2013). These studies employ a mixed-methods approach in order to fully address the complexity of the efficacy construct (Ivankova et al., 2006; Lee et al., 2013; Tschannen-Moran & Hoy, 2001; Wheatley, 2005; Yoo, 2016). A study of 148 teachers who completed a five-week online professional development program used a paired- T-test and one-way ANOVA with the three subscales of teacher efficacy (Yoo, 2016). Additionally, this same study used a qualitative component to measure what teacher attributes contributed to the increased or decreased sense of efficacy. The prompt to collect their open-ended responses was given with this instruction: you're your scores for each subscale of TSES, and analyze your sense of self-efficacy, especially by comparing your scores from the beginning of your learning and now (Yoo, 2016).

Ivankova, et al. (2006) outlined procedural issues with research conducted using a mixed-methods sequential explanatory design, the approach that this study has employed. Particularly relevant for this study Ivankova, et al. (2006) described (1) deciding on the priority given to the quantitative and qualitative data collection and analysis, (2) the sequence of the data collection and analysis, (3) the stages in the research process at which quantitative and qualitative are connected and integrated. Additionally, using the recommendations of Ivankova, et al. (2006) a visual representation of the study design was created to illustrate the relationship among the various elements of the design process (See Appendix A for "Visual for Sequential Mixed-Methods Design").

In term of the priority issue, a critical factor to consider was the scope of the quantitative and qualitative research questions. The research questions (RQs) in this study were balanced between quantitative (RQ1 and RQ2) and qualitative (RQ3 and RQ4). Despite this balance in number of research questions, the main aspect of this study was given to the qualitative data collection and analysis, a less common, but equally valid approach to mixed-methods designs (Ivankova et al., 2006; Morgan, 1998). This decision was influenced by the focus on RQ3 qnd RQ4 which explored the "critical teachers' perceptions of the professional development seminars" and "meaningful aspects of the CTI learning experience", respectively, in an attempt to identify and explain the factors that affect teachers' efficacy over time. The quantitative phase of the study did take place before the qualitative phase of the study, and RQ1 and RQ2 addressed whether teacher efficacy changed over time for teachers who completed this professional development program, and then, if years of teaching experience influenced the teacher efficacy change. The quantitative data collection and analysis was limited in scope to administrative data collected over two years from a valid and reliable survey tool for assessing teacher efficacy (Duffin, French, & Patrick, 2012; Tschannen-Moran & Hoy, 2001; Tschannen-Moran & McMaster, 2009). This phase was robust, however, data collection was limited to this one survey tool and two statistical techniques in terms of descriptive statistics and an analysis of variance (ANOVA) for repeated measures. The goal of the qualitative phase was to extend and interpret the statistical results obtained from the quantitative phase. Major findings from the quantitative phase were used to inform data collection in terms of questions that were created and used in the semi-structured interviews, namely exploring the teachers' perceptions that might be

associated with the teacher efficacy gain over time within the context of the professional development setting. Additionally, the language from items related to the two subscales (Student Engagement and Instructional Strategies) were used as foundational for developing the interview questions.

In terms of implementation of an sequential explanatory mixed-methods design, this study made slight modifications to the typical pattern of quantitative-qualitative data collection and analysis sequence (Fetters, Curry, & Creswell, 2013). In the typical quantitative-qualitative approach, the first phase focused on quantitative data collection and analysis, then the second phase focused on qualitative data collection and analysis. Given that this study utilized both primary and secondary (administrative) data, the sequence of data collection and data analysis was slightly modified. The sequence, shown in Appendix A, was as follows: quantitative phase 1 (QuantP1), qualitative phase 1 (QualP1), then qualitative phase 2 (QualP2). QuantP1 and QualP1 data were collected using two different anonymous administrative surveys collected as part of the program's ongoing evaluation efforts. QuantP1 data were collected using the Teachers' Sense of Efficacy Scale (TSES) in a pre- and post-test design over a three-month period (See Appendix D). QualP1 data were collected using four items included on an administrative survey completed by teachers after the professional development intervention (See Appendix E). The goal of the QuantP1 was to determine whether teacher efficacy changed over the course of this particular professional development intervention, and then whether that change was related to teachers' years of teaching experience. The goal of QualP1 was to begin to explore the feature of the professional development program that contribute to teacher efficacy growth. Following the collection and analysis of

QuantP1 and QualP1, the interview questions were created to be used in QualP2 data collection. The questions were informed by the language from the TSES subscale items related to Student Engagement and Instructional Strategies (See Appendix F). Given the theory of teacher efficacy used in this study related to Bandura's theory of self-efficacy (Bandura, 1997), the decision to use the items helped to sequence data collection in QuantP1, then to inform both data collection and analysis in QualP2. That is, because the TSES survey assesses teachers' beliefs related to efficacy on three key areas of teaching (to engage students, to teach students, and to manage students), these items could be used to explore the sources of teacher efficacy through in-depth interviews. Additionally, statistical results from QuantP1 were used to create a question in QualP2 aimed at exploring the reasons why teacher efficacy might grow over time within the context of the professional development experience. The goal, then, of QualP2 was to explore, explain and interpret the critical perceptions and meaningful aspects of the teachers' experiences that might contribute to efficacy growth over time. This modified sequence of quantitative and qualitative data collection and analysis within this traditional explanatory mixed-methods designed provided the best approach to fully explore the role of teacher efficacy growth for this professional development intervention.

In terms of integration of quantitative and qualitative phases, the goal was to identify the connecting points of the two phases (Ivankova et al., 2006). In this study, one connecting point was during the process for selecting participants. Results and analysis from QuantP1 informed the participant selection by providing a key factor to consider, namely the years of teaching experience. When years of teaching experience emerged as a contributing factor to efficacy growth over time, then it was decided that

teacher participants need to represent a wide range of years of teaching to provide the greatest among of relevant data. Another connecting point included developing interview questions for QualP2 based on the items and results from QuantP1. This also included mixing the quantitative and qualitative approaches at the design phase introducing both kinds of research questions, as well as during the initial interpretation phases for QuantP1 and QualP1.

Participants

Participants included public school teachers in grades K-12 who completed two different surveys during and after an in-service professional development program based on a university-school partnership over the course of a two-year period, 2017-2018. In 2017, a total of 65 teachers completed the efficacy survey, pre-test survey in September and post-test survey in December (QuantP1). Additionally, the same 65 teachers responded to the open-ended prompts on an end of program survey (QualP1). Among these 65 teachers, 20 taught elementary school, 17 taught middle school, and 28 taught high school. These 65 teachers averaged 10.22 years of teaching experience and taught an average of students. In 2018, a total of 73 teachers completed the efficacy survey, pre-test survey in September and post-test survey in December (QuantP1). Additionally, the same 73 teachers responded to the open-ended prompts on the end of program survey (QualP1). Among these 73 teachers, 22 taught elementary school, 21 taught middle school, and 30 taught high school. These 73 teachers averaged 10.15 years of teaching experience and taught an average of 121 students.

For QualP1, the first qualitative phase, a total of 180 teachers who completed professional development seminars in 2017 and 2018 were included. These teachers

ranged in grade level from kindergarten through 12th grade, and taught a variety of subjects in those grades, including art, English/language arts, mathematics, science, social studies/history, and special education.

A total of 179 teachers were invited to participate in interviews in QualP2. A total of 180 teachers who completed seminars in 2017 and 2018 were sent an email invitation to participate, however, one email was rejected with the message that the account is no longer active. As a result, it was assumed that the teacher was no longer in the school district and thus did not receive the invitation. Eight teachers were selected to participate in semi-structured interviews based on the following inclusion criteria: participated in university-school professional development program offered in 2017 or 2018; have taught curricula created in program in 2017, 2018, or 2019; and is still an active teacher in the same school district.

Of the 180 teachers who completed seminars in 2017 and 2018, a total of 100 (55.6%) had 10 years or fewer experience in the teaching profession, and a total of 80 (44.4%) of the 180 teachers had more than 10 years of teaching experience. Of the eight teachers who participated in the interviews, a total of three (37.5%) had 10 years of fewer in the teaching profession, and five (62.5%) had more than 10 years of teaching experience.

Procedures

Prior to collection and analysis of any data, an Institutional Review Board (IRB) process took place to ensure the integrity of the human subjects and related data involved. This included commitment to protocol and procedures for obtaining consent from

participants in the interview process, data collection and storage, and practices for ensuring the highest ethical standards of human subjects research. Official IRB approval was granted before the start of the data collection and analysis processes. QuantP1 – TSES administrative survey data included a cohort of teachers assessed in September 2017 and again in December 2017 using the teacher efficacy scale by Tschannen-Moran and Hoy (2001). A second cohort of teachers were assessed, using the same scale, in September 2018 and again in December 2018. Only those who completed both the pre-test (in September) and post-test (in December) were included in this study. These surveys were completed anonymously using the survey tool Qualtrics. Unique identification numbers were created and assigned to each teacher before survey administration to ensure anonymity. Identification numbers were used to match responses from pre-test to post-test to ensure the same person's scores were being compared. In preparation for data analysis, matched responses from both years, 2017 and 2018, were included into one dataset in IMB SPSS, version 26, statistical package.

In December 2017 and 2018, cohorts 1 and 2 of teachers completed an after-program survey. This was completed anonymously via email using the Qualtrics survey tool. Four open-ended items from this survey were used in this study.

Eight teachers were selected for the semi-structured interviews. Questions related to the nature of the professional development experience, the relationship between teacher efficacy and professional development, and the nature of the sources of teacher efficacy as it relates to particular activities, beliefs, and perceptions of the teachers' experiences. These interviews ranged between 32-40 minutes in length. Each interview was audio recorded, transcribed and analyzed using NVivo software. Each of the eight

participants was provided the opportunity to review interviewee transcripts and give feedback on initial data analysis. This method of member checks is consistent with best practices in qualitative research (Merriam, 2009). Providing participants in the study the chance to clarify their responses as members in the culture being studied contributed to overall integrity of study's findings.

Instrumentation

Teachers' sense of efficacy scale (TSES) – QuantP1.

The teacher efficacy scale will be the 24-item, long form developed by Tschannen-Moran and Hoy (2001) which includes a 9-point Likert-style question structure from 0 (*Nothing*) to 9 (*A Great Deal*) The Teacher's Sense of Efficacy Scale (TSES) includes three subscales: Student Engagement, Instructional Strategies, and Classroom Management (See Appendix D). Each subscale has eight separate items, organized in random order. Moderate alpha coefficients provided evidence for the internal consistency of scores on the TSES (0.81 for student engagement, 0.86 for instructional strategies, 0.86 for classroom management and overall = 0.90 (Tschannen-Moran & Hoy, 2001).

The TSES was given in 2017 and in 2018 to participants of the professional development program, to two different sets of teachers, using a pre-post survey approach. The survey was given in September at the beginning of the fall program and again in December at the conclusion of the program. Unique identification numbers where used to match the respondent pre-test with post-test surveys. Only those surveys that had matched responses, in September and in December, were used. In 2017, 65 teachers

completed both the pre- and post-test survey. In 2018, 71 teachers completed the pre- and post-test survey.

It should be noted that the pre-post efficacy scores were collected during the three-month intensive portion of the program from September through December. Due to the fact that the full professional development program seminar cycle was seven months (May through November) and took place over two academic years, the three-month period was used for measurement of teacher efficacy to avoid the challenges of spanning two academic years. Teacher attrition from program was more likely over summer months due to school/career/grade/subject changes, and weekly teacher and school schedule was more consistent from September through December.

Open-ended survey items, post-program – QualP1.

Open-ended survey items taken from an anonymous survey given to participants at the end of their professional development experience in December were used in this study (See Appendix E). A total of 180 participants were asked to respond openly and honestly to the items over the course of two years' worth of survey data. There were 65-items on the survey, however, only four open-ended items were included in this study. The open-ended survey items included the following items: (1) please describe your experience in your seminar this year; (2) please describe how your experience has affected you personally; (3) please explain to what extent the knowledge and skills you gained in CTI made a positive impact on your teaching?; and (4) please explain to what extent the knowledge and skills you gained in CTI made a positive impact on your students' learning and academic performance? This approach was associated with

research question three: (3) What critical teachers' perceptions of the professional development seminars are associated with the development of teacher efficacy?

Semi-structured interviews – QualP2.

An important component of the sequential explanatory mixed methods research design for this study was to include semi-structured interviews with teachers who completed the particular professional development program. This approach was associated with research question four: (4) What do teachers identify as meaningful aspects of the CTI learning experience that helped them grow in their sense of teacher efficacy? Interview questions were informed through both quantitative and qualitative phases, QuantP1 and QualP1, respectively. Fourteen questions were developed by including language taken directly from the TSES survey used in QuantP1 (See Appendix F). For example, an item related to efficacy beliefs around student engagement on the TSES was "How much can you do to help your students think critically?" A related interview question was "How did participating in CTI seminars help you help your students think critically?" This pattern was followed for all fourteen questions. This situated the interview questions directly within the context of the teacher efficacy work by using language from the TSES survey. Additionally, two additionally questions, drawn from QuantP1 and QualP1 results were included, that focused on teachers' reactions to quantitative data that suggested teachers' efficacy beliefs grew over the course of the seminars and teachers' reactions to qualitative data that suggested these professional development seminars improved teachers' knowledge and confidence which related to students' knowledge and confidence.

Through collection of rich data by these interviews, teachers explored the nature of their learning experience. Particular attention was paid to the role that the three sources of teacher efficacy play in the development of efficacy growth: mastery experiences, vicarious experiences, verbal persuasion, and physiological/emotional reaction (Bandura, 1997). Participants were asked to describe their learning experience is terms of identifying moments in the seminar experience, as well as beyond that to their classrooms. Thus the interview focused on two critical parts of the teachers' perceptions of the professional development experiences. First, the activities, beliefs and experiences associated with the learning experiences in the context of the seminar among other teachers and a professor. Second, the focus shifted to inquire about the process of implementing ideas and curricula from the seminar experience into their classrooms. Taken together, the responses informed an overall theory of teacher efficacy development as it related to professional development experiences.

Data Analytic Strategy

The data analytic strategy had three phases using the sequential explanatory mixed-methods approach (Ivankova et al., 2006). First, using the pre- and post-test data on the TSES, were analyzed using a factorial analysis of variance (ANOVA) procedure called a 2-way repeated measures ANOVA in the statistical software package IMB SPSS, version 26. Independent variables were years of teaching experience (10 years or greater, and fewer than 10 years) and time (pre and post intervention). Dependent variable for this part of the study includes the score on the TSES. As mentioned above, the TSES has three subscales for Student Engagement, Instructional Strategies, and Classroom Management, each containing eight distinct items for a total of 24 items on the TSES.

Mean scores were calculated on the 9-point Likert scale for each of the 24 items. Then the three factors mean scores were calculated for student engagement, instructional strategies, and classroom management. These means scores will be used in the repeated measure t-test. The repeated measures t-test were conducted for the two years of data separately, 2017 and 2018, to determine if there is a statistical difference between the mean scores on the pre- and post-test on the TSES. These results addressed research question one focused on to the extent to which there is evidence of teacher efficacy growth over the course of the professional development program. Then, the TSES data was organized by years of professional teaching experience (10 years or great, or fewer than 10 years). Mean TSES scores were analyzed to determine if there is a difference among teachers over time, as well as with various years of professional teaching experience on the TSES. Research suggests that teachers with more years of professional teaching experience have higher efficacy than those with fewer years of teaching experience (Kim & Seo, 2018; Wolters & Daugherty, 2007).

Second, this phase analyzed the open-ended survey item data. A grounded theory, constant-comparison analytic framework was used for this phase, including inductive coding techniques (Charmaz, 2006; Glaser & Strauss, 1967). The open-ended survey data was entered into NVivo, version 12 in order to analyze codes for categories and themes. Most frequently occurring codes were reported for this phase.

Third, this phase analyzed the semi-structured interviews transcripts entered into NVivo, version 12. Phase 3 took an interpretive framework, examining activities, beliefs, and thoughts in two contexts. First, the context of teachers' responses related to seminar experiences with other teachers, and second, the context of teachers' responses related to

curricular implementation. Particular attention was paid to the three sources of teacher efficacy (mastery experiences, vicarious experiences, and verbal persuasion), however, additional sources of teacher efficacy will be examined as they are constructed from the teachers' experiences.

Finally, the process involved the synthesis of the conclusions from the quantitative data and the qualitative data in order to answer the four main research questions. The overall purpose of this study was to examine if this particular professional development intervention for teachers changed teacher efficacy beliefs after participation, and to describe the teachers' beliefs, thoughts, and experiences associated with elements of professional development that might contribute to those efficacy changes.

CHAPTER 4: RESULTS

Results

This study employed a sequential explanatory mixed methods design to address four research questions: (1) the extent to which the professional development intervention is associated with teacher efficacy growth, (2) the extent to which teacher efficacy growth is associated with years of teaching experience, (3) the critical teachers' perceptions of professional development seminars that are associated with teacher efficacy growth, and (4) what teachers identify as meaningful aspects of the learning experience associated with efficacy growth. (1) Questions one was addressed in the main effect of the analysis of variance (ANOVA) which examined teacher efficacy over time in the professional development program in QuanP1. (2) Question two was addressed in the interaction effect of the ANOVA which examined teacher efficacy over time by years of teaching experience. (3) Question three was addressed from the analysis of the teachers' responses to four open-ended survey items in QualP1. (4) Question four was addressed from the analysis of teachers' interviews in QualP2. Taken together, these data help establish an approach to understand the relationship between effective teacher professional development and teacher efficacy growth.

Teachers' Sense of Efficacy Scale (TSES) – QuantP1

In order to examine the relationships between the effect of time on teacher efficacy scores, and the effect of time and years of teaching experience on teacher efficacy scores a two-way repeated measures analysis of variance (ANOVA) were used. Analyses were conducted to determine a change over time, and then considering time and years of teaching experience on overall efficacy scores, as well as efficacy scores related

to student engagement, instructional strategies, and classroom management. Normality, independence, and homogeneity of variances assumptions have been met. A visual inspection of the scores suggested the data were normally distributed. As to the independence assumption, the teachers completed the surveys independently and did not confer with each other. To test the homogeneity of variances assumption, for each ANOVA, Levene's Test for Equality of Error Variances was calculated and reported with the ANOVA results below. Additionally, the sphericity assumption had been met because this analysis included fewer than three levels in the within-subjects design. Because of this, the Sphericity Assumed rows in the ANOVAs were interpreted (See Tables 2, 4, 6, and 8).

Overall Efficacy: Results for Levene's Test of Equality of Error Variances showed the homogeneity of variances assumption was met (Levene's pre-test statistic was 0.260 and $p > 0.05$, and Levene's post- test statistic was 0.257 and $p > 0.05$). The results of the two-way repeated measures ANOVA revealed that there a statistically significant main effect of time (pre, post) on teachers' overall efficacy scores, $F(1, 136) = 10.214$, $p = 0.002$, $g = 0.245$. Teachers reported greater overall efficacy after completing the seminars ($M = 7.31$, $SD = 0.83$) compared to before the seminars ($M = 7.10$, $SD = 0.85$). Additionally, there was a statistically significant interaction effect between time and years of teaching experience on teachers' overall efficacy scores $F(1, 136) = 3.905$, $p = 0.050$. Teachers with 10 years or fewer of teaching experience made larger efficacy gains over time (pre-test $M = 6.93$, $SD = 0.89$; post-test $M = 7.26$, $SD = 0.84$, with effect size of $g = 0.38$). Teachers with greater than 10 years of teaching experience made

smaller efficacy gains over time (pre-test $M = 7.28$, $SD = 0.77$; post-test $M = 7.36$, $SD = 0.83$, with effect size of $g = 0.10$).

Student Engagement: Results for Levene's Test of Equality of Error Variances showed the homogeneity of variances assumption was met (Levene's pre-test statistic was 0.259 and $p > 0.05$, and Levene's post- test statistic was 0.399 and $p > 0.05$). The results of the two-way repeated measures ANOVA revealed that there a statistically significant main effect of time (pre, post) on teachers' efficacy scores for the student engagement subscale, $F(1, 136) = 6.076$, $p = 0.015$, $g = 0.188$. Teachers reported greater overall efficacy after completing the seminars ($M = 7.02$, $SD = 0.99$) compared to before the seminars ($M = 6.84$, $SD = 0.99$). Additionally, there was a statistically significant interaction effect between time and years of teaching experience on teachers' efficacy scores related to student engagement, $F(1, 136) = 4.821$, $p = 0.030$. Teachers with 10 years or fewer of teaching experience made larger efficacy gains over time (pre-test $M = 6.60$, $SD = 1.01$; post-test $M = 6.94$, $SD = 1.00$, with effect size of $g = 0.35$). Teachers with greater than 10 years of teaching experience made smaller efficacy gains over time (pre-test $M = 7.09$, $SD = 0.92$; post-test $M = 7.10$, $SD = 0.98$, with effect size of $g = 0.02$).

Instructional Strategies: Results for Levene's Test of Equality of Error Variances showed the homogeneity of variances assumption was met (Levene's pre-test statistic was 3.605 and $p > 0.05$, and Levene's post- test statistic was 0.064 and $p > 0.05$). The results of the two-way repeated measures ANOVA revealed that there a statistically significant main effect of time (pre, post) on teachers' efficacy scores for the instructional strategies subscale, $F(1, 136) = 13.954$, $p = 0.000$, $g = 0.30$. Teachers reported greater overall efficacy after completing the seminars ($M = 7.50$, $SD = 0.88$) compared to before

the seminars (M = 7.23, SD = 0.94). There was not a statistically significant interaction effect between time and years of teaching experience on teachers' efficacy scores related to instructional strategies, $F(1, 136) = 3.497$, $p = 0.064$. Teachers with 10 years or fewer of teaching experience made larger efficacy gains over time (pre-test M = 7.04, SD = 1.01; post-test M = 7.46, SD = 0.86, with effect size of $g = 0.41$). Teachers with greater than 10 years of teaching experience made smaller efficacy gains over time (pre-test M = 7.42, SD = 0.81; post-test M = 7.56, SD = 0.89, with effect size of $g = 0.17$).

Classroom Management: Results for Levene's Test of Equality of Error Variances showed the homogeneity of variances assumption was met (Levene's pre-test statistic was 0.008 and $p > 0.05$, and Levene's post- test statistic was 0.522 and $p > 0.05$). The results of the two-way repeated measures ANOVA revealed that there a statistically significant main effect of time (pre, post) on teachers' efficacy scores for the classroom management subscale, $F(1, 136) = 4.802$, $p = 0.030$, $g = 0.16$. Teachers reported greater overall efficacy after completing the seminars (M = 7.40, SD = 0.96) compared to before the seminars (M = 7.24, SD = 0.99). There was not a statistically significant interaction effect between time and years of teaching experience on teachers' efficacy scores related to classroom management, $F(1, 136) = 1.230$, $p = 0.269$. Teachers with 10 years or fewer of teaching experience made larger efficacy gains over time (pre-test M = 7.14, SD = 1.01; post-test M = 7.39, SD = 0.99, with effect size of $g = 0.29$). Teachers with greater than 10 years of teaching experience made smaller efficacy gains over time (pre-test M = 7.34, SD = 0.96; post-test M = 7.42, SD = 0.94, with effect size of $g = 0.08$).

The main effect of time on teacher efficacy was statistically significant for overall efficacy scores, as well as for each of the three subscales: student engagement,

instructional strategies, and classroom management. The effect sizes for the main effect are considered small, ranging from $g = 0.16$ to 0.30. The interaction effect for time and years of teaching experience on one subscale of teacher efficacy were statistically significant. Effect sizes for efficacy mean scores related to student engagement among teachers with 10 or fewer years of experience was $g = 0.35$. This effect size was much larger than the effect size for years with more than 10 years of teaching experience, $g = 0.02$. These data suggest small to medium effect sizes for efficacy of student engagement on the mean differences among teachers with 10 or fewer years of teaching experience (Cohen, 1988; Lakens, 2013).

Open-Ended Survey Items – QualP1

QualP1 addressed research question three related to teachers' perceptions of professional development seminars associated with teacher efficacy. The four questions (See Appendix were analyzed by identifying codes for each response to each item. A total of 595 individual codes were identified in the initial analysis of these four survey items. From these initial codes, a total of 16 categories emerged with the most frequently occurring codes. The 16 categories, with number of references included in parentheses: did not teach unit yet (25); enjoyed seminar discussions (22); enjoyed seminar experience (20); insight, knowledge, and useful in classroom (19); fellowship between different teachers (14); challenge myself (12); collaboration with teachers and professors is valuable (9); better teacher, better person (9); amazing experience (9); leader shared great resources (8); positive experience (8); and confidence in teaching activities and strategies (7); wonderful time (7); leader led discussions on relevant topics (7); leaders were helpful (7); and good (7). The "did not teach unit yet" code was most frequently occurring in

response to an item related to impact on students. Given this was a specific response to a question and a small fraction of the total responses this code was not included in subsequent analysis. Of the remaining 15 categories, further analysis combined these categories using constant comparison (Charmaz, 2006) into five emergent themes: Enjoyed Seminar Experience; Collaboration among Different Teachers and Professors; Professional Challenge through Content Knowledge, Relevant Topics and Resources from Professors, and Confidence to be Better Teacher and Person. Then, these five themes were reviewed to assess connections and associations to sources of teacher efficacy.

Responses associated with the Enjoyed Seminar Experience theme relate to responses were teachers indicated that they enjoyed the seminar experience, particularly the discussions. Participants indicated "the sharing of ideas and thoughts were the best," "I also enjoyed the discussions with fellow teachers about varied topics," and "I enjoyed understanding various experiences and conversations with other adults." These responses express general satisfaction with the sharing of ideas and discussions with teaching colleagues that formed the basis of the seminar experience. Participants also made more general comments about the enjoyment they received from the seminar experience: "I enjoyed attending the seminars throughout the year," "I greatly enjoyed the activities at the seminar," "I really enjoyed the seminars and interaction with other teachers," and "the seminar was well organized and enjoyable every week." In addition, within this theme participants used words "amazing", "positive" and "good" to describe their overall experiences. Participants shared "I had an amazing time meeting with my seminar group each week," "My experience has been nothing short of amazing and challenging," "Being

part of [this program] has been an amazing experience," "I had a wonderful time. Actually, a wonderful time fails to express the magnitude of the positive experience I had in the program," "My experience was very positive and rewarding," "My experience in my seminar was good," "I feel like we had a really good group," and "It was a good experience although I did get overwhelmed at one point."

In this theme, Enjoyed Seminar Experience, many of the comments referred to the overall enjoyment participants experienced, with many of the comments referencing the impact the discussions and conversations that participants shared with fellow teachers and the professor leading the seminar. The interaction with different teachers and professors seemed to be the source of joy and satisfaction in the seminar. Two comments did focus on the "challenging" and "overwhelming" nature of the experience. Overall, this theme aligned with experiences related to physiological/emotional responses, a source of teacher efficacy (Bandura, 1997). These professional development experiences, expressed by the teachers' responses, relate to feelings of amazement and joy, positive emotions that are associated with efficacy growth. If teachers felt these experiences as positive, then they would be more likely to also be happy and joyful, which could lead to greater confidence as a result. Additionally, there seemed to be a social component to their joy, with many teachers citing the "group", "interaction with other teachers", and "enjoyed the activities" related to this theme. These comments signal perceptions that relate to vicarious experiences, another source of teacher efficacy.

The second theme from the open-ended survey items was Collaboration among Different Teachers and Professors. This theme included comments related to the connection felt between and among participants in the learning environment: "From the

moment this seminar began, I could tell this community of teachers would be an amazing resource for my teaching. Teachers have very few opportunities to converse and collaborate with other educators (without taking away another expectation of our job). This blocked off time to dive into our topic and share experiences and advice was AMAZING! [all caps included in original] I wouldn't change it at all!" This particular response is indicative of value that teachers expressed in participating in this seminar experience. Another comment was very similar, "The opportunity to sit with other teachers and collaborate in a way that helps enhance student achievement is a great outlet for us teachers who enjoy sharing ideas." Yet another comment expressed the value of meeting new people, "It was great to fellowship with other teachers; those who were willing to step out of their comfort zone and meet new people." Still another participant talked about the motivation to stay connected following this experience, "I learned so much and met some amazing teachers and community members that I hope to continue working with in the future." Other comments echoed the impact of collaboration and connection: "The collaboration was awesome. I've made new friends, new connections, and gained knowledge," "Getting to work with other teachers across the district was an amazing opportunity," "I was able to meet and work with teachers from different schools at various levels," and "It has been great learning with different grade level teachers and subjects that I usually do not talk about with my professional learning group." This last comment signals how this particular seminar learning experience raises topics that are distinct from other learning groups of teachers. Additionally, many participants comments centered on the value of diverse learning groups of other teachers from different grade levels and subject areas.

One participant shared a nuanced point about the impact of collaborating with teachers in this experience: “I don’t believe that the seminar made the greatest impact in itself on my teaching thoughts and patterns, however, the idea of being able to meet regularly, and collaborate with a group of teachers on a specific unit, created an understanding in me that will impact my teaching strategies.” In this comment the participant identified value of collaborating on specific work that relates to classroom practice. Similar comments spoke to the value of collaborating as teachers: “I enjoy the collaboration among other teachers across the district. This program provided us with the opportunity to learn and grow from one another,” “Collaboration with other teachers and university professors is very valuable to me,” “This program holds me accountable to this while supporting me a friend,” and “This program had a huge impact on my overall teaching as we got to converse weekly about what was going on in our classes and reflect on how each experience with our students was a lesson.” These participants’ responses indicate the value and meaning of collaboration and fellowship among teachers from different grade levels, schools, and subject areas to overall teaching and learning outcomes. Teachers commented on the value of “collaboration” and “great learning with different grade level teachers” can also be associated with vicarious experiences, that is, those experiences where confidence is born from observing others. However, the particulars of those interactions and perceptions of observations was beyond the scope of this study.

The third theme from the open-ended survey items was Professional Challenge through Content Knowledge. Participants expressed a range of comments on the role of insight and content through various topics: “I really learned a lot and gained insight from

the professor and other teachers," "This program increased my knowledge of content," "[I gained] more insight and not afraid to challenge what is right," "My knowledge as presented through my new unit is an extremely positive addition for my students," "My experience has been very insightful and I've learned a lot to enhance my cross curriculum instruction," and "I did gain additional knowledge on the subject from readings and discussions." In addition to the knowledge gain expressed by participants, the value of experiencing a manageable challenging in this learning process was also mentioned: "I appreciated the challenge," "I knew it would be challenging, but it was for sure worth it," "some of the material was very challenging, but after some study it became manageable," "The experience challenged me in many ways," "I felt the seminar challenged me to think critically about how what I teach is affecting my students," "Challenging yet rewarding," "The seminar challenged me intellectually," "A great opportunity to be challenged intellectually," "I really enjoyed the seminar, but felt some times the subject matter was difficult to grasp as it required a belief of understanding of the unknown." All these comments by participants indicate the experience was a challenge, and hard at times, but they too acknowledge the benefits intellectually and professionally to exactly such a challenge. A final comment summed it up accurately: "The seminar was great to challenge myself mentally and it's always good to spend time doing heavy intellectual lifting with other grownups. My seminar was my favorite part of the work week."

The fourth theme from the open-ended survey items was Relevant Topics and Resources from Professors. This theme relates directly to the role of the seminar leader, the university professor who designs and carries out the majority of the learning experiences in the seminar. The professor functioned as both a content and pedagogical

resource for participants in the seminar, as evidenced by the following comments: “The professor provided a lot of additional content research that was pertinent to my curriculum unit,” “I have used several of the videos the professor presented to us in my classroom,” “The professor took us on a learning journey where we enjoyed and embraced, and got tons of resources to bring into our classrooms,” “The professor made the seminar exciting and provided me with a lot of great resources and strategies,” and “I gained an immense amount of resources on implanting writing in my classroom. I know the strategies and resources I have access to through the district that will help support my curriculum.” In addition to acting as an academic resources, the professors acted as colleagues by facilitating discussion on important and timely topics, “The professor was excellent in directing our meetings, provided a learning atmosphere and challenging debates,” “The professor did a good job of assigning readings and facilitated discussions each week,” “I enjoyed how timely the seminars seemed to be and our professor for allowing changes based on those timely issues,” “So relevant and such a wonderful group,” and “Our professor was always well prepared and had interesting and relevant activities for us to do.” The professor has served as a leader in the learning experience, according to these comments, “The professor was very helpful and great at facilitating conversations,” “The professor was very patient and helpful,” “The seminar had a strong correlation to the subject I teach, so I found the professor’s input and instruction very helpful,” “The professor was helpful and easy going. They provided us with plenty of activities and strategies to sue in the classroom, while also teaching us about the research that supports those methods.” Responses from the participants indicated that the professors who led the seminar experiences for the teachers served an important role as

academic resources, facilitator of timely discussion, and convener of relevant content topics.

The fifth and final theme from the open-ended survey items was Confidence to be Better Teacher and Person. A number of responses made direct connections between elements of the experience and being a better teacher: “Personally, I feel that I have grown as an educator and a lover of history from this seminar. Being able to speak with like-minded teachers and gain new information while teaching a curriculum while writing it has helped me grow into a better teacher,” “I firmly believe this program makes me a better teacher. It encourages me to think outside the box and take the time to think of a curriculum unit that I would not normally be able to create for my kids,” “I am much more knowledgeable about art and how I can use it to be a better teacher and person,” “This program makes me a better teacher. Period,” “This program pushed me in many ways to become a better teacher and a better person,” “We explored different aspects of identity, and I believe these will help me be a better teacher,” “I am better teacher, and a better practitioner of education, thanks to this program,” “I loved being part of this program. It has allowed me to grow intellectually and provided with an opportunity to gain new colleagues in my field. I am a better teacher and person because of this program,” and “I am a better teacher as a result of being part of this program.” These responses by participants help to underscore the overall value for practicing teachers in the classroom. Nearly all of the responses in this theme use language associating this to becoming a “better teacher.” However, given the brevity of many of the responses, exactly what elements contribute to this “better” are not directly addressed. However, that will be the focus of the semi-structure interview analysis later in this study.

Continuing with this final theme related to confidence, participants commented on the value of confidence in the context of this program: "This seminar provided confidence in teaching, fun activities and teaching strategies," "I gained more confidence in the curriculum I teach," "I feel my teaching has really taken off along with my confidence as an educator since I've been involved with this program. The program has changed my teaching and my life," "I am much more confident in my content knowledge. I also have several years' worth of units which provide my students with rich lessons and in-depth content," "I have grown more confident in my teaching and have enjoyed meeting new people and making new friends. It has also improved my public speaking skills through all of the opportunities we have had to present our work," and "When I participated in this program, I become more confident in my classroom. It helps me open up new worlds to my students according to my standards and my beliefs on what they should know and be able to do." It appears from responses within this theme that participants are attributing both becoming a better teacher and confidence gains to participation in the seminar experience. Many teachers identified the role of content knowledge and collaborating with other teacher as factors that contribute to these positive changes.

Taken together, these five themes relate to effective teacher professional development in terms of the emphasis on collaboration, content, and expert support, which have been identified as drivers of effective professional development in Darling-Hammond, et al. (2017). Within these themes, there was evidence of teachers' responses related to the four sources of teacher efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological responses. Responses to these open-

ended survey items indicate that gaining knowledge is associated with increased confidence over time, which is consistent with existing research on the role of gaining new knowledge and teacher efficacy (J. Ross & Bruce, 2007; Yoo, 2016).

Semi-Structured Interviews – QualP2

QualP2 addressed research question four related to teachers' views on meaningful aspect of professional development experiences that are associated with teacher efficacy through interview data. The semi-structured interviews were recorded, transcribed, and analyzed for codes then emerging themes (Charmaz, 2006). Each interview was analyzed individually, then all eight interviews were analyzed using constant comparison to identify common themes.

In total, 135 initial codes emerged from an open coding process of grounded theory approach with the eight teacher interviews. From these initial 135 codes, 49 codes emerged from the eight interviews using the constant comparison method (Charmaz, 2006; Glaser & Strauss, 1967). These emergent codes represented by rich testimonials from the teachers addressed research question four which focused on meaningful aspects of the professional development experiences that are associated to the development of teacher efficacy. After another close reading of the 49 codes in which a constant comparison method was applied again, a total of four common themes were identified: Learning for Its Own Sake; Engaging Students through Exciting Content; Collaborative Relationships; and Expert Support from Scholars. These four common themes came from regrouping and organizing the 49 emergent codes based on similar characteristics and features. Additionally, given this study used a sequential explanatory mixed-methods design, results from QuantP1 with the TSES data were used to inform data

analysis in QualP2. To be specific, data from QuantP1 suggested that not only did teachers grow their confidence over time, but that teachers with 10 years or less of teaching experience has greater gains than more experienced teachers. Thus, initial codes from teachers with 10 years or less teaching experience were examined separately from interview data with teachers who have more than 10 years of experience to determine patterns among these two groups of teachers by years of teaching experience.

One noticeable pattern from these interview data suggest there is greater consistency among the four themes with the less experienced teachers than the more experienced teachers. That is, teachers with 10 years or fewer experience seems to respond in ways that are somewhat more distributed or consistent than those years with more than 10 years of experience (See Table 9). Those more experienced teachers seem to be less balanced in terms of the distribution of the initial codes among the four themes. One way to describe this finding is to examine Table 9. This table illustrates the pattern of consistency among less experienced teachers compared with more experienced teachers by showing missing codes across the data table, represented by dashes in the table. Among the three less experienced teachers there is only one theme missing at least one code among two teachers. Among the more experienced teachers there are three themes missing at least one code among four teachers, including two teachers missing two codes from two themes. This evidence related to patterns of consistency among the four themes in less experienced teachers and lack of consistency among the four themes in more experienced teachers indicates potential implications for professional development interventions related to efficacy growth. These implications will be discussed more fully in Chapter 5.

Direct teacher quotes are presented below for each of the four themes, and within each theme there are quotes presented from less experienced teachers, or teachers with 10 years or fewer of teaching experience, first, followed by more experienced teachers, or teachers with more than 10 years of teaching experience. Teachers' quotes from interviewers are presented with some length to provide richer descriptions to serve better interpretation and meaning-making analysis.

Theme 1: learning for its own sake.

Overall, the Learning for Its Own Sake theme related to the idea that teachers expressed the inherent value in discovering new ideas through inquiry and active learning. Within this theme teachers explored the various ways knowledge is written about, discussed, and understood in the seminar learning context. Many teachers shared the importance of curiosity for themselves as a first step before teaching their students. A less experienced teacher expressed a value in learning as ownership over the learning process, similar to being in college:

> I feel that when you participate in a seminar you gain confidence because you feel like you have ownership you take back something that like you think you go into teaching to do. I think I'm going into create all these beautiful lessons and then somebody is like giving them to me. But when you create those units they are like your children so you have almost a right to be authentic and teach like to do what you did when in college.

Another less experienced teacher expressed that the learning process is useful no matter what you end up doing. This particular less experienced teacher compared her learning process in these professional development seminars to her students wanting to become an electrician. She described that learning is essential for whatever you do and that the process of learning is of great value because you have to "deviate" or connect it

to other things:

> It's knowing how to take this and appreciating that someone's there trying to teach you how you connect it to something else. Then you guys [her students] all may be sitting here saying I want to be this player. I want to do this and I want to do that and I'm not going to go to college and I'm going to be an electrician. But no matter what, you're going to have to learn how to do all those things. It doesn't matter what you do. I think taking the seminars and knowing it is weird how we're like on a one-track mind. But you have to deviate because they weren't just like teaching science by itself. It was like teaching science and literature. It wasn't like teaching art by itself. It was like teaching art with math. So it was like there's a deviation from the norm and when you learn that and it's easier for you to teach it to someone else and say it's not just one track. There's like so much that you could learn from just this particular way of knowing.

Another less experienced teacher expressed the value of learning in the context of being pushed outside of her "normal area" as a way to provide intellectual challenge and rigor in her learning experience. She identified the inherent value in thinking about and reading topics like history and science that allowed her a chance to go beyond her typical area to grow and develop:

> Well for one thing it's not just another science seminar, it's not another science professional development, it's something different, it's outside my wheelhouse, it pushes me so it challenges me because it's not my normal area. I like the academic challenge of it, the intellectual challenge of it, it's just more interesting to not always be talking about science. We talk about the history and in the end I'm relating it back to my class, which is great, but the seminar itself has given me opportunity to stretch myself academically, intellectually, get outside my area and push, and I love that.

More experienced teachers in these interviews also identified experiences as meaningful that related to Learning for Its Own Sake. They identified concepts like curiosity as an essential element of the learning process for itself, but also because that passion to learn and be curious affects others. One particular experienced teacher shared about the inherent value in learning through curiosity and joy, and that learning can create more positive interactions and ways of thinking about other things:

> This seminar made me really curious about the world and curious about how things fit together -- embedded in curiosity is that you don't know something. And I like not knowing in the process of getting to know and it's really fun to get to experience that with my kids. I'm happier and that change doesn't just change my demeanor. It changes the way I interact. It changes the way I view a problem. It changes the way I prioritize. I'd learn something the night before and I'd bring it in and the kids would learn something. I think that it's a ripple in the pond. I think it has a huge ripple effect, more than a one on one. I can't necessarily predict what that will look like.

Another experienced teacher identified the role of learning in the context of going beyond the standards in her classroom. She suggested that the learning experiences and related curriculum she created were meaningful to her because the content challenged her that was beyond the "required curriculum." This increased her students focus on their work because the topics and ideas were just more interesting to them:

> The content in our units is usually more rigorous because it's stretching the basic standards of our curriculum and is going beyond the required curriculum. And knowing that if I were going to present a curriculum unit that made me think of the students and how the content might be little bit more difficult for them to grasp because of the level they're at. But I know they are really focused on that when I am focused on getting their interest through this content.

Another theme related to learning for its own sake was expressed by this experienced teacher. She echoed the perspective from others in this theme that learning more about interesting things to herself is the first step toward being a strong teacher for her students. This example below related to teaching about the civil rights movement and her experience learning about untold histories in America about people who were very influential, yet whose stories aren't told:

> The one thing that just always stuck in my head over the last couple of years with the seminars is whose story is being told and who is telling the story. I want my students to learn some stories that are from some perspectives that may not necessarily be the popular perspective or the well-known perspective. When we do something related to civil rights I don't want to do Dr. King. I don't want to do

> Mrs. Parks. Who else? There are so many other people that contributed to the civil rights movement that did amazing things, but we don't know their stories. And so that sort of a goal that I've set for myself is to, that I want to keep learning and I want to dig a little bit deeper and go past that and try to get my students to do that too. That, you know, Dr. King is not the only African American that did amazing things for the community during the civil rights movement. But he's, everybody's go to, you know, here comes February, start with King. So that's something that I feel like this experience has given me -- the desire to go beyond just the basic things that we already know.

Theme 2: engaging students through exciting content.

Engaging Students through Exciting Content related to the ways the teachers brought in new resources to their students from their experiences in the professional development seminars. Through these experiences, teachers expressed discovering ideas related to their core subjects that when shared with their students will have the benefit of exciting and engaging them. Additionally, some teachers shared a new outlook on engaging students through varied assessments.

A less experienced teacher shared her commitment to engaging her students through the process of asking questions and having students discover their own answers, as opposed to answering those questions. This teacher expressed the value of examining her own assumptions about the content and her beliefs as a way to then engage her students' own thinking and beliefs:

> I feel like an appropriate challenge as a growing person is to challenge some of our beliefs and attitudes about things but it also pushed academically to go beyond. The more conceptual idea of things I have to really dig deep inside myself and reflect on what I am thinking and also the thinking of what is going on in that time period. That like really pushed the envelope of and pushed the beliefs but also the academics to a whole another level really with the [student] questioning and not really answering all questions [from the students] but making them find out information for themselves to guide them to research this and come up with your own assumptions and perceptions of what is going on.

Another less experienced teacher expressed her perceptions of the seminar experience by putting herself in the position of a student learner. She shared that she would tell her students about her learning experiences in the seminar as a way to gain credibility that she, too, knew the feeling of being a student. She went further to express a connection with her students by stating that she failed in that she didn't know everything in the seminar, just like her students didn't know everything in her class:

> I was able to come back and tell my students I'm participating in this seminar. I'm an adult and I still don't get it. And I go to these seminars and I don't get stuff. It happens. I was able to try to say to them, I know you're not going to get it. It's okay to fail. I fail all the time. I'm doing this all the time. We're going to do this for the rest of our lives where we're going to do this. And then I'm sort of embracing that in this seminar experience and letting them know that every week I spent this time with 12 other people and they're all different and they all have weaknesses and we all have strengths and we share those strengths. So I try to bring that mentality into the classroom. And saying to them that as an adult learner, I know that it's hard but you just have to keep trying and you just keep learning. And this is not going to be the end of it. Seventh grade is not the end of it.

Another less experienced teacher shared her perspective that the content knowledge gained in the seminars, provided a confidence to engage a student's "oddball question." Her new knowledge allowed her to teach more confidently by knowing she could address difficult questions from her students:

> For me it's really the deeper content knowledge. It is knowing I'm standing up here knowing what I'm talking about on a level that they are probably not going to get to so I don't have to worry about that oddball question coming out that I can't answer. I think it's having some really solid unit that I look forward to teaching that I know is good and that the kids are getting a lot out of.

An experienced teacher who wrote curricula on Native American children in United States boarding schools described the role of different content as a way to engage

her students. She shared an example using photographs, researched through the seminar experience, which allowed her students the opportunity to ask more questions, thus making observations and connections to facilitate their learning process:

> What I did with both of the units that I wrote is I just took a look at what the state objectives were and then I didn't use any of the materials that we have at school. One of the things that we did with our unit on Native American children going to boarding schools was we started with a photograph of children who had just been taken off the reservations and they weren't allowed to infer they just had to make straight out observations. Their (children in the photograph] clothes are ragged, they're angry, it's dusty, and then they could ask questions like, why do they look sad? Why did they look mad? Why is it this? And so they had to go from what they knew exactly just by looking at something to asking questions about it. And then I showed them a photograph of the exact same students after they had their hair cut, had their clothing changed and they looked at the differences. They used to start asking more questions and it rolled back to whose stories being told.

Another experienced teacher who wrote curricula for her textile production course in high school cited the way new content can engage students. She shared an example of having her students focus on a longer-term project with a big question, and she found this kept their attention and interest in ways other, textbook-based project rarely did. She identified the value of her students thinking more deeply and critically as a way to measure success for these new curricula:

> These seminars helped me to create activities that were going to challenge them to think critically because they're not going to do that unless I set it up for that. If I were to just put chapter two in front of that textbook and say I want you to read and answer these three questions and then that's what they do. But if otherwise, I'd take a topic of let's say the domestic marketplace and expand upon it and just ask them this is one thing I'm doing this week with my students is I'm asking them to think of cities in the United States they associate with fashion industry and everyone's going to say New York. But if I asked them to dig a little deeper and think of others cities, they're probably not going to mention Portland, Oregon, or Kansas City, Missouri, whereas those places do have a viable fashion scene. So these seminar experiences help me to have students think critically and helped me to dig a little bit deeper into content knowledge and then set it up for them to where it hooks them. Like take what they already kind of have this preconceived

> idea and then ask them to elaborate on it. And then it's made me set it up so that they have to think critically. It's challenged them to think.

Last, an experienced teacher found that it wasn't the length of her new, written curricula that mattered most, but rather her entire outlook on teaching that changed. She cited the importance of examining the "big ideas" as a teacher to help her gain perspective in order to determine what matters most as she teaches her students:

> The idea of taking that big idea and bringing it all the way down here. There's that whole path back up to that big idea that I have the opportunity to open up for my kids. A curriculum unit that we write for this seminar experience might be a week, it might be two weeks, but it changes how I think about big ideas. And so as I look at what we're studying, whether it's going to be a play or we're going out on the nature trail and picking up rocks, I'm looking for that path up to that big idea. So while the core of my kids might be down here at the beginning of the path, if I see the whole path, then it's easy to move my higher level kids up along that path and it's exciting to get to.

Theme 3: collaborative relationships.

Collaborative Relationships related to the concept of connectedness, fellowship, and interaction with colleagues that all the interviewees identified as valuable. Many teachers pointed to the diverse seminars having teachers from elementary, middle and high school, along with the university professor. They expressed feeling energized and empowered by discussing ideas about teaching with teachers from different grade levels, schools, and backgrounds.

A less experienced teacher eloquently expressed the role of relationships in her seminar learning experience. She observed that the experience of others validating one's work or comments has a powerful confidence-building component to her. She described the feeling of confidence that follows when other teachers complement her work,

particularly others with credibility like a professor or expert. In addition, this teacher explored the role that being part of a caring group can play on one's confidence:

> You gain confidence because you are being validated through an array of people who are there to help you to get to a place to make you better. So you almost have mentors without having official mentors. And on top of that you speaking with professors on a colleague level and pushing you to feel like you are respected to come up with this. They are validating what I'm saying and they are giving me suggestions and not demands and it almost it builds your confidence because you have freedom to think and freedom to go outside the box, relatively to stick with your content, but still it gives you a chance to feel like oh my gosh I am doing something that is going to affect my students and not just on a small scale but this is something they are going to remember so I am putting so much into it. It's like riding a bike for the first time – somebody is giving me the chance to be that. You have so much support so you never feel alone to create this unit it seems so overwhelming but it doesn't matter because it never becomes an overwhelming thing because you have people to help you. So that confidence is built from that first day that someone says don't worry about it I'll help you. You don't have to worry about it here are some resources to help you and here are some strategies it's almost like a family type of thing.

Another less experienced teacher shared how "invaluable" it was to share her work with fellow teachers. She cited the interactions with professors, too, as a critical part of the experience, particularly their extra efforts to support her in making connections between her course content and ideas being discussed in the seminar experience. Then she also expressed the simple, yet profound feeling of solidarity that comes from being with other teachers on a regular basis who feel the same way she does:

> The time sharing with other teachers, particularly when we share about our curriculum units has been invaluable. The interaction with the professors being able to ask questions, even when they are not in my particular subject area, they are very good about trying hard to relate it to mine that has been something else. The time to sit around talking casually to other teachers that has been such a supportive thing. It's nice to know other people are exhausted at the end of the day. And you know feeling the same you do, that has been really tremendous.

Another less experienced teacher cited the role of feedback from teaching colleagues as essential. She described that her curriculum unit project was directly inspired by the interaction among the other teachers in the seminar:

> Every single curriculum I wrote was creative after talking to everyone else in the seminars. All of the fellows in the seminar said, you can do this. These fellows came up with the idea of my unit about superheroes. So I came up with a curriculum that my kids were designing superheroes. Like I would've never thought of that if it wasn't for this seminar experience with other teachers.

An experienced teacher described being in an "environment of other teachers." This teacher contrasted an approach to teaching whereby the internet is used as a limited resource for learning and growth. Instead, she shared, it is the "room with people" that makes the difference and that her experience in this professional development seminar led her to "think critically":

> It's just that whole notion that I am in an environment of other teachers and we're learning. I want my students to learn what I'm learning and the conversations that carry on. A teacher does not have anything other than the four walls. She is sitting in with kids and if all they're doing is going off the internet to pick up ideas of ways to get the kids to think critically then they're not being challenged or enriched by someone who studied it. You can gain insight from the Internet to a degree, but when you are in a room with people and that's all they're talking about and just the way they're thinking through things and the way your mind thinks through stuff, you just gain more. This experience with others forced me to think critically.

Another experienced teacher talked about the connection with other teachers as critical to her learning experience. She cited "building relationships" led to feeling greater comfort in the experience. Additionally, this teacher identified the particular seminar structure, with teachers from different grade levels and subject areas, as a strength to her experience:

> I really enjoy being able to have the time in the seminars that you're able to connect and talk with people and it may not necessarily have been something specific to a unit. I think that it's the building relationships that makes me feel like I'm more comfortable. I think talking to people outside of my tight circle at school of issues that I might have with students that I'm just not sure about. The thing that I loved about this seminar experience is the way that it's structured is that you're working with such a wide variety of people, kindergarten to 12th grade specialists, and high school to history teachers. And then I'm able to look at what I'm doing with third, fourth, fifth graders. So I think that those connections that we're able to make are hugely valuable and giving me ideas for things that I can do with the children.

Another experienced teacher shared that the "opportunity to participate in these collaborative relationships" compared to nothing else in her life. She found value in working out the ideas with others that helped her grow and feel part of a larger educational community:

> The fact that this seminar experience not only gives me that opportunity to participate in these collaborative relationships with stellar educators but are from such different places than me informs me in a way that there's nothing else in my life that would inform me in same way that this process does. It's working out the ideas together and the fact that we're working out those ideas and sometimes struggling with them and even struggling with each other makes you a stronger professional and a stronger individual. This experience makes me look for participation in the educational community in our community at large with ideas about what's happening in my classroom in a way that's been a great gift.

Theme 4: expert support from scholars.

Expert Support from Scholars related to the teachers' appraisal of the role of university professor who led the professional development seminars. Teachers identified the support provided by the professor as essential to their learning experience by acting as the credible expert.

A less experienced teacher described the particular role that a professor played in modeling effective teaching practices. This teacher shared that the professor was able to

work with teachers from various grade levels and tailor instruction to meet these diverse audiences. This gave the teacher confidence to observe how this professor differentiated instruction as a way to consider differentiation in her own classroom:

> We had kindergarten through 12th grade teachers in this seminar experience and the professor did a great job of addressing each grade level. He helped how you can do this for that grade if you are in this grade. This is how you can use this information you learned today. This is the way that you can use these themes. If you are a middle school teacher, this is the way you can use these themes and here is how if you're in high school. So maybe in inadvertently that transfers over to how you differentiate knowing that you have your low learners, your ESL learners, your high achievers, and how you design your lessons accordingly.

An experienced teacher, too, described the role of the professor as effective educational model. This teacher shared that having an expert model in her seminar experienced illustrated the value of being a teacher coach in her classroom, particularly through the process of allowing her students to learn from their mistakes:

> This experience has helped me to think more critically that I've been able to use some of that with my own students to make the ideas bigger and then help them discover how they connect to it. It's helped me to be less of a didactic teacher and much more of a coach or collaborator with them. I've seen that the professors have been a great educational model for me. As soon as I'm not being a didactic teacher it automatically opened up the door for my kids to think more critically and to make more mistakes sometimes, but they have the opportunity to learn from those mistakes themselves.

In summary, teachers expressed meaningful aspects of the professional development experiences associated with teacher efficacy through the four themes that emerged from the interview data. These themes are consistent with existing literature on effective professional development experiences (Borko, 2004; Darling-Hammond et al., 2017; Desimone, 2009; T. R. Guskey, 2002; Yoon et al., 2007). Additionally, these four themes interact with studies that examined the role of teacher efficacy (Glackin, 2018;

Lee et al., 2013; Yoo, 2016). Furthermore, the pattern of consistency among the eight teachers and the four themes, particularly with less experienced teachers, provides an opportunity to examine the interaction among professional development and teacher efficacy among less experienced teachers.

CHAPTER 5: DISCUSSION

The concept of self-efficacy is one of the most widely studied constructs in social science (Bandura, 1977, 1997). Teacher efficacy extends this fundamental principle of human behavior to consider the particular role that efficacy beliefs play in the role of a practicing classroom teacher (Bandura, 1997; Tschannen-Moran & Hoy, 2001; Yoo, 2016). Additionally, teacher efficacy has been associated with student academic achievement (Kim & Seo, 2018). This study explored four questions using a mixed-methods sequential explanatory design to examine teacher efficacy growth over time in a professional development program, the relationship between efficacy and years of teaching experience, and the critical features of professional development that might contribute to the development of teacher efficacy. The four research questions were:

1) To what extent is content-based professional development for in-service teachers associated with efficacy growth?

(2) Is the amount of growth in teacher efficacy demonstrated during the CTI learning experience associated with a teacher's years of experience?

(3) What critical teachers' perceptions of the professional development seminars are associated with the development of teacher efficacy?

(4) What do teachers identify as meaningful aspects of the CTI learning experience that helped them grow in their sense of teacher efficacy?

In examining the first research question, the mean difference in overall teacher efficacy scores increased over time for teachers who participated in the professional development program. That is, teachers scored significantly higher on the Teachers'

Sense of Efficacy Scale (TSES) after completing the professional development seminars by 0.21 points (See Table 1). In addition to overall teacher efficacy, the three subscales were also analyzed to determine mean differences. On the Student Engagement subscale, teachers score significantly higher after the seminars by 0.18 points (See Table 3). On the Instructional Strategies subscale, teachers scored significantly higher after the seminars by 0.27 points (See Table 5). On the Classroom Management subscale, teachers scored significantly higher by 0.16 points (See Table 7). These results indicate that teachers who participated in the professional development seminars increased their overall teacher efficacy, as well as efficacy related to student engagement, instructional strategies, and classroom management, over the course of the program. These findings are similar to other studies that suggest teacher efficacy improves over the course of professional development interventions (Glackin, 2018; Lee et al., 2013; J. Ross & Bruce, 2007; Yoo, 2016). However, the duration of the interventions in these studies ranged from 12 hours over the course of four days to an online intervention that lasted five weeks. In any case, this current study is based on an intervention that was measured over the course of 12 weeks for a total of at least 18 hours of professional development. Studies that invest in a sustained duration of professional development tend to be associated with positive student academic outcomes (Darling-Hammond et al., 2017; Yoon et al., 2007).

In research question one, these data illustrated that teacher efficacy grew over the course of this professional development program, yet this evidence alone did not address the relationship to teaching experience. Research question two addressed the question related to the relationship between efficacy growth over time and years of teaching

experience. The teachers were divided into two groups (10 years or fewer and greater than 10 years) in order to conduct the two-way repeated measures ANOVA based on previous research on efficacy and years of teaching experience (Kim & Seo, 2018). In terms of overall teacher efficacy there was a significant interaction effect between time and years of teaching experience, with a small to moderate effect size (See Figure 1). Additionally, there was a significant interaction effect on the student engagement subscale (See Figure 2), however no significant interaction effect on the instructional strategies or the classroom management subscales. On all four measures – overall teacher efficacy and the three subscales – teachers with 10 years of experience or less showed greater efficacy gains than teachers with greater than 10 years of experience. This finding is a useful contribution to the literature on professional development and teacher efficacy in that past studies have demonstrated greater teacher efficacy in experienced teachers. For example, Kim and Seo (2018) find that teachers with greater than 11 years of teacher experience showed a positive correlation between teacher efficacy and student academic achievement, but not for teachers with fewer than 11 years of experience. This implies that experienced teachers with great teacher efficacy are more likely than less experienced teachers with great teacher efficacy to support students' academic achievement. Another study points out that because teacher efficacy has been associated with positive teacher behaviors, attitudes and student interactions, often lacking in novice teachers, there is a case to be made that explains why experienced teachers are more effective than less experience colleagues (Wolters & Daugherty, 2007). However, these studies don't examine the same teachers' growth over time, as in this study, but rather rely on cross-sectional data to draw conclusions. In particular, most of

the studies have examined teacher efficacy and years of teaching experience using large datasets of thousands of individual cases, then compared them. This present study is examining the same teachers over the course of a professional development intervention using a pre- and post-test design. Furthermore, a finding based on the TSES survey from this study that both overall teacher efficacy and teacher efficacy to engage students increased more among less experienced teachers suggests that this particular professional development intervention is meeting a need among teachers with fewer years of experience regarding teacher efficacy. Therefore, a critical takeaway from this study is not, like the others, to address why teachers with certain years of teaching experience have greater or lesser teacher efficacy, but rather, to examine ways we can grow teacher efficacy in less experienced teachers who typically come in with comparatively less efficacy than experienced colleagues (Kim & Seo, 2018; J. Ross & Bruce, 2007)

Wolters and Daugherty (2007) identified three explanations for the influences on experienced teachers seemingly greater teacher efficacy compared with less experienced teachers. First, they identify a patterns of attrition wherein less skilled and less confident teachers are those who tend to leave the profession (Bandura, 1997) as well as the fact that in teaching as a profession with a high rate of attrition with newer teachers (Ingersoll, 2001). Second, the authors cite an explanation that experienced teachers are more likely to have obtained “additional and more” specific training than less experienced teachers, simply by the fact of being in teaching longer. Third, they highlight a related explanation that involves experienced teachers’ direct experience, that is, more time to gain confidence through working in classrooms and in schools for, again, longer periods of time.

To respond to these explanations, it is important to shed light on the particular ways this study contributes to the literature related to teacher efficacy and professional development. The first explanation related to attrition is significant, however, would suggest that more experienced teachers would have increased teacher efficacy over time in this professional development program compared with less experienced teachers. This was not the case – less experienced teachers in this study demonstrated significantly greater efficacy gains in overall teacher efficacy, as well as in the student engagement subscale. Therefore, the explanation that more experienced teachers should have greater teacher efficacy is not entirely relevant to this study, which found significant efficacy growth among the less experienced teachers.

Both the second and third explanations of greater efficacy among experienced teachers assumes and relies on the notion of time as a critical factor. That is, simply by the fact that teachers have taught for more years, they will have accumulated more professional development experiences and had more frequent direct experiences, and therefore, these teachers will develop teacher efficacy as a result. However, it is not reported to what extend the quality of the professional development experience among those teachers was studied. It is not clear that simply more time in teaching will lead to greater efficacy due to more experiences. This is a tenuous argument given that it could also be suggested as another plausible explanation that the quality of those experiences matters as much or more than the frequency of those experiences. Lee and colleagues (2013) suggested that it is problematic to assume more trainings and experiences lead to more efficacious teachers given that these experiences might not be positive or based on sources of efficacy growth. In other words, the types and quality of those professional

development experiences and direct experiences are essential to develop a fuller picture of exactly how teacher efficacy and years of teaching experience relate, as well as how efficacy develops in both experienced and inexperienced teachers.

Admittedly, Wolters and Daugherty (2007) acknowledge the scope of addressing the validity of these explanations was beyond the scope of their study. Additionally, the scope of this current study similarly avoids making specific valuations of these claims. Yet, as they suggest, it is likely a combination of attrition, direct experience, and training that contribute to the relationship between teacher efficacy and years of teaching experience. Wolters and Daugherty (2007) suggested that future research should examine teachers over a period of time to determine changes in teacher efficacy with experience.

Research question 3 explored the features of professional development that might contribute to teacher efficacy growth over time. The first theme from the analysis of the open-ended survey items was Enjoyed Seminar Experience, with many comments using words like “I enjoyed,” “positive”, “amazing,” and “good” to describe their experiences. These responses indicate teachers felt that the seminar experiences provide a valuable use of their time and provided opportunities to experience joy while in a learning environment. To the extent that these experiences contribute to efficacy growth, they might be related to one of the sources of efficacy growth known as physiological/emotional response, or a positive physiological reaction to an experience that could lead increased sense of efficacy (Bandura, 1997; Glackin, 2018; J. Ross & Bruce, 2007).

Collaboration among Different Teachers included responses from teachers about the value of having teaching colleagues working alongside each other in the learning experience. They used the word "collaboration" often, as well as "community" and "fellowship" to characterize their experiences. This theme also included examples of teaching identifying their teaching colleagues as "friends" meaning that the people they were working with transcended the typical categories of co-workers or event colleagues. The literature on effective professional development cites the role of collaboration among colleagues as one of the essential features of high quality programs (Darling-Hammond et al., 2017; Desimone, 2009; Smith, 2009a). Embedded in the comments on collaboration is the concept of time, or as the professional development literature refers to it, sustained duration. The language that teachers used to describe the value of collaboration to them denoted an underlying assumption about the relationship between time and collaboration. In other words, it can be hard to have meaningful collaborations in short periods of time. Teachers noted "Collaboration with other teachers and university professors is very valuable to me" and "the idea of being able to meet regularly, and collaborate with a group of teaching will impact my teaching strategies." These comments related to "value" and "impact" typically are associated with longer term commitments and projects. The interaction between collaboration and sustained duration is essential in professional development outcomes for teachers (Darling-Hammond et al., 2017; Yoon et al., 2007).

A number of teachers used the word "challenge" when describing the features of the professional development experience that were valuable to them. This concept of challenge was often used in the context of content knowledge and related to the third

theme from open-ended survey items analysis, Professional Challenge through Content Knowledge. Furthermore, it is very likely the very nature of experiencing the challenge through the content that allowed the teachers, in hindsight and reflection, to find meaning and satisfaction in the experience overall. Teachers shared, "I knew it would be challenging, but it was for sure worth it," "some of the material was very challenging, but after some study it became manageable," "challenging yet rewarding," and "I great opportunity to be challenged intellectually." The teachers are expressing the role of rigor in their own learning as essential to their experience of benefiting from the program. Similar to research in professional development, these finding suggest it is not just a focus on content per se, but rather relevant, discipline-specific content that teachers find meaning in and find value for themselves (Darling-Hammond et al., 2017).

The fourth theme of the open-ended survey analysis was Relevant Topics and Resources from Professors. Professors, those who are leading these long-term seminar experiences, are of great value to the teachers. Teachers viewed content shared in these meetings as resources they could use in their classrooms: "The professor took us on a learning journey where we enjoyed and embraced, and got tons of resources to bring into our classrooms." This relevance of material to teachers' classrooms is expressed by numerous teachers in their responses. They appreciate the attention to detail the professors provide in terms of organizing their materials and time in a way that shows connections to their classrooms. These professors balance both content and curriculum to benefit teachers' practice: "The seminar had a strong correlation to the subject I teach, so I found the professor's input and instruction very helpful."

The fifth theme for the open-ended survey items analysis was Confidence to be a Better Teacher and Person. This theme included numerous comments from teachers stating they feel like a "better teacher" as a result of being in these professional development seminars. However, given the fact that not many responses included significant detail, it is hard to interpret these particular comments in too much detail in the context of understand teachers' perceptions of professional development experiences. It is likely, however, that similar to the first theme Enjoyed Seminar Experience this theme is associated with a source of efficacy through the physiological and emotional responses induced by these positive experiences.

In summary of the thematic analysis of open-ended survey items related to the QualP1 phase, the findings provide guidance related to addressing the third research question related to teachers' perceptions of professional development that promote teacher efficacy. First, four of the essential seven characteristics of effective professional development outlined recently by Darling-Hammond and colleagues (2017) are present within these themes: is content focused; supports collaboration; provides coaching and expert support; and is of sustained duration. Evidence from the survey responses indicate these professional development seminars are emphasizing content effectively, incorporating collaboration in innovative ways, demonstrating expert support by professors, and are taking place over a long period of time.

Additionally, teacher responses within these five themes suggest sources of teacher efficacy likely motivating efficacy growth. Teachers are received direct experience in practices and activities related to researching, writing, and discussing content, the very content that they taught to their students. In other words, they are given

multiple opportunities to experience mastery through the focus on content through the seminar experiences. These professional development experiences encourage knowledge gain and skill development through enactive mastery experiences. In addition to these enactive mastery experiences, it is likely cognitive mastery experiences that promote efficacy growth (Glackin, 2018; Palmer, 2011). Teachers gained direct experience, for example, conducting and presenting on research practices, and also gained cognitive mastery enhancing critical thinking skills by studying content related to those practices. It is this combination of both types of mastery experiences that are likely contributing to efficacy growth in less experienced teachers in this study.

Teachers are learning from their colleagues in the seminars through interactive presentations, sharing materials, and discussing ways to teach curriculum. These experiences of vicarious engagement help teachers to develop confidence through shared experience and observation (Bandura, 1997; Glackin, 2018).

Teachers are situated in these seminars which are essentially interactive social groups with conversations and discussion about their work in progress. Through the feedback process and collaboration with colleagues in the seminars, teachers are given positive affirmations about their content knowledge and pedagogical practices. This is known as verbal persuasion and is one of the four sources of teacher efficacy (Bandura, 1997). Not only can confidence arise from successfully mastering a task, or learning a concept, it can come from observing others be successful in mastering a task or learning a concept, but it can also come from receiving positive feedback about the work that they complete. While verbal persuasion might be considered to be a weak source of teacher efficacy, it has been demonstrated in some cases to be particularly important for novice

teachers who have not yet developed confidence though mastery (Bandura, 1997). Lastly, through the first theme, Enjoyed Seminar Experience, many teachers used positive language that signaled a great satisfaction and enjoyment with their experience. This is likely going to be have caused a physiological response, which is the fourth source of teacher efficacy.

Returning to the finding related to research question four from the interview data that showed a stronger pattern of consistency among the initial codes and themes of less experienced teachers compared with more experienced teachers. The distribution of the less experienced teachers' experiences related to their seminar experiences suggest they found meaning in all four of the themes that emerged and that these themes are associated with research on effective professional development. This is significant because existing literature suggests that it is not usually a single factor but rather many factors that contribute to teacher change and student outcomes (Borko, 2004; Darling-Hammond et al., 2017; Desimone, 2009; J. Ross & Bruce, 2007; Wolters & Daugherty, 2007; Yoon et al., 2007). These less experienced teachers have identified meaningful experiences across the four themes related to effective professional development. This suggests a combination of an appreciation for the inherent value of learning, student engagement through content, collaborative relationships, and expert support are associated with effective professional development which leads to increased teacher efficacy among less experienced teachers.

Findings from the interviews included four common themes: Learning for Its Own Sake; Engaging Students through Exciting Content; Collaborative Relationships; and Expert Support from Scholars. These four themes relate closely to the five themes

from open-ended survey items above. Examining these themes together in the context, first, of effective professional development, then in the context of sources of teacher efficacy shed light on the contribution of this study to the understanding of the relationship between effective professional development and teacher efficacy growth over time. There are three features of effective professional development that emerge when comparing both sets of themes from QualP1 and QualP2: content focus, collaboration, and expert support. The research on effective professional development has long emphasized the importance of focusing on content knowledge in meaningful ways when providing these programs for teachers (Borko, 2004; Darling-Hammond et al., 2017; T. R. Guskey & Yoon, 2014; Yoon et al., 2007). Related themes from QualP1 are Professional Challenge through Content Knowledge and Confidence to be a Better Teacher and Person. Related themes from QualP2 are Learning for Its Own Sake and Engaging Students through Exciting Content. Additionally, the research is clear on the value of collaboration (Darling-Hammond et al., 2017; Glackin, 2018). Related themes from QualP1 are Enjoyed Seminar Experience and Collaboration among Different Teachers and Professors. Related themes from QualP2 are Collaborative Relationships. The role of expert support by qualified instructors is found in both sets of themes. Related themes from QualP1 are Relevant Topics and Resources from Professors, and related themes from QualP2 are Expert Support from Scholars.

The intersection between effective teacher professional development and teacher efficacy in this study includes elements of the four sources of efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological/emotional responses. Evidence from the open-ended survey items and interview data suggest that

cognitive mastery experiences, that is, experiences focused on critical thinking and creativity in the seminars, might have contributed to teachers' efficacy gain. This is consistent with research on the role of cognitive mastery for teachers who participated in professional development that encouraged critical thinking (Glackin, 2018; Palmer, 2011). Teachers' responses to open-ended survey items and interviews suggest the role of collaboration with other teachers and professors in their overall meaningful appraisal of their experiences. Furthermore, teachers described the value of the experience of "being a student" to help provide important information and feedback so that they could better understand what their own students felt like in the classroom. This description is consistent with the influence of vicarious experiences to motivate efficacy growth in teachers (Bandura, 1997).

Although evidence suggests verbal persuasion is a weak source of teacher efficacy, it is particularly relevant in the case teachers might have little previous experience in an area (Bandura, 1997; J. Ross & Bruce, 2007). This suggests that teachers with less teaching experience might be more receptive to verbal persuasion as a sources of efficacy growth. In this study teachers cited examples of being "validated" by others, including the credible expert, as well as teachers in their seminars, as meaningful aspects of their learning experiences. Perhaps teachers newer to the teaching profession might have benefited from opportunities to be told that they did well through discussion in the seminar meetings, or in written feedback on their curriculum projects. Whereas more experienced teachers might not have benefited from this verbal persuasion, less experienced teachers found this type of communication essential to feeling more confidence in their ability to teach effectively. This might contribute to a comprehensive

explanation why less experienced teachers gained efficacy more so than experienced colleagues. Lastly, there was evidence of physiological/emotional responses from teachers in these seminar experiences. Teachers cited that they "enjoyed" and the seminars were "positive" and even stronger language such as they found them "amazing." All these words suggest there might have been an affective motivating factor at play for less experienced teachers which contributed to their efficacy growth.

Taken together findings from this sequential explanatory mixed methods study contribute to the areas of professional development and teacher efficacy in critical ways. First, the statistically significant findings that teachers with less experience showed greater teacher efficacy gains over time compared to more experienced colleagues contradicts existing research about the relationship between teaching experience and teacher efficacy (Kim & Seo, 2018; Wolters & Daugherty, 2007). Additionally, these existing studies don't examine teacher efficacy change over time, preferring to examine cross-sectional data of different teachers. This study could shed light on how efficacy developments in teachers related to particular critical teachers' perceptions of professional development programs. Second, three features of professional development emerge as possible contributors to teacher efficacy change over time. Given the findings from the open-ended survey data analysis and the interview data analysis it appeared that content-focused professional development that involved a diverse group of practicing teachers from different grade levels, subjects and schools who are led by an expert scholar in their field might be associated with teacher efficacy growth over time.

Limitations and Future Research

There were limitations to this current study. First, the study used a sequential explanatory mixed-methods design to examine both quantitative and qualitative data. Despite intentions to use the outcomes of the quantitative phase more directly, selection of teachers to participate in the interviews was limited. Given the results from the ANOVA means testing on the pre- and post-survey data showed a significant finding related to teacher efficacy gains in less experienced teachers, there were only three teachers selected who had ten years or less teaching experience. Additionally, the ANOVA only examined two categories of teachers with the dividing line at 10 years of teaching experience. Data suggests more categories, for example 0-5 years, 6-10 years, 11-15 years, and so on, related to years of teaching experience in order to more accurately assess the differences associated with teachers at different stages of career progression (Kim & Seo, 2018; J. Ross & Bruce, 2007).

Second, a total of 179 teachers were invited to be part of this study, and eight volunteered. These eight teachers were interviewed only once during the study. Among those eight teachers only three were considered less experienced teachers, or teachers with 10 years or fewer of teaching experience. These three teachers represented only 37.5% of the total teachers interviewed, which is less than the 55.6% of less experienced teachers in the entire sample of 180 teachers invited for interviews. While this sample of interviewed teachers was small, additional less experienced teachers could have contributed to the results associated with the relationship between the quantitative and qualitative phases of the study.

Third, another limitation related to data collection and program duration. The entire professional development seminar program lasted for seven months, from April through December, yet the QuantP1 pre-post survey data collection only began in September and ended in December when the program ended. The rationale for the shorter data collection window was based on the school calendar starting in August, and attempts to collect data at the end of one school year might provide unnecessary complications to the study. Even with that, the entire program is a full seven months so there is a possibility that the initial pre-survey scores might not have been an accurate representation of teacher efficacy at the start of the study.

Future research should target teachers with less experience to explore how efficacy growth over time might emerge differently for these teachers compared with teachers who have more experience. Numerous studies examine the interplay between teachers with different years of teaching experience and teacher efficacy (Glackin, 2018; T. R. Guskey, 1988; J. Ross & Bruce, 2007). These studies explored the subtleties associated with other factors on teacher efficacy, including goal structures, grade levels, and pedagogical changes.

Future research should also explore efficacy growth in teacher professional development by conducting multiple interviews over time, before, during and after the professional development experience. Additionally, based on research data researchers might study efficacy using an ethnographical approach wherein their classrooms are visited, interviews are conducted, and sample work reviewed over a longer period of time (Glackin & Hohenstein, 2018). Researchers have called for greater and more robust qualitative analysis of the teacher efficacy construct as a way to more fuller understand

the construct, which has long been studied quantitatively (Labone, 2004; Wheatley, 2005).

Another direction for future research might be to quantitatively assess teacher efficacy before, during and after the program intervention. This would likely provide a more complete picture of teacher efficacy prior to the intervention and before teachers might have changed as a result. Additionally, assessments of teacher efficacy during the intervention at key points could provide opportunities for, not only additional data, but more complicated inferential statistical tests in order to determine if different points in time might show greater or lesser efficacy growth. Lastly, efficacy assessments following intervention would be helpful. These data would provide information immediately after invention to show short-term treatment effects. Data collection many months after the intervention is finished, or perhaps a year after, would explore lasting effects of the intervention as it relates to teacher efficacy.

Implications for Teacher Professional Development

Overall findings of this study suggest teachers gain efficacy over the course of a 3-month professional development intervention. These efficacy gains over time seem to be particularly relevant for less experienced teachers and situated within the student engagement subscale. This construct within the overall teacher efficacy construct includes teachers' beliefs related to confidence to motivate unmotivated students, help foster student creativity, help students value learning, and help students think critically. Additionally, evidence from this study suggests that teachers' perceptions of effective professional development associated with teacher efficacy include collaboration, content focus, and expert support. These three elements align with existing literature on effective

professional development (Darling-Hammond et al., 2017). In addition to effective professional development, sources of teacher efficacy related to these finds are relevant. Teachers in this study expressed value and meaning associated with deepening content knowledge, observing and learning through participation in long-term seminars with diverse K-12 teaching colleagues, being supported by expert professors, and having credible colleagues provide positive and encouraging feedback throughout the process.

School districts, organizations, and teachers should focus on teacher professional development that, based on the data from this study, as well as existing literature within the field of efficacy and teacher professional development, emphasizes the following elements: (1) relevant, rigorous and content-focused learning experiences, (2) collaborative, dynamic teacher learning teams, and (3) expert support through effective modeling by credible professionals, namely university professors. In addition, given that student engagement data in this study demonstrated less experienced teachers benefited from intensive professional development, school districts might consider not just providing additional support for newer teachers, but might consider providing multiple types of support to these teachers. Evidence from this study suggests less experienced teachers might be particularly poised to benefit from interventions that are aimed at efficacy growth defined through the lens of student engagement. Targeted inventions focused on teachers' beliefs about student creativity, student critical thinking, and student value of the learning process could lead to positive academic outcomes.

REFERENCES

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science*, *333*(6045), 1034–1037. https://doi.org/10.1126/science.1207998

Bandura, A. (1977). Bandura (1977). *Pyschological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Borko, H. (2004). Professional Development and Teacher Learning: Mapping the Terrain. *Educational Researcher*, *33*(8), 3–15. https://doi.org/10.3102/0013189x033008003

Borko, H., Jacobs, J., Eiteljorg, E., & Pittman, M. E. (2008). Video as a tool for fostering productive discussions in mathematics professional development. *Teaching and Teacher Education*, *24*(2), 417–436. https://doi.org/10.1016/j.tate.2006.11.012

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, *44*(6), 473–490. https://doi.org/10.1016/j.jsp.2006.09.001

Charmaz, K. (2006). *Constructing Grounded Theory*. Thousand Oaks, Ca.: Sage.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York: Routledge Academic.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective Teacher

Professional Development. *Palo Alto, CA: Learning Policy Institute*, (June). https://doi.org/10.1016/j.fusengdes.2007.07.052

Desimone, L. M. (2009). Improving Impact Studies of Teachers' Professional Development: Toward Better Conceptualizations and Measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189x08331140

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of Professional Development on Teachers' Instruction: Results from a Three-year Longitudinal Study. *Educational Evaluation and Policy Analysis*, *24*(2), 81–112. https://doi.org/10.3102/01623737024002081

Duffin, L. C., French, B. F., & Patrick, H. (2012). The Teachers' Sense of Efficacy Scale: Confirming the factor structure with beginning pre-service teachers. *Teaching and Teacher Education*, *28*(6), 827–834. https://doi.org/10.1016/j.tate.2012.03.004

Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. Teachers College Record,. *[Web of Science ®]*, , *[Google Scholar]*, *103*(6), 1013–1055.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs - Principles and practices. *Health Services Research*, *48*(6 PART2), 2134–2156. https://doi.org/10.1111/1475-6773.12117

Fiest, J., & Fiest, G. (2002). *Theories of Personality* (5th ed.). New York: McGraw-Hill.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). of Teachers. *American Educational Research Journal*, *38*(4), 915–945.

https://doi.org/10.3102/00028312038004915

Glackin, M. (2018). 'It's more than a prop': Professional development session strategies as sources of teachers' self-efficacy and motivation to teach outside the classroom. *Professional Development in Education, 45*(3), 1–18. https://doi.org/10.1080/19415257.2018.1490917

Glackin, M., & Hohenstein, J. (2018). Teachers' self-efficacy: progressing qualitative analysis. *International Journal of Research and Method in Education, 41*(3), 271–290. https://doi.org/10.1080/1743727X.2017.1295940

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

Greenleaf, C. L., Litman, C., Hanson, T. L., Rosen, R., Boscardin, C. K., Herman, J., … Jones, B. (2011). Integrating Literacy and Science in Biology. *American Educational Research Journal, 48*(3), 647–717. https://doi.org/10.3102/0002831210384839

Guskey, T. (2002). Does it make a difference? Evaluating professional development. *Educational Leadership, 59*(6), 45–51.

Guskey, T. R. (1988). Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education, 4*(1), 63–69. https://doi.org/10.1016/0742-051X(88)90025-X

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice, 8*(3), 381–391.

https://doi.org/10.1080/135406002100000512

Guskey, T. R., & Yoon, K. S. (2014). What Works in Professional Development? *Phi Delta Kappan*, *90*(7), 495–500. https://doi.org/10.1177/003172170909000709

Hill, H. C., Beisiegel, M., & Jacob, R. (2013). Professional Development Research. *Educational Researcher*, *42*(9), 476–487. https://doi.org/10.3102/0013189x13512674

Ingersoll, R. M. (2001). Teacher Turnover and Teacher Shortages: An Organizational Analysis. *American Educational Research Journal*, *38*(3), 499–534. https://doi.org/10.3102/00028312038003499

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice. *Field Methods*, *18*(1), 3–20. https://doi.org/10.1177/1525822X05282260

Kim, K. R., & Seo, E. H. (2018). The relationship between teacher efficacy and students' academic achievement: A meta-analysis. *Social Behavior and Personality: An International Journal*, *46*(4), 529–540. https://doi.org/10.2224/sbp.6554

Kisa, Z., & Correnti, R. (2015). Examining Implementation Fidelity in America's Choice Schools. *Educational Evaluation and Policy Analysis*, *37*(4), 437–457. https://doi.org/10.3102/0162373714557519

Klassen, R. M., Chong, W. H., Huan, V. S., Wong, I., Kates, A., & Hannok, W. (2008). Motivation beliefs of secondary school teachers in Canada and Singapore: A mixed methods study. *Teaching and Teacher Education*, *24*(7), 1919–1934.

https://doi.org/10.1016/j.tate.2008.01.005

Klassen, R. M., & Tze, V. M. C. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review*, *12*, 59–76. https://doi.org/10.1016/j.edurev.2014.06.001

Kleinsasser, R. C. (2014). Teacher efficacy in Teaching and Teacher Education. *Teaching and Teacher Education*, *44*, 168–179. https://doi.org/10.1016/j.tate.2014.07.007

Labone, E. (2004). Teacher efficacy: Maturing the construct through research in alternative paradigms. *Teaching and Teacher Education*, *20*(4), 341–359. https://doi.org/10.1016/j.tate.2004.02.013

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, *4*(NOV), 1–12. https://doi.org/10.3389/fpsyg.2013.00863

Lara-Alecio, R., Tong, F., Irby, B. J., Guerrero, C., Huerta, M., & Fan, Y. (2012). The effect of an instructional intervention on middle school english learners' science and english reading achievement. *Journal of Research in Science Teaching*, *49*(8), 987–1011. https://doi.org/10.1002/tea.21031

Lee, B., Cawthon, S., & Dawson, K. (2013). Elementary and secondary teacher self-efficacy for teaching and pedagogical conceptual change in a drama-based professional development program. *Teaching and Teacher Education*, *30*(1), 84–98. https://doi.org/10.1016/j.tate.2012.10.010

Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation*.

Josey-Bass.

Mohamadi, F. S., & Asadzadeh, H. (2012). Testing the mediating role of teachers' self-efficacy beliefs in the relationship between sources of efficacy information and students achievement. *Asia Pacific Education Review, 13*(3), 427–433. https://doi.org/10.1007/s12564-011-9203-8

Morgan, D. (1998). Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qualitative Health Research, 8*(3), 362–376.

Munoz, Z. j. (2008). Exploring the impact of teachers' sense of efficacy upon hispanic high school students' academic achievement. *Unpublished Dissertation*.

National Commission on Teaching and America's Workforce. (2016). What Matters Now: A New Compact for Teaching and Learning. The Evidence Base. *National Commission on Teaching and America's Future*. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,url,uid&db=eric&AN=ED572506&site=ehost-live&scope=site

Palmer, D. (2011). Sources of efficacy information in an inservice program for elementary teachers. *Science Education, 95*(4), 577–600. https://doi.org/10.1002/sce.20434

Penuel, W. R., Fishman, B. J., Yamaguchi, R., & Gallagher, L. P. (2007). What Makes Professional Development Effective? Strategies That Foster Curriculum Implementation. *American Educational Research Journal, 44*(4), 921–958. https://doi.org/10.3102/0002831207308221

Penuel, W. R., Gallagher, L. P., & Moorthy, S. (2011). Preparing Teachers to Design Sequences of Instruction in Earth Systems Science. *American Educational Research Journal*, *48*(4), 996–1025. https://doi.org/10.3102/0002831211410864

Ross, J. A. (1994). Ross , J . A . (1994). The impact of an in-service to promote cooperative learning on the stability of teacher efficacy . Teaching and Teacher Education , 10 (4), 381-394 ., *10*(September 1993), 381–394.

Ross, J., & Bruce, C. (2007). Professional development effects on teacher efficacy: Results of randomized field trial. *Journal of Educational Research*, *101*(1), 50–60. https://doi.org/10.3200/JOER.101.1.50-60

Roth, K. J., Garnier, H. E., Chen, C., Lemmens, M., Schwille, K., & Wickler, N. I. Z. (2011). Videobased lesson analysis: Effective science PD for teacher and student learning. *Journal of Research in Science Teaching*, *48*(2), 117–148. https://doi.org/10.1002/tea.20408

Sahlberg, P. (2007). Education policies for raising student learning: The Finnish approach. *Journal of Education Policy*, *22*(2), 147–171. https://doi.org/10.1080/02680930601158919

Smith, R. M. (2004). *To Motivate My Students: An Evaluation of the National Demonstration Project of the Yale-New Haven Teachers Institute*.

Smith, R. M. (2009). To Strengthen Teaching : an Evaluation of Teachers Institute Experiences, 1–34.

Teacher Professional and Career Development, United States Department of Education.

(n.d.). Retrieved from https://www.ed.gov/oii-news/teacher-professional-and-career-development.

Tooley, M., & Connally, K. (2016). No panacea: Diagnosing what ails teacher professional development before reaching for remedies, (June), 44. https://doi.org/10.14507/er.v23.2060

Trotter, Y. (2006). Adult Learning Theories: Impacting Professional Development Programs. *Delta Kappa Gamma Bulletin*, 8–13. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=00118044&AN=20357005&h=26Z+VQs+3Ht0U8V5qA1FQnfCfyl7Azhjqo3eRLfXV9N8JGn2BEjjRDRtajiwZDtb9OV8e3/rhrZG7DdQkrDkwg==&crl=c

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education*, *17*(7), 783–805. https://doi.org/10.1016/j.echo.2004.03.035

Tschannen-Moran, M., & McMaster, P. (2009). Sources of Self-Efficacy: Four Professional Development Formats and Their Relationship to Self-Efficacy and Implementation of a New Teaching Strategy. *The Elementary School Journal*, *110*(2), 228–245. https://doi.org/10.1086/605771

Välijärvi, J., Kupari, P., Linnakylä, P., Reinikainen, P., Sulkunen, S., Törnroos, J., & Arffman, I. (2007). *The Finnish success in PISA - and some reasons behind it 2: PISA 2003*.

Wayne, A., Tanenbaum, C., Brown, D., & Boyle, A. (2017). *State Efforts to Promote*

Equitable Access to Effective Teachers. *Policy and Program Studies Service Office of Planning, Evaluation and Policy Development U.S. Department of Education*. https://doi.org/10.4135/9781412969024.n142

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). Teacher PD Tech Report: A status report on teacher development in the U.S. and abroad. *National Staff Development Council*, 162. https://doi.org/10.1006/jfbi.2002.2063

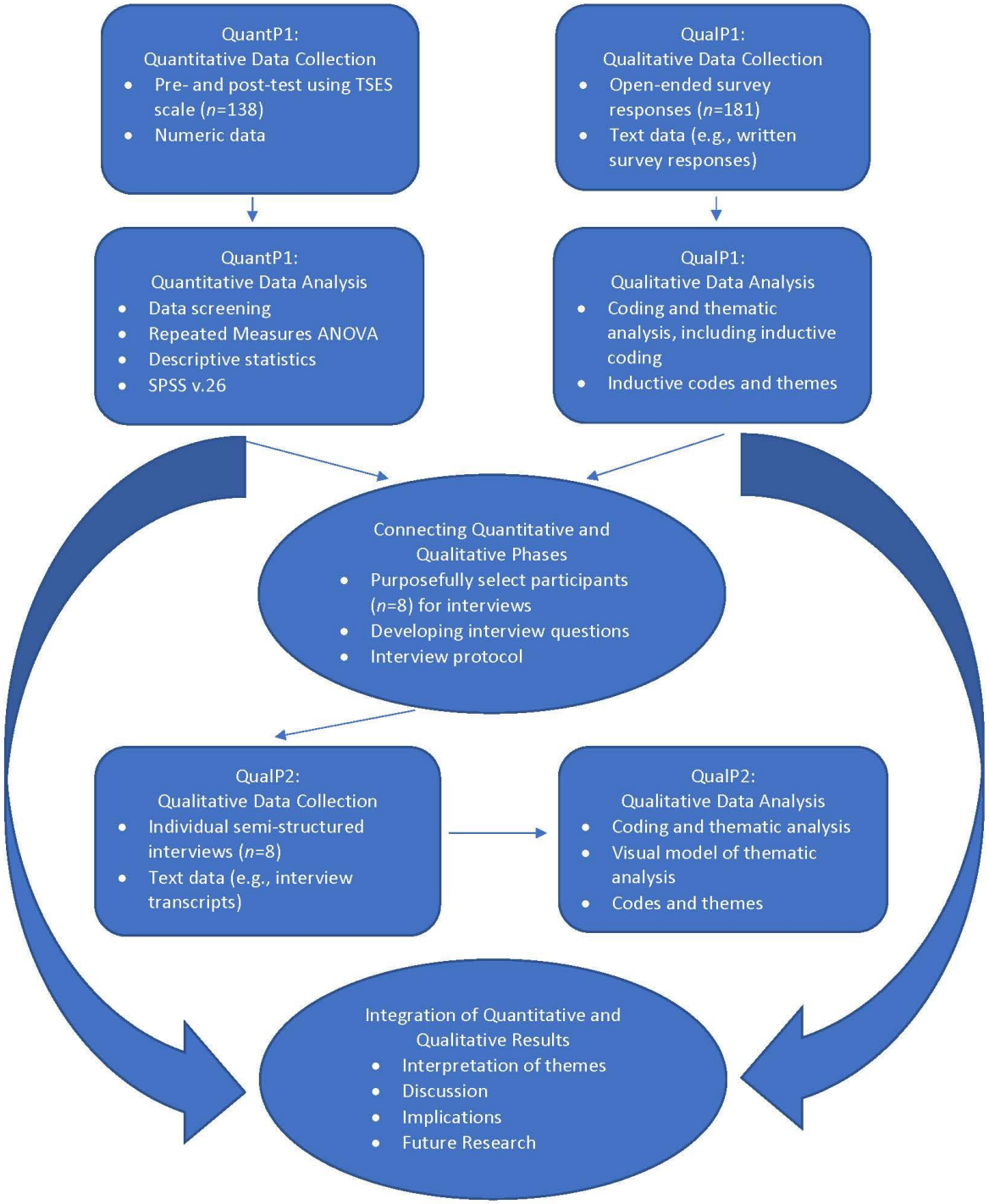
Wheatley, K. F. (2005). The case for reconceptualizing teacher efficacy research. *Teaching and Teacher Education*, *21*(7), 747–766. https://doi.org/10.1016/j.tate.2005.05.009

Wolters, C. A., & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: Their relation and association to teaching experience and academic level. *Journal of Educational Psychology*, *99*(1), 181–193. https://doi.org/10.1037/0022-0663.99.1.181

Yoo, J. H. (2016). The Effect of Professional Development on Teacher Efficacy and Teachers' Self-Analysis of Their Efficacy Change. *Journal of Teacher Education for Sustainability*, *18*(1), 84–94. https://doi.org/10.1515/jtes-2016-0007

Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. L. (2007). Reviewing the evidence on how teacher professional development affects student achievement. *Evaluation*, (REL 2007033), 62. https://doi.org/10.3102/0002831208328088

Appendix A: Visual Model for Sequential Explanatory Mixed-Methods



Appendix B: Tables

Table 1.

Descriptive Statistics for Overall Teacher Efficacy on TSES by Years of Teaching Experience

	yrs_exp_cat	Mean	Std. Deviation	N
PreTotal	10 yrs or fewer	6.9268	.89270	70
	Greater than 10 yrs	7.2812	.77469	68
	Total	7.1014	.85235	138
PostTotal	10 yrs or fewer	7.2619	.83809	70
	Greater than 10 yrs	7.3603	.82765	68
	Total	7.3104	.83139	138

Table 2.

ANOVA Tests of Within-Subjects Effects on Overall Teacher Efficacy on TSES by Time and Years of Teaching Experience

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
time	Sphericity Assumed	2.958	1	2.958	10.214	.002
	Greenhouse-Geisser	2.958	1.000	2.958	10.214	.002
	Huynh-Feldt	2.958	1.000	2.958	10.214	.002
	Lower-bound	2.958	1.000	2.958	10.214	.002
time * yrs_exp_cat	Sphericity Assumed	1.131	1	1.131	3.905	.050
	Greenhouse-Geisser	1.131	1.000	1.131	3.905	.050
	Huynh-Feldt	1.131	1.000	1.131	3.905	.050
	Lower-bound	1.131	1.000	1.131	3.905	.050
Error(time)	Sphericity Assumed	39.388	136	.290		
	Greenhouse-Geisser	39.388	136.000	.290		
	Huynh-Feldt	39.388	136.000	.290		
	Lower-bound	39.388	136.000	.290		

Table 3.

Descriptive Statistics for Student Engagement Subscale on TSES by Time and Years of Teaching Experience

	yrs_exp_cat	Mean	Std. Deviation	N
PreEngageAVG	10 yrs or fewer	6.5946	1.00979	70
	Greater than 10 yrs	7.0846	.92298	68
	Total	6.8361	.99529	138
PostEngageAVG	10 yrs or fewer	6.9446	.99742	70
	Greater than 10 yrs	7.1048	.98179	68
	Total	7.0236	.98940	138

Table 4.

ANOVA Tests of Within-Subjects Effects on Student Engagement Subscale on TSES by Time and Years of Teaching Experience

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
time	Sphericity Assumed	2.364	1	2.364	6.076	.015
	Greenhouse-Geisser	2.364	1.000	2.364	6.076	.015
	Huynh-Feldt	2.364	1.000	2.364	6.076	.015
	Lower-bound	2.364	1.000	2.364	6.076	.015
time * yrs_exp_cat	Sphericity Assumed	1.876	1	1.876	4.821	.030
	Greenhouse-Geisser	1.876	1.000	1.876	4.821	.030
	Huynh-Feldt	1.876	1.000	1.876	4.821	.030
	Lower-bound	1.876	1.000	1.876	4.821	.030
Error(time)	Sphericity Assumed	52.910	136	.389		
	Greenhouse-Geisser	52.910	136.000	.389		
	Huynh-Feldt	52.910	136.000	.389		
	Lower-bound	52.910	136.000	.389		

Table 5.

Descriptive Statistics for Instructional Strategies Subscale on TSES by Time and Years of Teaching Experience

	yrs_exp_cat	Mean	Std. Deviation	N
PreInstructAVG	10 yrs or fewer	7.0411	1.01321	70
	Greater than 10 yrs	7.4173	.81142	68
	Total	7.2264	.93524	138
PostInstructAVG	10 yrs or fewer	7.4554	.86342	70
	Greater than 10 yrs	7.5551	.89160	68
	Total	7.5045	.87564	138

Table 6.

ANOVA Tests of Within-Subjects Effects Instructional Strategies Subscale on TSES by Time and Years of Teaching Experience

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
time	Sphericity Assumed	5.258	1	5.258	13.954	.000
	Greenhouse-Geisser	5.258	1.000	5.258	13.954	.000
	Huynh-Feldt	5.258	1.000	5.258	13.954	.000
	Lower-bound	5.258	1.000	5.258	13.954	.000
time * yrs_exp_cat	Sphericity Assumed	1.318	1	1.318	3.497	.064
	Greenhouse-Geisser	1.318	1.000	1.318	3.497	.064
	Huynh-Feldt	1.318	1.000	1.318	3.497	.064
	Lower-bound	1.318	1.000	1.318	3.497	.064
Error(time)	Sphericity Assumed	51.245	136	.377		
	Greenhouse-Geisser	51.245	136.000	.377		
	Huynh-Feldt	51.245	136.000	.377		
	Lower-bound	51.245	136.000	.377		

Table 7.

Descriptive Statistics for Classroom Management Subscale on TSES by Time and Years of Teaching Experience				
	yrs_exp_cat	Mean	Std. Deviation	N
PreClassAVG	10 yrs or fewer	7.1446	1.01252	70
	Greater than 10 yrs	7.3419	.95823	68
	Total	7.2418	.98751	138
PostClassAVG	10 yrs or fewer	7.3857	.99312	70
	Greater than 10 yrs	7.4210	.93962	68
	Total	7.4031	.96376	138

Table 8.

ANOVA Tests of Within-Subjects Effects for Classroom Management Subscale on TSES by Time and Years of Teaching Experience						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
time	Sphericity Assumed	1.767	1	1.767	4.802	.030
	Greenhouse-Geisser	1.767	1.000	1.767	4.802	.030
	Huynh-Feldt	1.767	1.000	1.767	4.802	.030
	Lower-bound	1.767	1.000	1.767	4.802	.030
time * yrs_exp_cat	Sphericity Assumed	.453	1	.453	1.230	.269
	Greenhouse-Geisser	.453	1.000	.453	1.230	.269
	Huynh-Feldt	.453	1.000	.453	1.230	.269
	Lower-bound	.453	1.000	.453	1.230	.269
Error(time)	Sphericity Assumed	50.050	136	.368		
	Greenhouse-Geisser	50.050	136.000	.368		
	Huynh-Feldt	50.050	136.000	.368		
	Lower-bound	50.050	136.000	.368		

Table 9. Frequency Order of Codes from Interview Analysis of Eight Teachers by Four Themes and Years of Teaching Experience

Four Themes Name	Learning for Its Own Sake	Engaging Students	Collaborative Relationships	Expert Support	Total
Nakisha*	1	3	1	-	5
Kelly*	1	1	2	2	6
Tami*	2	3	3	-	8
Total	4	7	6	2	19
Laura^	-	6	1	-	7
Liz^	2	-	2	2	6
Anne^	2	4	1	-	7
Amber^	2	2	1	1	6
Kumiko^	-	1	3	-	4
Total	6	13	8	3	30

*Teacher with 10 years or fewer teaching experience (N=3)
*Teachers with more than 10 years of teaching experience (N=5)
Pseudonyms were used for all teachers' names per IRB guidelines.

Appendix C: Figures

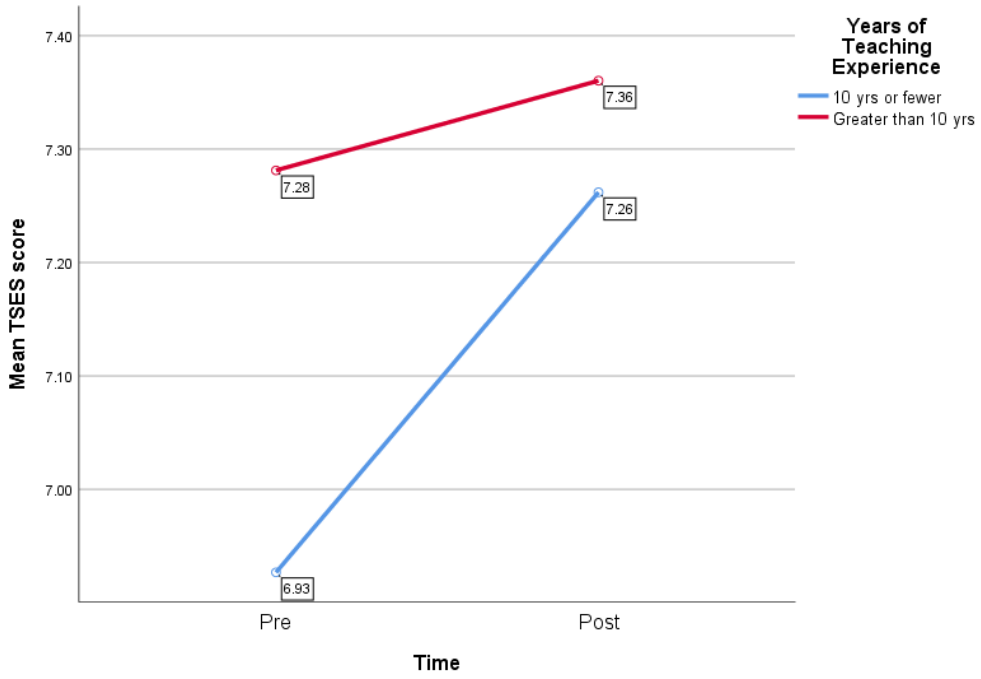


Figure 1. Line Graph of Overall Teacher Efficacy on TSES by Time and Years of Teaching Experience.

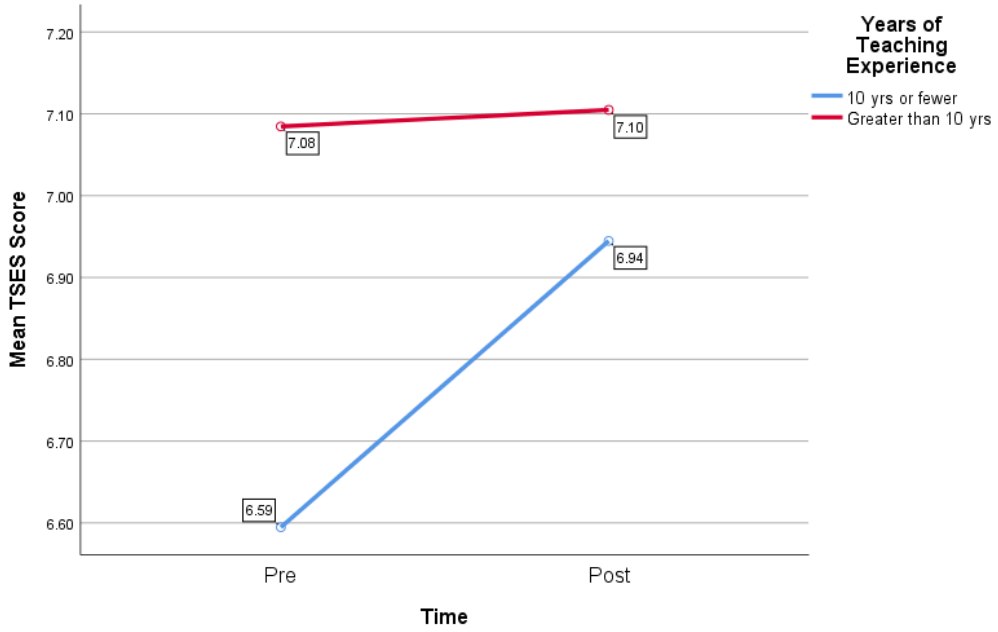


Figure 2. Line Graph of Student Engagement Subscale on TSES by Time and Years of Teaching Experience.

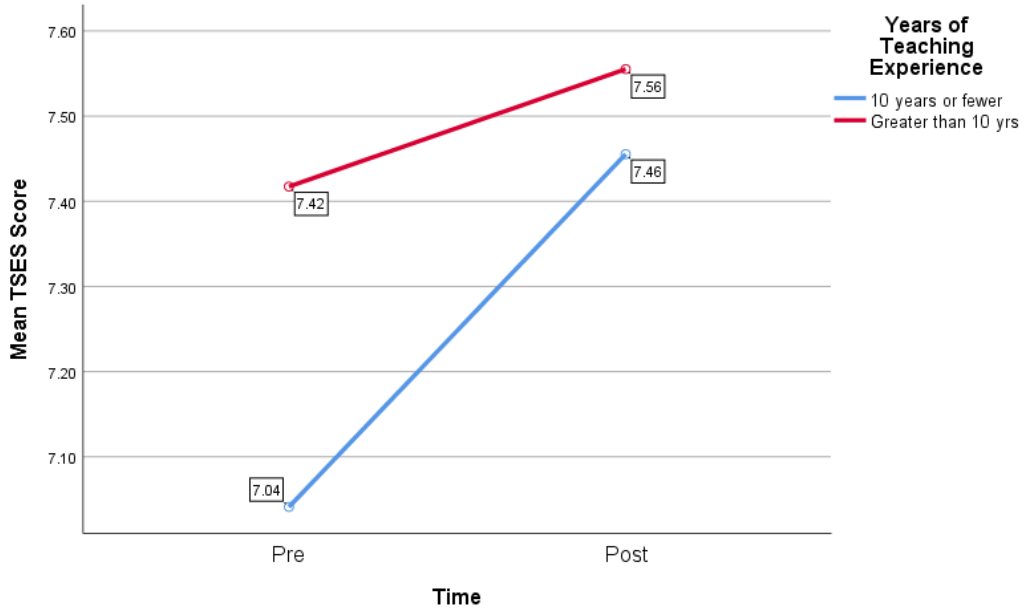


Figure 3. Line Graph of Overall Teacher Efficacy on TSES by Time and Years of Teaching Experience.

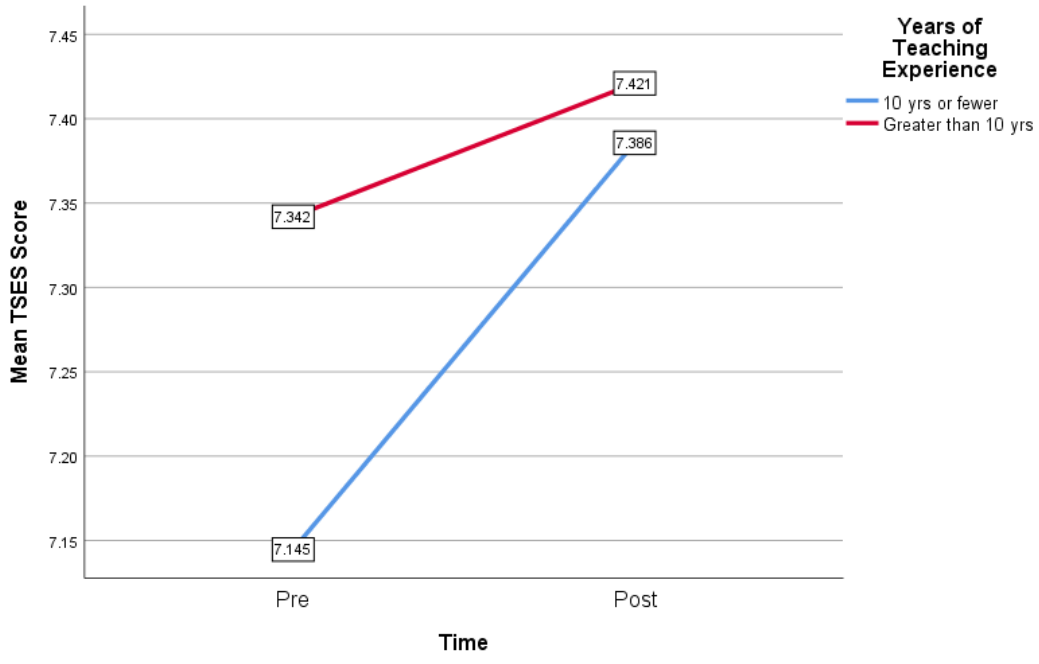


Figure 4. Line Graph of Overall Teacher Efficacy on TSES by Time and Years of Teaching Experience.

Appendix D: Teachers' Sense of Efficacy Scale (long form)

Teachers' Sense of Efficacy Scale[1] (long form)

Teacher Beliefs Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.	How much can you do? Nothing		Very Little		Some Influence		Quite A Bit		A Great Deal
1. How much can you do to get through to the most difficult students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2. How much can you do to help your students think critically?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3. How much can you do to control disruptive behavior in the classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4. How much can you do to motivate students who show low interest in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5. To what extent can you make your expectations clear about student behavior?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6. How much can you do to get students to believe they can do well in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7. How well can you respond to difficult questions from your students ?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
8. How well can you establish routines to keep activities running smoothly?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
9. How much can you do to help your students value learning?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10. How much can you gauge student comprehension of what you have taught?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11. To what extent can you craft good questions for your students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12. How much can you do to foster student creativity?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13. How much can you do to get children to follow classroom rules?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
14. How much can you do to improve the understanding of a student who is failing?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
15. How much can you do to calm a student who is disruptive or noisy?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
16. How well can you establish a classroom management system with each group of students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
17. How much can you do to adjust your lessons to the proper level for individual students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
18. How much can you use a variety of assessment strategies?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
19. How well can you keep a few problem students form ruining an entire lesson?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
20. To what extent can you provide an alternative explanation or example when students are confused?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
21. How well can you respond to defiant students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
22. How much can you assist families in helping their children do well in school?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
23. How well can you implement alternative strategies in your classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
24. How well can you provide appropriate challenges for very capable students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Appendix E: Four Open-ended Survey Items, Post-Program

(1) Please describe your experience in your seminar this year.

(2) Please describe how your experience has affected you personally.

(3) (if answered ‘yes’ to previous question, did CTI make a positive impact on your teaching?) Please explain to what extent the knowledge and skills you gained in CTI made a positive impact on your teaching.

(4) (if answered ‘yes’ to previous question, did CTI make a positive impact on your students’ learning and academic performance?) Please explain to what extent the knowledge and skills you gained in CTI made a positive impact on your students’ learning and academic performance.

Appendix F: Individual Interview Guide

1. How did participating in CTI seminars help you gain deeper content knowledge?
2. How did participating in CTI seminars help you get through to your most difficult students?
3. How did participating in CTI seminars help you help your students think critically?
4. How did participating in CTI seminars help you motivate your students who show low interest in school work?
5. How did participating in CTI seminars help you help your students value learning?
6. How did participating in CTI seminars help you foster student creativity?
7. How did participating in CTI seminars help you improve the understanding of a student who is falling?
8. How did participating in CTI seminars help you respond to difficult questions from your students?
9. How did participating in CTI seminars help you gauge student comprehension of what you have taught?
10. How did participating in CTI seminars help you craft good questions for your students?
11. How did participating in CTI seminars help you adjust your lessons to the proper level for individual students?
12. How did participating in CTI seminars help you use a variety of assessment strategies?

13. How did participating in CTI seminars help you provide an alternative explanation or example when students are confused?
14. How did participating in CTI seminars help you provide appropriate challenges for very capable students?