

The Relationship between Teacher Efficacy Levels and Virginia Standards of Learning Fifth  
Grade Math Achievement in One Virginia School Division

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Learning, Student Achievement, High-Stakes Testing, Accountability, Educational Leadership,  
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## **Abstract**

The purpose of this study was to investigate the relationship between teacher efficacy levels and fifth grade Virginia SOL Mathematic achievement. This study sought to determine the extent to which personal efficacy, general efficacy, and total efficacy account for fifth grade Virginia Standards of Learning Mathematic achievement over and above that explained by teacher experience, teacher education, and class size. A critical review of the previous research methodologies and findings on teacher efficacy demonstrated the need for further research in this area. This study hoped to provide school officials in educational leadership with data necessary to plan professional development to improve classroom instruction, teacher efficacy, and student achievement.

This study utilized a quantitative survey which measured personal, general, and total efficacy levels among fifth grade teachers in 11 elementary schools located in central Virginia. Twenty-one of the 27 (78%) 5<sup>th</sup> grade teachers that were surveyed, completed and returned the survey used in the study. Other data, such as teacher education, teacher experience, class size, and student achievement scores were collected from the division with the permission of the division's superintendent.

Results of the data analysis indicated that there was no statistically significant relationship between teacher efficacies and 5<sup>th</sup> grade mathematics SOL achievement. The findings demonstrated that personal teaching efficacy, general teaching efficacy, and total teaching efficacy had no significant impact on 5<sup>th</sup> grade mathematics SOL achievement over and above the extent that teacher experience, teacher education, and class size impacted student achievement. It should be noted that the following limitations may have impacted the final results of the analysis. Class sizes were of mixed math ability, ranging from 11-23 students. Special education students tended to be in the smaller sized inclusion classes and gifted and talented students tended to be in the larger class sizes. Teacher efficacy levels were based on self-report. The sample size was small and limited generalizability of the results due to the focus

on one Virginia school division. Also, student factors, such as prior achievement, were not included in the study.

In this study, teacher education and class size did show significance associated with student achievement. Again, the limitations may have contributed to the findings of this study. The study showed that teachers with a master's degree had lower student achievement than teachers with a bachelor's degree, but the results might have been impacted from the limitations. Larger class sizes also had increased student achievement. Factors, such as class make-up of students (smaller classes typically had special education inclusion students and larger class sizes typically included gifted and talented students), class size (smallest class was 11 students and the largest class was 24), and teacher assignment (teachers with master's degrees could have been assigned to students with more academic needs), need to be considered when reviewing these findings, implications, and recommendations.

The implications and recommendations were drawn from the findings of this study. The factors and limitations of the study were taken into consideration when the implications and recommendations were developed.

## **Dedication**

Donna:

Thank you for all of your support and patience.

You are my everything and I love you!

Zach and Kayla:

You make me proud!

I would not be where I am today without you.

Mom and Dad:

Thank you for your guidance!

I owe everything to you.

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Thanks for always being there to support me.

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Thank you for bringing such joy to all of our lives!

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## Chapter 1

### Background

The federal government has invested billions of dollars to help schools meet the requirements of the No Child Left Behind Act of 2001 (NCLB) to improve student academic performance in Reading, Math, and Science (U.S. Government Accountability Office, 2009). Under NCLB states have been required to develop challenging student academic standards, administer tests based on those standards to measure student proficiency, and develop targets for performance on these tests (U.S. GAO, 2009). NCLB requirements have contributed in schools, teachers, and administrators trying to determine the most effective instructional practices to improve student achievement.

### Assessments

Assessment has become a key process in tracking student achievement. It has become the nation's way of discovering if instruction has had its intended effect (Wiliam, 2010). All those with a stake in the outcomes of education--learners, teachers, parents, other taxpayers, employers, and the wider community--want to know what students have learned, and it seems plausible that it can easily be measured through the use of straightforward and familiar instruments, such as achievement tests (Wiliam, 2010). The use of criterion-referenced assessments has become a norm for holding teachers, schools, and districts accountable for student achievement.

A key element in the standards-based accountability system is assessments. The assessments are used to measure which schools are improving student learning by evaluating student performance against the standards. The Virginia Department of Education believes assessments are powerful tools for managing and improving the learning process by providing information for monitoring student achievement and evaluating programs (U.S. GAO, 2009). In addition, assessments can influence instructional content and help teachers use or adjust specific classroom practices. U. S. GAO (2009) officials believe assessments can influence whether teachers broaden or narrow the curriculum, focus on concepts and problem solving, or emphasize test preparation over subject matter content.

According to the U. S. GAO (2009), most states adopted multiple-choice tests over other types of assessments because they were cost effective and could be scored quickly. While multiple-choice tests provided cost and time-saving benefits to states, the use of multiple-choice tests made it difficult to measure highly complex content. U.S. GAO (2009) also felt teachers were narrowing the curriculum being taught by either spending more classroom time on tested subjects at the expense of other non-tested subjects, restricting the breadth of content covered to focus only on the content covered by the test, or focusing more time on test-taking strategies than on subject content. In other words, the view was that teachers were teaching to the test.

In 2012, the Elementary and Secondary Education Act (ESEA), known as No Child Left Behind 2001 through 2012, required states to set annual objectives for increasing student achievement in reading and mathematics and closing achievement gaps among student subgroups. Virginia applied for and was granted a flexibility waiver by the U. S. Department of Education (VDOE, 2013). Even though all schools had to meet annual measurable objectives (AMOs), the focus was now on improving outcomes for students in Virginia's lowest performing schools in order to raise reading and mathematics achievement (VDOE, 2013). The AMOs represent the percentage of students within each subgroup that must pass Standards of Learning (SOL) tests in reading and mathematics in order to substantially reduce the achievement gap between students who have historically had difficulty meeting Virginia Commonwealth's achievement standards (VDOE, 2013). While the AMOs were intended as yearly goals for low-performing schools, all schools were expected to meet or exceed the objectives (VDOE, 2013).

Virginia's accountability system supports teaching and learning by setting academic standards known as the Standards of Learning (SOL) and through annual assessments of student achievement. The Virginia Board of Education revised the mathematics SOL in 2009 to ensure Virginia graduates would compete successfully with their peers in other states and countries in the global economy (VDOE, 2010). According to the VDOE (2010), the new mathematics standards were also equal in rigor and depth to the Common Core State Standards, a set of clear college- and career-ready standards for kindergarten through 12th grade in English language arts/literacy and mathematics adopted by 43 states. Virginia's new mathematics standards and corresponding tests reflect that today's students require more advanced mathematical knowledge and skills to pursue higher education and compete in a technologically sophisticated work force (VDOE, 2010). Along with the increased rigor in the mathematics curriculum came increased

rigor in mathematics testing. Approximately fifteen percent of the test items are new technology-enhanced items. Technology-enhanced items (TEI) require students to apply what they have learned and use critical-thinking skills in ways not possible with traditional multiple-choice questions. Even though the items are to mirror common classroom tasks and assignments, a significant drop in student mathematics achievement has resulted due to the implementation of TEI items and increased rigor on the Virginia Standards of Learning mathematics tests (VDOE, 2010).

### **Accountability**

In the period of accountability advocated by the No Child Left Behind Act of 2001, testing has been selected as the primary means of measuring performance of schools. Teachers and administrators face federal and state governmental policies that require them to be accountable for their students' performances. Accountability through assessments can be good and bad. Accountability in the educational system can encourage teachers and administrators to try innovative ways of instruction which can lead to more engaging lessons for the students. Unfortunately, poor test score results can affect teachers in a negative way. If teachers try innovative ways of teaching and receive poor test scores, they will often return to the old ways that worked for them in the past. An example would be resorting back to drilling students and reliance on traditional textbooks. When this happens, accountability no longer invites the change of improving instructional methods to engage students in their learning.

### **Educational Leadership**

Over the past few decades, researchers have reported that principal leadership is critical in developing and sustaining those school-leveled conditions believed to be essential for instructional improvement (Hallinger & Heck, 1996). School leaders must lead and get results in an intensely political environment. Principals need to be prepared to practice both public and institutional leadership in order to be an outspoken champion for education for all children (Heifetz, 2006). Bandura (1997) suggested that self-efficacy is vital to school leader success because efficacious leaders set higher goals, are more able to adapt to changing contexts, and are more persistent in overcoming obstacles. Self-efficacy theory, where as it applies to teacher self-efficacy and principal self-efficacy, provides a conceptual framework through which to examine

factors of effective leadership and teaching and the ways in which these factors enhance school success and student growth (Versland, 2013). Bandura (1993) found four sources that generate self-efficacy development:

1. *Mastery experience*- successfully completing a specific task;
2. *Vicarious experience*- learning by watching others;
3. *Social persuasion*- influential mentors persuading people to believe they can successfully complete a task; and
4. *Psychological arousal*- the degree to which people look forward to, or dread a specific task (p. 119).

Self-efficacy is a necessary component of successful school leadership because it affects choices principals make about what activities to engage in as well as the coping strategies they employ as challenges emerge (Wahlstrom, Seashore-Louis, Leithwood & Anderson, 2010). A principal's ability to influence others is vital to accomplishing instructional leadership practices associated with setting direction, developing people, redesigning the organization, and managing the instructional program (Versland, 2013).

### **Effective Teaching**

The teaching profession is a challenging job. An administrator goal is to higher highly skilled, knowledgeable, experienced, and dedicated teachers that are well aware of their responsibilities. With the increased demands of accountability, teachers play an important role in inspiring, motivating, and encouraging the youth in the process of learning. Without effective teachers and administrators, educational systems often struggle to perform successfully. How much does teacher efficacy impact a teacher's willingness to differentiate instruction in order to provide effective instruction? Not only do teachers need to be highly skilled and knowledgeable in their profession, they also need to have a strong personal self-efficacy as a way to explain the willingness to change, try new methods of instruction, and differentiate to meet each student's needs while fully believing in what they are doing to make instruction effective.

## **Efficacy**

Teachers play an important role in students' academic success (Guskey, 1984). Personal efficacy is the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). When a teacher has high personal efficacy, it impacts how a student will perform in the classroom (Guskey, 1984). Teachers' confidence in their ability to perform the actions leading to student learning represents one of the few individual teacher characteristics that reliably predict teacher practice and student outcome (Ross, Cousins, & Gadalla, 1996). Teachers with high levels of efficacy believe in children's ability to succeed and devote more time and effort to teaching. They teach objectives in a more interesting and clear way that produces better learning outcomes for students (Ross et al., 1996). Teacher efficacy researchers have traditionally labeled two sets of constructs: "teaching efficacy" and "personal teaching efficacy" (Ashton & Webb, 1986; Gibson & Dembo, 1984). Hoy and Woolfolk (1990) labeled these constructs "personal teacher efficacy" and "general teacher efficacy."

Personal teacher efficacy (PTE) pertains to a teacher's belief she or he possesses teaching skills to bring about success in students. PTE is the teacher's belief about his or her own effectiveness in teaching. The extent to which teachers believe they have the capacity to affect student performance has been conceptualized as personal teacher efficacy (Ashton & Webb, 1986). Efficacious teachers believe their skillful instruction can offset the effects of an impoverished home environment and believe all students can be successful. Also, efficacious teachers believe that the relationship between students and teachers is a joint venture necessary for ultimate success (Ashton & Webb, 1986).

General teacher efficacy (GTE) is the belief that the teachers are able to bring about student change despite outside school constraints (Ross, Cousins, & Gadalla, 1996). GTE differs from PTE in that the teacher holding the belief does not necessarily believe he or she is able to perform the actions thought to be productive. GTE can be viewed as the sum of the teacher's outcome expectancies and the belief particular teaching actions will lead to student success. Many researchers treat GTE and teacher outcome expectancies as equivalent (Ross et al., 1996). Teachers who believe external factors children bring to school (home environment, socioeconomic conditions, etc.) have negative effects on student achievement are said to have

lower GTE efficacy. Therefore, the teachers believe some children will not be impacted by teaching (Jeck, 2009).

Personal and general teacher efficacy have become of great interest for researchers and educational leaders. Previous research on the efficacy of practicing teachers has reported significant relationships between teachers' sense of efficacy and increases in students' scores on achievement tests (Ashton & Web, 1986). However, there is a lack of research linking efficacy to student test scores on the new and more rigorous Virginia fifth grade mathematics SOL assessments. According to the research, teachers with high levels of personal teaching efficacy are more likely to expect all students can learn and to feel responsible for learning than are teachers with low efficacy measures (Ashton & Webb, 1986). The researcher assumes that teacher efficacy has an impact, beyond that explained by other variables, on student achievement on new Virginia mathematics SOL tests, but this logical assumption has not yet been validated through empirical research.

### **Statement of the Problem**

The factors that influence achievement on math assessments included teacher experience, teacher education, and class size. Little research has been done regarding teacher efficacy and the extent it is related to fifth grade mathematics SOL achievement. Although previous studies have reported significant relationships between teachers' sense of efficacy and increases in students' scores on achievement tests, there is a lack of evidence measuring the relationship between teacher efficacy and student achievement on fifth grade mathematics SOL assessments above and beyond that which is explained by teacher experience, teacher education, and class size.

### **Purpose of Study**

This study investigated the relationship between teacher efficacy levels and fifth grade Virginia SOL mathematic achievement in one Virginia school division. The purpose of this study was to determine the extent to which personal efficacy, general efficacy, and total efficacy account for fifth grade Virginia Standards of Learning mathematic achievement over and above that explained by teacher experience, teacher education, and class size.

To accomplish the purpose of this study, the following research questions were asked:



1. To what extent does personal teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
2. To what extent does general teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
3. To what extent does total teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

### **Significance of Study**

The significance of conducting this study was: (a) to use the findings to allow researchers and practitioners to examine practices, theories, and policies related to efficacy and student SOL mathematics achievement; (b) to provide school officials in educational leadership with data necessary to plan staff development to improve classroom instruction and efficacy; (c) and to add to the literature on teacher efficacy and its relationship to student achievement on fifth grade Virginia SOL mathematics assessments.

Efficacy data are useful to help explain the behavior of teachers. Teachers' efficacy often influences teaching behaviors: choice of activities, effort expended, and persistence (Schunk, 1989). When teachers have a low sense of personal efficacy, they doubt their capabilities to influence students' learning. They also do not persist in helping students who have difficulty learning, expend additional effort to find materials, or think of ways to reteach content in ways students might understand better (Schunk, 1989). Research is needed on the role of efficacy in explaining individual differences in teachers' behaviors and on ways to enhance teachers' efficacy. Ashton and Webb (1986) found that teachers with higher self-efficacy were more likely to have a positive classroom environment, support students' ideas, and meet the needs of all students in the class. High teacher efficacy was positively associated with teachers' use of praise, individual attention to students, less use of criticism, frequent checking on students' progress in learning, and high student achievement on mathematics and language tests (Schunk, 1989). Teacher efficacy could influence not only teachers' behaviors but also student achievement.

## Conceptual Framework

This study utilized the measure of personal teacher efficacy, general teacher efficacy, and total teacher efficacy proposed by Gibson and Dembo (1984). Gibson and Dembo (1984) found that teacher efficacy consists of teaching efficacy, general teaching efficacy, and personal teaching efficacy. Research findings on models of teacher efficacy can help teacher educators and provide benchmarks for improving the teaching profession. Researchers and scholars have developed an interest in teacher efficacy because it promotes teacher effectiveness and provides solutions to problems in teacher education (Dibapile, 2011). It also enhances teacher productivity and student achievement. The conceptual framework for this study is rooted in Gibson's and Dembo's construct of teacher efficacy. Teacher efficacy levels were examined in this study to determine the extent to which teacher efficacies (personal, general, and total) account for variability in 5<sup>th</sup> grade Virginia SOL mathematics achievement over and above that explained by teacher experience, teacher class size, and class size. Figure 1 represents the conceptual framework designed for this study.

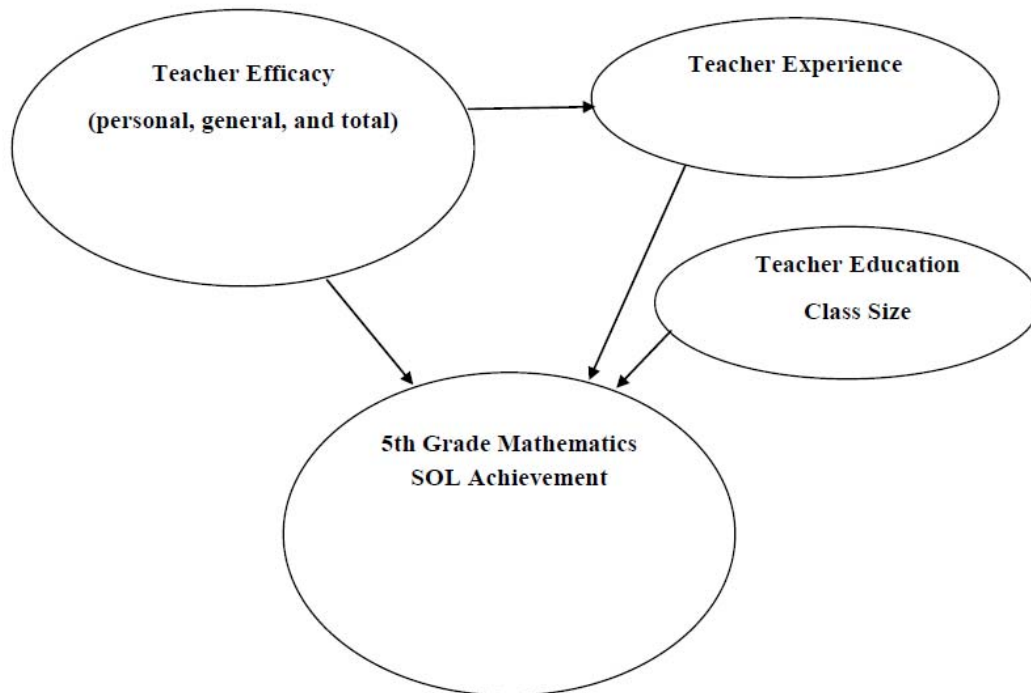


Figure 1. Conceptual framework.

## **Limitations**

The study has the following limitations:

1. Class sizes were of mixed math ability, ranging from 11-24 students and were not heterogeneously grouped. Special education students tended to be in the lower sized inclusion classes and gifted and talented students tended to be in the larger classes.
2. The teacher efficacy levels were based on self-report.
3. The number of teachers that were likely to respond to the study would not be 100 percent.
4. The sample size was small and limited generalizability of the results due to focusing on one Virginia school division.
5. No student factors, such as prior achievement, were included in the study.

## **Delimitations**

The following delimitations are listed:

1. The control variables were limited to teacher experience, teacher education, and class size.
2. The independent variables were limited to PTE, GTE, and TTE.
3. The study included only one school division.
4. Class SES was not included as one of the control variables.
5. Self-contained special education classrooms and SOL scores were not included in the data.

## **Definitions**

For the purpose of this study, the following terms were identified and defined:

**Academic Rigor.** Instruction, schoolwork, learning experiences, and educational expectations that are academically, intellectually, and personally challenging. Rigor is pushing yourself beyond what is easy. Pushing students to move beyond who and where they were when they entered the classroom.

**Achievement.** Something accomplished successfully, especially by means of exertion, skill, practice, or perseverance.

**Efficacy.** Gibson and Dembo (1984) defined efficacy and measured it by the Gibson and Dembo Teacher Efficacy Scale. Three constructs were defined and measured:

*Personal teaching efficacy (PTE)* is the belief teachers have in their own abilities to teach children and promote/enhance academic success regardless of factors they cannot control;

*General teaching efficacy (GTE)* is the belief some teachers hold that, no matter how hard they try, there are uncontrollable outside factors that prevent their teaching from impacting all students; and

*Total efficacy (TE)* is the sum of personal efficacy and general efficacy (Gibson & Dembo, 1984).

**Elementary and Secondary Educational Act (ESEA).** This act is an extensive statute that funds primary and secondary education, while explicitly forbidding the establishment of a national curriculum. It also emphasizes equal access to education and establishes high standards and accountability. Additionally, the bill aims to shorten the achievement gaps between students by providing each child with fair and equal opportunities to achieve an exceptional education (U. S. GAO, 2009).

**No Child Left Behind Act (NCLB).** A federal legislation that has enacted the theories of standards-based education reform. NCLB attempts to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments. It is based on the belief that setting high standards and establishing measurable goals can improve individual outcomes in education (U.S. DOE, 2002).

**Virginia Standards of Learning (SOL).** Standards that describe the commonwealth's expectations for student learning and achievement in grades K-12 in English, mathematics, science, history/social science, technology, the fine arts, foreign language, health and physical education, and driver education (VDOE, 2013).

## **Organization of the Study**

With increasing accountability and demand for students to perform well on Virginia SOL tests, efficacy has an impact on student outcomes and achievement. This study analyzed the literature on historical background and assessments, achievement, school accountability,

administrator efficacy, and effective instruction. The study also analyzed the literature and investigate to determine the extent to which personal efficacy, general efficacy, and total efficacy account for fifth grade math achievement over and above that explained by teacher experience, teacher education, and class size. Chapter One of this study introduced personal teacher efficacy, general teacher efficacy, and total teacher efficacy. Chapter One also compared the extent of how PTE, GTE and TTE account for fifth grade math achievement. This chapter included the introduction, background and assessments, student achievement accountability, educational leadership and administrator efficacy, effective teaching, efficacy, statement of the problem, purpose of the study, significance of the study, limitations of the study, delimitations of the study, definitions, and the organization of the study. Chapter Two presents the literature review that focused on historical background, assessment, school accountability, educational leadership, effective teaching, teacher self-efficacy, efficacy measures, student efficacy, student engagement, student achievement, and teacher efficacies (personal, general, and total). Chapter Three explains the quantitative methodology used in the study. Included were the population surveyed, the survey instrument, the structure of the data analysis, how the data were collected, and how the data were analyzed and interpreted. Chapter Four presents the results of the data and what the results of the data revealed. Chapter Five provides findings, implications, and recommendations on the study for practice and further research.

## **Chapter 2**

### **Literature Review**

The purpose of this literature review was to survey the current research concerning the belief that teacher efficacy affects student achievement. Teachers who demonstrate high levels of efficacy are more likely to make an educational difference in their students by believing in their own ability to impact student engagement, learning, and achievement (Erdem & Demirel, 2007). Teachers with high levels of efficacy believe they can positively influence student engagement and achievement despite any perceived challenging circumstances (Protheroe, 2008). With increased accountability, teachers and administrators are focusing on increasing student engagement, learning, and achievement (Harlen & Deaking-Crick, 2002). Teachers with high levels of efficacy believe in their abilities to meet these expectations (Erdem & Demirel, 2007).

This review of literature examines the level of teacher efficacy and its effect on students' achievement. It defines teacher efficacy and describes how the levels of teacher efficacy affect students and their learning environment. The review of literature also defines school accountability, leadership efficacy, effective instruction, student engagement, and describes how the level of teacher efficacy affects student engagement and achievement. Finally, this review of literature demonstrates the importance of teacher efficacy when student engagement and achievement are involved by presenting the supporting research.

#### **Search Procedures**

The literature search was conducted using various databases through Virginia Tech Libraries. These included:

- ERIC Education Resources Information
- Virginia Tech's Summon, Addison, and Databases
- ProQuest's Dissertations and Theses
- Education/ejournals

In addition to using Virginia Tech Databases, additional searches were conducted through the following websites:

- Google.com

- Ed.gov
- Doe.virginia.gov
- Edweek.org

Key search terms were: teacher efficacy, self-efficacy, teacher self-efficacy, collective teacher efficacy, student engagement, student achievement, accountability, effective instruction, educational leadership, leadership efficacy, and education reform.

## **Historical Background**

Since the late 19<sup>th</sup> century, public schools have become imperative in most states to acculturating immigrants and preparing citizens to participate in an increasingly sophisticated economy (Osborne, 2005). In 1957, the Soviets successfully launched the Soviet satellite, Sputnik. In order to compete with the Soviets, the United States government encouraged educational leaders to expand the Math and Science curricula in schools to improve international comparison of student achievement (Dow, 1991).

In 1983, *A Nation at Risk* (ANAR) was published. In this publication, the National Commission on Excellence in Education stated, “Our society and its education institutions seem to have lost sight of the basic purposes of schooling, and of the high expectations and disciplined effort needed to attain them” (National Commission on Excellence in Education, 1983, p. 113). The ANAR study found that in the 1970s, the following risks were evident in our educational system:

- Some 23 million American adults were functionally illiterate by the simplest tests of everyday reading, writing, and comprehension;
- Average achievement of high school students on most standardized tests was lower than when Sputnik was launched;
- Many high school students did not possess the “higher order” intellectual skills educators should expect of them;
- Between 1975 and 1980, remedial mathematics courses in public four-year colleges increased by 72 percent (National Commission on Excellence in Education, 1983, p. 115).

Along with the risks noted, the ANAR also suggested that the demand for highly skilled workers in new fields was accelerating rapidly:

- Computers and computer-controlled equipment were penetrating every aspect of people's lives, homes, factories, and offices;
- By the turn of the century, millions of jobs would involve laser technology and robotics;
- Technology was radically transforming a host of other occupations such as health care, medical science, energy production, food processing, construction, and the building, repair, and maintenance of sophisticated scientific, educational, military, and industrial equipment (National Commission on Excellence in Education, 1983, p.116).

In defining excellence in education, the ANAR stated excellence characterizes a school or college that sets high expectations and goals for all learners and then tries in every way possible to help students reach them (National Commission on Excellence in Education, 1983). The study also indicated that the goal of American education must be to develop the talents of all students to their fullest. Furthermore, the study suggested that attaining that goal requires that educators expect and assist all students to work to the limits of their capabilities. Educators should expect schools to have genuinely high standards rather than minimum ones, and parents to support and encourage their children to make the most of their talents and abilities (National Commission on Excellence in Education, 1983). Recommendations proposed to reform education by ANAR were:

- In content areas - state and local high school graduation requirements should be strengthened and at a minimum all students seeking a diploma be required four years of high school English, three years of high school mathematics, three years of high school Science, three years of high school Social Studies, one-half year of Computer Science, and a foreign language.
- In standards and expectations - schools, colleges, and universities should adopt more rigorous standards and higher expectations.



- In regard to time - significantly more time should be devoted to learning the New Basics, longer school days, and/or a lengthened school year.
- In teaching - improve the preparation of teachers to make teaching a more rewarding profession by meeting high educational standards, increasing salaries so they are competitive, market-sensitive, and performance based, adopt eleven-month contracts for curriculum and professional development, and incentives, such as grants and loans, should be made available to attract outstanding teachers.
- In leadership and fiscal support - citizens across the nation should hold educators and elected officials responsible for providing the leadership necessary to achieve these reforms (National Commission on Excellence in Education, 1983, pp. 123-127).

Education reform changed the complexion of public education and led to the next movement known as No Child Left Behind (NCLB; U.S. DOE, 2002). President George W. Bush signed the NCLB Act into law in January 2002. The intent of NCLB was to have teachers that were highly qualified in their subjects, to have all students proficient by the school year 2013-2014, to provide more funding to education, to hold schools and school districts accountable, to provide parents with school report cards, and to subject schools to state takeover if they failed to improve (Chen, 2007). Students and parents were also exposed to Public School Choice, Supplemental Educational Services, charter schools and magnet schools if their school was not improving. NCLB required schools to focus on the achievement of the subgroups of African-American, economically disadvantaged, students with disabilities, and English as a second language (Chen, 2007).

Chen suggested that with the implementation of NCLB came growing concerns from teachers and the public. Some of the major concerns were: pressure on teachers to focus on the subjects rated by the NCLB testing requirements instead of focusing on a well-rounded education, funding, and the federalizing of education (Chen, 2007). Most test-based school accountability policies caused schools to neglect subjects other than math and reading (Dee & Jacob, 2010). According to Dee and Jacob (2010), teachers also tended to direct energy to the types of questions that appeared most commonly on the high-stake tests and away from other topics within the tested domain.

## **School Accountability by Standardized Testing**

Assessment has become a key process in education. It has become the nation's way of discovering if instruction has had its intended effect (Wiliam, 2010). All those with a stake in the outcomes of education - learners, teachers, parents, other taxpayers, employers, and the wider community – want to know what students have learned, and it seems plausible that it can easily be measured through the use of straightforward and familiar instruments, such as achievement tests (Wiliam, 2010). Use of standardized achievement tests has become the norm for holding teachers, schools, and districts accountable. Wiliam also suggested the key assumption of accountability testing was that differences in the achievement of students on standardized tests should be primarily attributable to differences in the quality of education received by students.

In the United States, testing for accountability made the stakes much higher for teachers than for students (Wiliam, 2010). Wiliam (2010) stated this fact has made the logic of accountability testing simple. Students attending higher quality schools will have higher achievement than those attending lower quality schools so that the differences in the quality of schooling will result in systematic differences in achievement between schools. Provided the accountability tests assess school achievement, higher test scores will indicate higher quality schooling (Wiliam, 2010). Wiliam (2010) stated there is growing evidence that the impact of high-stakes assessments is not simply confined to performance on the tests themselves. The presence of high-stakes testing assessment systems appears to increase student achievement on a range of measures that are remote from the accountability tests on a range of measures that are distal, or even remote from accountability tests (Wiliam, 2010). The introduction of a high-stakes accountability system increased scores on National Assessment of Educational Progress, as well as on state-mandated tests, indicating that the effects of accountability tests generalize well beyond what is actually tested (Phelps, 2005).

The current research has shown that the impact of accountability testing can raise student achievement on a broad range of measures, but there are also unintended outcomes with accountability testing (Cizek, 2005). Cizek (2005) identified a range of unintended outcomes that have been claimed in critiques of accountability tests including a disproportionate focus on tested content, demoralization of teachers, and undue pressure on students. Harlem and Deakin-Crick (2002) examined student outcomes and found strong evidence for a number of findings also found in other critiques (teachers emphasizing lower order skills, lowered self-image and

increased anxiety for lower achieving students, a shift from mastery-orientation to performance orientation, and extrinsic motivation). Most of the evidence for the negative effects was found in naturalistic studies that provided insufficient details of the context of the data collection to generalize the findings (Harlem & Deakin-Crick, 2002).

Wiliam (2010) suggested that a case exists for the use of high-stakes accountability tests but that considerable work needs to be done to minimize the costs and maximize the benefits of such tests. Because differences between schools account for only a small proportion of the variance in student scores (less than 10%), standardized tests represent rather inappropriate tools with which to hold districts, schools, and teachers accountable. Some evidence suggested that establishing an accountability regime that uses externally set tests, where the results of these tests have significant consequences for students, teachers, schools, and districts, can be a cost efficient way to increase student achievement (Wiliam, 2010). Ultimately, if high-stake assessments were used for accountability, the tests would need to be closely aligned with desired outcomes (Resnick, 1987).

## **Student Engagement**

Student engagement has become a major factor in addressing the steep declines in academic motivation and achievement (Fredricks, Blumenfeld, & Paris, 2004). With technology being a driving force in today's world, teachers face the tough task of keeping students engaged in their classrooms. Fredricks et al. (2004) suggested school engagement is a multifaceted construct that includes the subcategories of behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement is defined as the participation in academic and social or extracurricular activities and correlates with positive academic outcomes and low rates of student dropout. Emotional engagement comprises positive and negative interactions with teachers, peers, academics, and school and is considered influential in one's willingness to complete school work. Cognitive engagement refers to one's willingness to exert the effort necessary to complete difficult tasks (Alvarez & Frey, 2012).

It is generally understood that engagement relates to learning, but this relationship is often unclear (Axelson & Flick, 2011). For example, Axelson and Flick (2011) stated that some students may be highly engaged but learn almost nothing due to the design of the class being poor or the information being incompetently taught. Engagement may simply be the byproduct

of a learning environment that suits the student. Axelson and Flick (2011) also stated classroom teachers have enormous power over their students. Powerful, engaging teachers can turn students into lovers of the taught curriculum. Unfortunately, the opposite is true, and teachers that do not engage their students in their learning can cause disengagement (Axelson & Flick, 2011).

### **Student Efficacy**

Individuals acquire information to appraise self-efficacy from their performance accomplishments, vicarious (observational) experiences, forms of persuasion, and physiological indexes (Schunk, 1989). Schunk (1989) stated students acquire much capability information from knowledge of others. Observing similar peers perform a task conveys to observers that they, too, are capable of accomplishing the task. Efficacy appraisal is an inferential process: people weigh and combine the contributions of a person and situational factors as perceived ability, task difficulty, amount of effort expended, amount of external assistance received, task outcomes, patterns of successes and failures, perceived similarity to models, and persuader credibility (Schunk, 1989). Assuming adequate skills, positive outcome expectations, and valued outcomes, self-efficacy is hypothesized to influence the choice and directions of much human behavior (Schunk, 1989). Schunk (1989) also stated teachers with high self-efficacy can positively influence students to develop high self-efficacy, and the students will be motivated to achieve difficult tasks. Students who value high grades and believe diligent studying will produce them will not be motivated to study if they doubt their capabilities to study effectively (Schunk, 1998).

Some school activities involve performance of previously learned skills, but students spend much of their time on learning and engagement. Self-efficacy should influence new learning as well as the performance of previously learned skills (Schunk, 1989). In assessing self-efficacy for learning, students judge what they will need to learn, what knowledge and skills are prerequisites for new learning, how well they can recall the prerequisite information from memory, how easily they have learned similar skills in the past, how well they can attend to the teacher's instruction and rehearse material to be learned, and how skillfully they can monitor their level of understanding. Self-efficacy for learning involves assessing what will be required in the learning context and how well one can use one's knowledge and skills to produce new learning (Schunk, 1998).

Schunk (1989) found in his study that teachers who used both cognitive modeling and didactic instruction increased student self-efficacy. The research showed that self-efficacy demonstrated an important construct for explaining students' learning and performance of cognitive skills in various content areas. Variables associated with learning contexts influenced students' self-efficacy: models/social comparative information, goal-setting, performance feedback, strategy instruction, cognitive processing, and reward contingencies. These and other task-engagement variables highlight cues signaling how well students learn or perform skills. Students use these cues to appraise self-efficacy for continued learning or skillful performance (Schunk, 1989). Teachers' self-efficacy should influence teaching behaviors that enable students to develop their own self-efficacy to accomplish the learning task at hand.

Ashton and Webb (1986) found that teachers with higher self-efficacy were more likely to have a positive classroom environment with less student anxiety and teacher criticism, support students' ideas, and meet the needs of all students in the class. High teacher efficacy positively affected teachers' use of praise, providing of individual attention to students, and checking students' progress in learning frequently. Teachers' high efficacy levels also contributed to high student achievement and less use of criticism on mathematics and language tests (Ashton & Webb, 1986).

### **Student Achievement**

Anita Woolfolk, a longtime researcher on teacher efficacy, spoke of the practical impacts of teacher self-efficacy. She stated teachers who set high goals, who persist, who try another strategy when one approach is found wanting – in other words, teachers who have a high sense of efficacy and act on it– are more likely to have students who learn (Shaughnessy, 2004). Does teachers' sense of efficacy affect their teaching and student achievement? In his review of research, Jerald (2007) associated these qualities with teachers who have a strong sense of efficacy:

- Tend to exhibit greater levels of planning and organization;
- Are more open to new ideas and are more willing to experiment with new methods to better meet the needs of their students;
- Are more persistent and resilient when things do not go smoothly;
- Are less critical of students when they make errors; and

- Are less inclined to refer a difficult student to special education (Jerald, 2007, p. 3).

Researchers interested in teacher self-efficacy believed two types of beliefs comprise the construct of efficacy, personal teaching efficacy and general teaching efficacy. Hoy (2000) described personal teaching efficacy as a teacher's own feeling of confidence in regard to teaching abilities and general teaching efficacy as the reflection of a general belief about the power of teaching to reach difficult children. Researchers also believed these two constructs were independent. Teachers might have faith generally in the ability of teachers to reach difficult children, while lacking confidence in their personal teaching ability (Protheroe, 2008).

Hoy (2000) suggested that some of the most powerful influences on the development of teacher efficacy are mastery experiences during student teaching and the induction year. Thus, the first years of teaching could be critical to the long-term development of teacher efficacy. Hoy (2000) viewed the school setting as having a potentially powerful impact on a teacher's sense of efficacy. Through vicarious experiences in the school setting, teachers might observe another teacher using a particularly effective practice and thus feel more confident in using that practice to be more successful in reaching their own students. Also in the school setting, social persuasion could take the form of either pep talks or feedback that highlights effective teaching behaviors while providing constructive and specific suggestions for ways to improve (Hoy, 2000).

Teachers who believe they can teach all students in ways that enable them to meet these high standards exhibit teaching behaviors that support this goal (Protheroe, 2008). Goddard, Hoy, and Woolfolk Hoy (2000) believed that one way to improve student achievement is for school administrators to work to raise the efficacy beliefs of their faculties. The researchers suggested that administrators provide efficacy-building mastery experiences through thoughtfully designed staff development activities and research projects (Goddard et al., 2000).

Teacher efficacy exists as a characteristic of the school organization. As a property of the school, collective teacher efficacy may account for the differences in levels of student achievement between schools (Bandura, 1993). The collective teacher efficacy of a school is an organizational factor that emerges as a potentially influential component of student achievement (Tschannen-Moran & Barr, 2004). Bandura (1993) found that after controlling for student body characteristics, teacher characteristics, and prior school level achievement, students of teaching staffs with high collective efficacy achieved at higher percentile ranks on national normed tests of language and mathematics. Goddard et al. (2000) also found that collective teacher efficacy

made a significant independent contribution to explaining between-school differences in student achievement when controlling for prior student achievement and socioeconomic status.

Tschannen-Moran and Barr's (2004) study findings suggested that factors strengthening collective teacher efficacy may assist in improving student achievement. The researchers felt that identifying school characteristics associated with improved collective teacher efficacy may prove to be helpful to the development of effective schools (Tschannen-Moran & Barr, 2004).

Tschannen-Moran and Barr's study findings also recommended the following for fostering student achievement:

- A team of teachers who implement proven instructional strategies, such as the use of graphic organizers or manipulatives, have mastery experiences when students' performances improve on assessment measures;
- Teachers have opportunities for vicarious learning experiences when teachers from one school visit another school where student achievement is high;
- Teachers share strategies, methods, activities, and samples of student work and teachers are able to see what works in improving student outcomes;
- Social persuasion acts as a powerful tool when teachers and principals network with high-achieving schools and interact in ways that support the belief that achievement can be raised through more powerful instructional strategies;
- Schools may provide opportunities for staff and students to deal with the stress of high-stakes testing to increase efficacy;
- Changing teachers' behaviors by encouraging them to accept responsibility for student achievement and improving teachers' abilities to overcome temporary setbacks and failures is a necessity to improve student achievement; and
- Teacher planning, responsibility, and persistence in challenging situations are behaviors that foster student achievement and reinforce teacher efficacy beliefs (Tschannen-Moran & Barr, 2004, p. 205).

Tschannen-Moran and Barr (2004) stated understanding the relationship between collective teacher efficacy and student achievement provides insight about ways of improving student outcomes. The researchers also affirmed that in this era of accountability and high standards,

administrators may find that fostering strong collective teacher efficacy beliefs contributes to increased student performance.

Empirical research has linked student achievement to teacher efficacy. When teachers have high efficacy, they are more likely to implement and persist with challenging strategies in the classroom. Ashton and Webb (1986) noted teachers with high teacher efficacy also have high expectations for students because they believe students can achieve, and they spend more time with low achievers than their low teacher efficacy peers. When teacher efficacy is high, educators create a classroom that encourages adoption of mastery orientations (approaching a school task for the purpose of learning) over performance orientations (approaching a school task for the purpose of demonstrating superiority over others; (Bruce, Esmonde, Ross, Dookie, & Beatty, 2010). These teachers also have effective classroom management strategies that encourage students to take responsibility for their learning. With the development of student persistence, deep conceptual understandings, and self-regulation in high efficacy classrooms, students attain greater achievement (Bruce et al., 2010).

Bruce et al. (2010) conducted a study that contrasted two school districts, one with a history of mathematics professional learning and one without. The professional learning model involved two facilitators working with groups of classroom teachers and groups of support staff in 15 district school boards (12 English and 3 French language) in the province of Ontario, Canada. The professional learning model focused on: mathematics communication in the classroom, teaching and learning mathematics through problem-solving using a three-part lesson format, co-teaching of problem-solving lessons in classrooms, and collaborative analysis of student work samples (Bruce et al., 2010). The researchers found that teachers in the school with the least knowledge of effective mathematics teaching practices actually had higher personal teacher efficacy and higher student achievement scores than the district that had engaged in a comprehensive mathematics professional learning program.

The study also found that after a sustained and intense year-long professional learning program, the situation was reversed. The mathematics teachers with greater prior professional learning experiences increased their PTE more than those of the other district, and their students learned more (Bruce et al., 2010). The results of the study suggested that there were empirical implications for the long-term professional development efforts of teachers, and theoretical implications regarding teacher efficacy.



Bruce et al. (2010) found that the study demonstrated the following:

- The teachers who were more experienced with the pedagogy being explored in the professional learning program, which in this case was teaching through problem solving, were able to maximize their learning from the program;
- This study showed that applying teacher efficacy professional learning experiences effectively to the classroom on an ongoing basis led teachers who were just beginning to learn about this type of pedagogy to mainly focus on surface features, such as the need to rely on grade level expectation instead of textbooks or trade materials, and the formal structures of co-teaching. These findings support other research that has called for long-term, classroom-embedded, sustainable strategies that support teacher efficacy professional learning, rather than single workshops or professional learning programs that are disconnected from the classroom environment; and
- In-between-session activity of teacher participants where they implemented problem-based mathematics lessons regularly in their classroom had a positive effect on teacher efficacy and related student achievement. Participant engagement in ongoing co-planning and co-teaching beyond the six professional development sessions was a key factor in the rate of participant feelings of success. Those participants who co-planned and co-taught between formal sessions were more confident and engaged as well as capable of implementing effective mathematics pedagogical practices by the end of the program. (Bruce et al., 2010, p. 1607)

Theoretically, the study also confirmed previous research indicating that:

- Shifts in mathematics pedagogy require time and ongoing support in the form of authentic and collaborative professional learning opportunities that are supported and classroom embedded.
- There is an indirect but powerful relationship between increasing teacher efficacy and increasing student achievement. (Bruce et al., 2010, p. 1607)

Bruce et al. (2010) also theorized that teacher efficacy, mediated by contextual factors, impacted what teachers learned from the professional learning opportunity and how they learned. The study illustrated that sustained professional learning programs that are collaborative and

classroom-embedded support effective professional learning that leads to substantial student achievement gains and the related gains in teaching quality. Teacher efficacy can act as a further mediator to support higher student achievement (Bruce et al., 2010).

## **Educational Leadership**

In 2012, a Wallace Foundation report indicated that principal turnover occurs quickly: once every three to four years (Wahlstrom et al., 2010). The report also stated that rapid principal turnover has significant effects on school culture and student achievement (Wahlstrom et al., 2010). As the focus on school quality and leader accountability increases, the need for attempts for identifying and describing effective practices has developed (Versland, 2013). Heifetz (2006) found five common mistakes principals make when implementing change. The five common mistakes are listed below.

1. *Misdiagnosing problems.* Failure to differentiate between technical and adaptive challenges is the most common mistake leaders make. Technical problems have known solutions and can be handled with authoritative expertise. Adaptive challenges require leaders to clarify their priorities and learn new ways of thinking and behaving. Adaptive leadership requires changing hearts and minds (Heifetz, 2006, p. 512).
2. *Underestimating the need to think politically.* Thinking politically means identifying and engaging the key constituents whose behaviors affect the education of children. While often skilled at marshalling processes and resources to solve technical problems, many principals do not appreciate the importance and difficulty of bringing the relevant parties on board (Heifetz, 2006, p. 512).
3. *Avoiding or mismanaging conflict.* Educational leadership requires heart, stomach, and skill to productively manage the multiparty conflicts that arise every day. Adaptive challenges always involve conflict between the current situation and a vision of the future, and among different groups of stakeholders, including those who are threatened by proposed changes. Leaders who have achieved success through their ability to restore equilibrium struggle to accept and manage instability as a normal byproduct of adaptive problem solving (Heifetz, 2006, p. 512).
4. *Growing unnecessarily defensive and isolationist.* Most leaders are unprepared for the emotional and physical demands of the job. They are frequently under attack and

become defensive. Conflict is a change process. To successfully manage conflict, leaders must not take it personally when they are criticized in their role as an educational leader (Heifetz, 2006, p. 512).

5. *Thinking they are supposed to know all the answers.* Traditionally, people turn to principals for answers and solutions, yet educational leadership is a collaborative, experimental activity. Because new, more successful adaptations are often the product of trial and error, leaders can be more effective when they lead with questions rather than answers (Heifetz, 2006, p. 512).

Without specific preparation for leadership, principals may lack the skill needed to successfully lead change in schools. Leaders can improve the performance of a school organization by influencing subordinates, peers, and outsiders. Heifetz (2006) believes that this form of influence along with decisions about management programs (organizational structure) and decisions about the competitive strategy for the organization should be used together for effective strategic leadership.

### **Principal Efficacy**

Central to leadership and its development, Bandura (1997) states that efficacy is the most pervasive among the mechanisms of agency and provides a foundation for all other facets of agency to operate. Bandura and Locke (2003, p.87) state, “efficacy beliefs affect whether individuals’ think in self-enhancing or self-debilitating ways, how well they motivate themselves and persevere in the face of difficulties, the quality of their well-being and their vulnerability to stress and depression, and the choices they make at important decision points.” With today’s leaders facing unprecedented challenges as organizations struggle to adapt to ever-accelerating rates of change both internally and externally with the environment surrounding them, leaders need to be able to positively influence the changes while meeting the increasing demands of their leadership roles (Hannah, Avolio, Luthans, & Harms, 2008).

Hannah et al.’s (2008) review provided a multi-level framework for differentiating and discussing the interaction between leader efficacy and leadership efficacy. By summarizing the knowledge on leader efficacy and related areas of efficacy research, Hannah et al., (2008) made the case to advance the body of leadership research to incorporate collective efficacy toward a more practical focus on how such efficacy can be developed. In the study, Hannah et al. (2008)

proposed four areas they felt were needed to advance leader efficacy and leadership efficacy.

These four areas were:

To advance leader efficacy:

1. Investigating the hierarchical structuring of a leader's efficacy beliefs which we propose is comprised of general efficacy, means efficacy, and various domains of specific self-efficacy, as well as the interactions between these various forms of efficacy in facilitating effective behavior (Hannah et al., 2008, p. 670).
2. Advancing a deeper understanding of how efficacy develops and operates within leaders' self-systems and influences subsequent cognition, affect, and behavior (Hannah et al., 2008, p. 670).

To advance leadership efficacy:

3. Taking a multi-leveled approach toward the emergence of efficacy in organizations, including individual (leader and follower), team/collective and organizational levels (Hannah et al., 2008, p. 670).
4. Based on our expanded conceptualization of leadership efficacy; making proposals to refine the antecedents to and processes of leadership efficacy development (Hannah, et al., 2008, p. 670).

Hannah et al. (2008) used existing theory and research on leader efficacy as a point of departure for proposing “an expanded and multi-leveled framework for understanding the domain of leadership efficacy that includes leader, follower, and collective efficacies” (p. 669). The review suggested that there is potentially great value in building a more comprehensive understanding of the contribution of leader efficacy in building collective leadership efficacy (Hannah et al., 2008). Hannah's et al. (2008) intent was to connect the literature on leader efficacy with the larger body of research on organizational behavior efficacy to facilitate the modeling of efficacy formed through the interactions between leaders, followers, and groups (p. 670). It is believed by Hannah et al. (2008) that when leaders and followers share a positive view of their abilities to constructively influence each other, and then support each other and perform well, that unique organizational cultures may emerge where these contextual factors not only shape leadership efficacy, but will also be impacted by leadership efficacy over time.

Even though there is limited work on leader efficacy published in general, techniques for building efficacy have been well tested in prior research (Hannah et al., 2008). Bandura (1997) states that the most potent antecedents to the creation of efficacy beliefs are mastery experiences based on past performance accomplishments. However, Bandura (1997) also pointed out that success alone does not equal efficacy, but rather how the individual interprets the success. Leader efficacy is also developed by modeling or vicarious learning where individuals observe competent and relevant models successfully performing tasks (Hannah et al., 2008).

Hannah et al. (2008) stated in their review that, “leaders’ efficacy beliefs are perceptions of and can thus be distinct from their actual capabilities, just as self-efficacy beliefs are distinct from means efficacy” (p. 687). Leaders’ efficacy involves their perception both of their capabilities and how those capabilities can be used in a given task and context (Day, 2001). The purpose of Hannah et al. (2008) doing the review was to identify and analyze the existing limited literature on leader efficacy, along with bringing into focus a more expanded view of leadership efficacy and propose how it can impact across a “broad range of organizational contexts, performance criteria, and domains of interest” (p.688). Hannah et al. (2008) stated, “We believe it is possible to focus future development in a more refined manner to advance positive cognitions, affects, goals and values, expectancies and self-regulatory mechanisms in leaders, their followers, and the groups they lead. Leaders who are oriented toward growth and engagement in leadership efficacy as presented here can contribute to not only a better understanding of effective leadership, but also help answer the call for informed insights into the intrapersonal process related to leadership skill development and use” (p. 688).

In conclusion, Hannah et al. (2008) suggested that integrating leadership self-efficacy and leadership development across levels of organizations, along with changes in leadership efficacy, will likely have a better chance of sustainability. “If both leader and follower leadership efficacy is enhanced, and in turn the collective efficacy of the group they belong to is also enhanced, we would expect that leadership interventions will have more positive and sustainable effects across organizational levels” (Hannah et al., 2008, p. 668).

In another study of leadership self-efficacy and the relation to effective leadership, Anderson, Krajewski, Goffen, and Jackson (2008) found that a comprehensive taxonomy of leadership self-efficacy is important for expanding and understanding leadership effectiveness and enhancing the ability to practice in this area. The study proposed that leaders with higher

self-efficacy enact key leadership skills that will engage those activities more often and with greater effectiveness than those with lower self-efficacy (Anderson et al., 2008). Anderson et al. (2008) felt that despite the fact that leadership self-efficacy has the potential to greatly aid in the understanding and prediction of effective leadership in organizations, literature had failed to specify a comprehensive, empirically derived taxonomic structure of leadership self-efficacy to aid in “hypothesis formations and guide subsequent theory development” (p. 595).

The study interviewed forty-four leaders based on the criteria: variety in functional job specialization, gender, geographic location, and high leadership effectiveness (Anderson et al., 2008). A detailed content examination was conducted on the basis of the qualitative data acquired through the interview process, and the content examination provided a determination of the factors affecting leadership effectiveness and leadership development with the organizations (Anderson et al., 2008). A qualitative research methodology was used to identify 88 leadership attributes to create leadership self-efficacy and leadership effectiveness measures (Anderson et al., 2008).

The study found non-trivial relations between leadership self-efficacy and leadership effectiveness consistent with broader evidence of the relevance of self-efficacy beliefs to performance (Anderson et al., 2008). Anderson et al. (2008) recommended leadership development efforts might benefit by focusing on self-efficacy as a starting point. “Leaders could engage in targeted efficacy raising exercises to develop in areas where their self-efficacy is not as strong as desired, or required as indicated by their dimensional profile” (Anderson et al., 2008, p. 606).

### **Effective Instruction**

When teachers play an important role in teaching learning situations, individuals are provided an opportunity to learn through an exposure to new ideas and experience (Qureshi & Niazi, 2012). Qureshi and Niazi (2012) believe effective teaching is necessary for effective learning as it indicates interest and an urge to learn among students. Effective instruction involves a teacher that is a leader that inspires and influences students through expert and referent power, empowers students and inspires them to do things which they are unable to provide otherwise, and is thoughtful and committed to his/her job with strong self-efficacy to persuade his students to perceive their environments around them, what their likings are, what

attracts and holds their attention, and how they are stimulated (Quershi & Niazi, 2012). Borich (1992) described an effective teacher as one who concerns students' learning outcomes. An effective teacher should demonstrate five key behaviors and five helping behaviors in teaching. The five key behaviors are: lesson clarity, instructional variety, task orientation, engagement in the learning process, and student success (Borich, 1992). Using student ideas and contributions, structuring, questioning, probing, and teacher affect are the five helping behaviors in order to effective teaching and effective learning (Borich, 1992).

A teacher's job in preparing the future leadership is extremely difficult and challenging and needs exhaustive training and a broad knowledge base (Quershi & Niazi, 2012). Not only does a teacher need to keep abreast of the latest knowledge and teaching styles, techniques, and strategies, an effective teacher needs to establish, manage, maintain learning focused classroom environments, and monitor students' classroom progress to identify their potentials and make arrangements for their guidance and counseling (Quershi & Niazi, 2012). A teacher's self-efficacy is needed to accomplish these components for effective instruction. Quershi and Niazi (2012) stated, "A teacher plays a pivotal role in the learning process and through his effective teaching methodologies he influences the academic outcomes of students. Effective teachers genuinely care, like, accept, and value their students. These teachers demonstrate kindness, share responsibility, accept diversity, foster individual instruction, and encourage creativity. With these skills and traits, they will have the potential to be an effective teacher who will be remembered fondly by their students. This is why it is essential to provide all possible opportunities for the teachers to equip them with the basic traits essentially required to be an effective teacher" (p. 37-38).

The degree to which information or skills are organized and presented so that students can easily learn them, and the degree to which students are given enough time to learn the materials being taught are crucial variables in the delivery of effective instruction (Bost & Riccomini, 2006). Dixon, Yssel, McConnell, and Hardin (2014) examined teacher efficacy beliefs. Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) described teacher efficacy beliefs as the efforts teachers invest in teaching, the goals they set, their persistence when things do not go smoothly, and their resilience in the face of setbacks. In their study, Dixon et al. (2014) reviewed the literature on differentiating instruction, how differentiated instruction relates to teacher

education programs, professional development and its relationship to differentiation, and also include teacher efficacy and sense of efficacy beliefs.

“Differentiation is an approach to curriculum and instruction that systematically takes student differences into account in designing opportunities for each student to engage with information and ideas and to develop essential skills. Differentiation provides a framework for responding to differences in students’ current and developing levels of readiness, their learning profiles, and their interests, to optimize the match between students and learning opportunities. These three dimensions of student difference can be addressed through adjustments to the content, process, products, and environments of student-learning, and each is justified by research-based rationale” (Tomlinson & Jarvis, 2009, p. 599). Teachers who differentiate their instruction respond to learner needs in the way content is presented, the way content is learned, and the ways students respond to the content (Dixon, Yssel, McConnell, & Hardin, 2014). The very nature of differentiation requires teachers to be flexible in their approach to teaching and to adjust the curriculum and presentations of information to learners rather than expecting learners to modify themselves for the curriculum (Hall, Stangman, & Meyer, 2009). “To offer the same curriculum and instruction to all students is to deny that individual differences exist or matter in the enterprise of learning” (VanTassel-Baska, 1997, p. 11). Dai (2010) argued that when curricular content and process fall outside of a student’s zone of proximal development, it is too easy or too hard, differentiation is called for. Therefore, differentiation is a philosophy or a way of thinking about teaching and learning that is student-centered and focuses on serving levels of understanding within each concept taught (Tomlinson 2000, 2008).

Understanding how to teach to diverse abilities is a challenge that teachers can meet successfully, especially if they have strong efficacy in their personal abilities as well as their teaching abilities (Dixon et al., 2014). “Harnessing teacher efficacy, helping teachers get in touch with the will as well as the skill to be excellent teachers, should be the focus of teacher support in the classroom” (Weiner, 2003, p. 12). In their study, Dixon et al. (2014) focused on differentiation of instruction, professional development, and both teacher efficacy and self-efficacy beliefs. Two school districts were chosen for participation, one large suburban with more than 4,000 students and one mid-sized in an industrial city. District 1 was considered a white-collared demographic makeup with a large socioeconomic status population typical of a large city area, and District 2 was considered a blue-collared demographic makeup with a diverse



student body. Forty-one participants, with the demographic information of gender, ethnicity, and where and what subjects teachers taught, completed the study materials. Two teacher efficacy scales were used in the study, the Teacher Self-Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) and the Teacher Efficacy Scale (Woolfolk & Hoy, 1990).

Teacher efficacy in the classrooms is both interesting and important to the understanding of classroom practices (Dixon et al., 2014). The study found that teachers who had more professional development in differentiation, regardless of school, felt more efficacious in differentiated instruction in their classes. Both the Teacher Efficacy Scale and the Teacher Self Efficacy Scale indicated that teachers who had more professional development hours in differentiating instruction felt more efficacious in differentiating instruction in their classrooms (Dixon et al., 2014). Dixon et al. (2014) study's data revealed that grade level and discipline taught did not matter in how efficacious a teacher felt in implementing differentiation, but professional development did. The results of the study contribute to the knowledge on differentiation in the classroom. "When teachers are efficacious in their beliefs about their ability to teach students effectively, they more likely to differentiate" (Dixon et al., 2014, p. 125).

Ellis, Worthington, & Larkin (1994) recommended ten effective teaching principles and their relevance for keeping students engaged in school. These principles were:

1. *Active Engagement*- Refers to the amount of time student and teachers attend to work that is diagnostically and instructively appropriate. Students learn more when they are actively engaged during an instructional task;
2. *Providing the Experience of Success*- High and moderate success rates are correlated positively with student learning outcomes, and low success rates are correlated negatively with student learning outcomes. Simply engaging students in social and academic activities is not sufficient; students must experience success early and often when they are engaged in school activities;
3. *Content Coverage and Opportunity to Learn*- Increased opportunity to learn content correlates positively with increased student achievement. The more content covered, the greater potential for student learning;
4. *Grouping for Instruction*- Students achieve best in classes in which they spend most of their time engaged in learning activities supervised directly by their teacher. Grouping can facilitate a teacher's ability to keep students engaged in the classroom;

5. *Scaffolded Instruction*- Students can become independent, self-regulated learners through carefully scaffolded instruction. Students require a supportive learning environment to experience success;
6. *Addressing Forms of Knowledge*- Teachers should address all forms of knowledge at one point during instruction. The critical forms of knowledge associated with strategic learning are: declarative knowledge (basic facts and vocabulary), procedural knowledge (steps used to solve problems), and conditional knowledge (when and where to use certain strategies);
7. *Organizing and Activating Knowledge*- Not only is the content that teachers emphasize important, but the structure information during the instructional episode is also critical to student success. Combining what the learner already know and understands with new information increases the understanding and application of new information;
8. *Teaching Strategically*- Teachers can help students become more independent, self-regulated learners through strategic instruction. Teaching strategically relates more to teaching students “how to learn” effectively than to “what content to teacher;”
9. *Making Instruction Explicit*- Teaching is most effective when teachers present information in a systematic and explicit manner to help students become independent and self-regulated learners. Educators and researchers have learned a great deal about the attributes of instruction that results in increased student learning; and
10. *Teaching Sameness*- By teaching sameness, both within and across subjects, teachers promote the ability of students to access potentially relevant knowledge in novel problem-solving situations. Teachers must purposely design instruction to help students recognize patterns and organize knowledge (p. 305-307).

These 10 principles of effective instruction are research-validated practices that are capable of aiding students experience school success and make academic gains in the general education curriculum (Bost & Riccomini, 2006).

Teaching and learning are complex processes, and teachers are the central influence on student achievement (Nebesniak, 2013). Nebesniak (2013) admits that a precise prescription of effective instruction does not exist, but she suggests that the key components of effective instruction should include developing a conceptual understanding, making curricular

connections, and engaging students while efficiently directing their attention. Effective teachers use the learning environment and instructional materials to direct students' attention, engage them in the concepts, and ultimately increase their knowledge. Effective teaching can engage students in tasks that invite their curiosity and draw them into the curriculum, and students who engage in worthwhile curriculum tasks and whose attention is continually directed towards the curriculum understanding are more likely to succeed (Nebesniak, 2013). Administrators, coaches, and teacher educators can be more methodical, precise, and helpful when supporting teachers in developing self-efficacy and effective classroom instruction translating into higher student achievement (Nebesniak, 2013).

### **Teacher Self-Efficacy**

Teachers play an important role in students' academic success. When a teacher has high self-efficacy, it impacts how a student will perform in the classroom (Guskey, 1984). Teachers' confidence in their ability to perform the actions leading to student learning illustrates one of the few individual teacher characteristics that reliably predicts teacher practice and student outcome (Ross, Cousins, & Gadalla, 1996). Teachers with high levels of self-efficacy believe in the children's ability to be successful and devote more time and effort to teaching. They teach objectives in a more interesting and clear way that produces better learning outcomes for students (Ross et al., 1996). Teachers with high levels of efficacy also are open to change and willing to use new ideas to meet the needs of their students. Guskey (1984) found greater teacher efficacy resulted in not only more positive attitudes about teaching but also a higher level of confidence in specific content teaching abilities.

Bandura (1993) defined self-efficacy as a subject's judgment about his or her ability to complete a future action. Individuals who feel that they will be successful on a given task are more likely to be so because they adopt challenging goals, try harder to achieve them, persist despite setbacks, and develop coping mechanisms for managing their emotional states (Bandura, 1993). A second conceptual strand of theory and research grew out of the work of Bandura (1997), identifying teacher efficacy as a type of self-efficacy – a cognitive process in which people construct beliefs about their capacity to perform at a given level of attainment. These beliefs influenced how much effort people put forth, how long they would persist in the face of

obstacles, their resiliency in dealing with failures, and how much stress or depression they experienced in coping with demanding situations (Bandura, 1997).

Efficacy expectations influence teachers' thoughts and feelings, their choice of classroom activities, the amount of effort they are willing to expend, and their persistence in the face of obstacles (Cantrell, 2003). Teachers with a high level of efficacy believe they can control and strongly influence student learning and achievement. When teachers have high levels of efficacy, they tend to work harder and persist longer even when students are difficult to teach, partly because these teachers believe in themselves and in their students (Woolfolk, 1998). The teacher self-efficacy belief is an important concept in the understanding of teacher's thoughts, decisions, feelings, behaviors, performance, and attitudes towards their students (Erdem & Demirel, 2007).

Erdem and Demirel (2007) conducted a study that presented development and validation of the new measurement instrument to explore student-teachers' self-efficacy beliefs towards teaching. A survey was developed and administered to 346 student teachers from Hacettepe University, Ankara, Turkey during the spring term of the 2003-2004 school year. Erdem and Demirel (2007) considered self-efficacy a theory that included the individual's conscience pertaining to how they motivate themselves, how they think, how they behave, and how they feel. A self-efficacy belief reflects a teacher's own teaching ability belief. The purpose of Erdem and Demirel's study was to see if teachers were more successful in practice when they have acquired a belief in their personal teacher efficacy concerning their future career. The Teacher Self-Efficacy Belief Scale was used to identify student teacher's efficacy beliefs before they became regular teachers. Similar to Bandura's findings on teacher self-efficacy, the study found that the Teacher Efficacy Belief Scale was beneficial in revealing teachers' self-efficacy belief, and the scale was a valid and reliable survey for student teachers and teachers in practice (Erdem & Demirel, 2007).

Schools are organizations where teachers work together in an interactive social system (Tschannen-Moran & Barr, 2004). Efficacy beliefs impact how people feel, think, act, and motivate themselves. The efficacy beliefs that emerge from the interactive process in schools influence both participants' well-being and what they can accomplish as a group (Bandura, 1997). Tschannen-Moran and Barr (2004) conducted a study to determine whether a relationship exists between collective teacher efficacy and the achievement of middle school students in Virginia, as measured by the Standards of Learning tests, and to investigate the contribution of

collective efficacy beliefs independent of social economic status. A sample of 66 middle schools was drawn from the population of middle schools in the Commonwealth of Virginia. Only middle schools with grades five through eight or grades six through eight configurations were used in the study. Approximately 25% of the participating schools were from rural areas, 50% were located in suburban contexts, and 25% were from urban environments. Surveys were administered at regularly scheduled faculty meetings and the Collective Teacher Belief Scale was administered to approximately one-third of the faculty present. The schools' mean-scaled score on the Grade 8 Math, Grade 8 Writing, and Grade 8 English 2001 Spring Virginia Standards of Learning measured academic achievement.

The researchers found that there was a significant positive relationship between teachers' perceptions of collective teacher efficacy and student achievement as measured by the Grade 8 Math, Writing, and English SOL tests (Tschannen-Moran & Barr, 2004). The researchers also stated that administrators face the task of trying to develop a school that has teachers with high levels of personal teacher efficacy along with efficacy beliefs in the school itself (Tschannen-Moran & Barr, 2004). One way for students to succeed is to have teachers that have high levels of personal teacher efficacy and believe in themselves and their students. In the age of high stakes accountability, fewer teachers are working in isolation and have been required to collaborate with their peers to cover the curriculum (Tschannen-Moran & Barr, 2004). Tschannen-Moran and Barr (2004) stated that collaboration requires teachers to believe in themselves, their teammates, the students, and the system. If a school does not have this culture, it is faced with trying to establish it. The success of the school, as indicated by levels of student achievement, depends upon the collective belief that the teachers in that building can improve student achievement (Tschannen-Moran & Barr, 2004).

Once teachers accept high levels of personal teacher efficacy, they are more likely to not accept low student achievement and to work hard to help children learn no matter what obstacles they face (Tschannen-Moran & Barr, 2004). Tschannen-Moran and Barr (2004) stated that strong PTE beliefs not only create a positive school climate, they bolster morale among students and staff. Schools with teachers that display high levels of efficacy constitute a powerful factor affecting different arenas of the school organization, influencing attitudes and affective, motivational, and behavioral aspects of teacher functioning within the school (Tschannen-Moran & Barr, 2004). Teachers with higher levels of PTE are more likely to learn and use innovative

strategies for teaching, implement management techniques that provide for student autonomy, set attainable goals, persist in the face of student failure, willingly offer special assistance to low achieving students, and design instruction that develops students' self-perceptions of their academic skills (Davis, 2003).

Woolfolk Hoy and Davis (2005) argued that teachers who feel efficacious about their instruction, management, and relationships with students may have more cognitive and emotional resources available to press students toward completing more complex tasks and developing deeper understandings. This behavior is because teachers with a high sense of PTE may be less afraid of student conflict and more likely to take greater intellectual and interpersonal risks in the classroom (Woolfolk Hoy & Davis, 2005).

### **Efficacy Measures**

Measuring teacher efficacy has been a challenge over the past 40 years. Tschannen-Moran et al. (1998) stated that a valid measure of teacher efficacy must encompass both an assessment of personal competences and an analysis of the task in terms of the resources and constraints that exist in particular teaching contexts. Most existing measures of teacher efficacy did not include both dimensions of efficacy. Their study examined the underpinnings of teacher efficacy to bring coherence to the construct and its measurement. The research compared the different efficacy measures to see if there was one that was best for measuring teacher efficacy. The study examined the following measures of efficacy: RAND measure, Teacher Locus of Control, Responsibility for Student Achievement, Webb Efficacy Scale, Gibson and Dembo's Teacher Efficacy Scale, Science Teaching Efficacy Belief Instrument, Ashton Vignettes, and Bandura's Teacher Efficacy Scale. Each measure has its own way of measuring teacher efficacy with similarities and slight differences from each other. In an attempt to capture the meaning of this construct, researchers have tried both long, detailed measures and short, general ones (Tschannen-Moran et al., 1998).

Bandura has been a frontrunner on how to best measure teacher efficacy. Bandura (1997) pointed out that teachers' sense of efficacy is not necessarily uniform across the many different types of tasks teachers are asked to perform nor across different subject matter. He constructed a 30-item instrument with seven subscales: efficacy to influence decision making, efficacy to influence school resources, instructional efficacy, disciplinary efficacy, efficacy to enlist parental

involvement, efficacy to enlist community involvement, and efficacy to create a positive school climate. Each item is measured on a nine-point scale anchored with the notations “nothing, very little, some influence, quite a bit, and a great deal” (Tschannen-Moran et al., 1998). The more closely the observer identifies with the model, the stronger will be the impact on efficacy (Bandura, 1997). Bandura (1997) also stated that when a model with whom the observer identifies performs well, the efficacy of the observer is enhanced. When the model performs poorly, the efficacy expectations of the observer decrease.

To be useful and generalizable, measures of teacher efficacy need to examine teachers’ assessments of their competence across the wide range of activities and tasks they are asked to perform. Yet, there is a danger of developing measures so specific that they lose their predictive power for anything beyond the specific skills and contexts being measured (Tschannen-Moran et al., 1998). Tschannen-Moran et al. (1998) recommended the studies test the relative predictive power of assessments of personal competence and the analysis of the task. One of the most perplexing issues in the measurement of efficacy beliefs is determining the level of specificity that is most helpful. Bandura (1986) suggested that self-efficacy beliefs should be assessed at the optimal level of specificity that corresponds to the task being assessed and the domain of functioning being analyzed. This idea implies that the best measure of efficacy is one that is the most appropriate for the research and study being conducted.

The Gibson and Dembo (1984) scale is an effective instrument designed to measure teacher perceptions and attitudes about themselves and their students (Jeck, 2009). The 30-item scale consists of a Likert scale where teachers rate themselves from 1 (*strongly disagree*) to 6 (*strongly agree*) to indicate their level of agreement with each individual statement (Gibson & Dembo, 1984). Personal Teaching Efficacy was identified as Factor 1 and General Teacher Efficacy was identified as Factor 2 in the study. According to Gibson and Dembo (1984), “all of the items included in Factor 1 reflect the teacher’s sense of personal responsibility in student learning” (p. 573). Factor 2 represents the teaching efficacy, or belief that any teacher’s ability to bring about change is significantly limited by factors external to the teacher, such as home environment, family background, and parental influence (Gibson & Dembo, 1984). Gibson and Dembo (1984) suggested that this dimension reflects the teacher’s belief about the general relationship between teaching and learning and is represented by the second factor item.

Table 1 shows the survey question item number, the actual question, the factor score, and whether the question is PTE or GTE. The two factor scores (PTE and GTE) were tallied for each participant. The PTE and GTE scores were tallied and combined to achieve the total efficacy score. The items included in Factor 1 reflect the teachers' sense of personal responsibility in student learning and/or behavior (Gibson & Dembo, 1984). The questions on the scale that most accurately measure the PTE traits are: 1, 12, 14, 19, 21, 24, 25, and 29. Factor 2 represents a teacher's sense of teaching efficacy, or belief that any teachers' ability to bring about change is significantly limited by factors external to the teacher, such as the home environment, family background, and parental influences (Gibson & Dembo, 1984). The questions on the scale that most accurately measure GTE traits are: 2, 4, 6, 16, 23, 27, and 30.

Two substantial factors emerged from the factor analysis, with Factor 1 "accounting for 18.2% of the total variance and Factor 2 accounting for 10.6% of the total variance" (Gibson & Dembo, 1984, p. 573). Gibson and Dembo (1984) explained that "the remaining factors accounted for less than 6% of the total variance" (p. 573). The reliability coefficients of the 16 items were: 0.78 for the PTE factor, 0.75 for the GTE factor, and 0.79 for all the 16 items combined (Gibson & Dembo, 1984). The relationship between the two factors revealed the "two factors were only moderately related ( $r = -.19$ ), suggesting that the two factors represent related, but relatively independent, constructs" (Gibson & Dembo, 1984, p. 571). Factor 1 represents a teacher's sense of personal teaching efficacy, or belief that one has the skills and abilities to bring about student learning (Gibson & Dembo, 1984). According to Gibson and Dembo (1984) "all of the items included in Factor 1 reflect the teacher's sense of personal responsibility in student learning" (p. 573). Factor 2 represents general teaching efficacy, or belief that any teacher's ability to bring about change is significantly limited by factors external to the teacher,



Table 1

*Gibson and Dembo Teacher Efficacy Scale Question Breakdown*

Item #	Factor	Question/statement	PTE	GTE
16	.65	A teacher is very limited in what he/she can achieve because a student's home environment is a large influence on his/her achievement.		X
21	.61	If a student masters a new math concept quickly, this might be because I knew the necessary steps in teaching that concept.	X	
6	.60	If students are not disciplined at home, they aren't likely to accept my discipline		X
19	.55	When the grades of my students improve it is usually because I found more effective teaching approaches.	X	
2	.54	The hours in my class have little influence on students compared to the influence of their home environment		X
4	.54	The amount that a student can learn is directly and primarily related to family background.		X
15	.53	When I really try, I can get through to most difficult students.	X	
27	.52	The influences of a student's home experiences can be overcome by good teaching.		X
24	.51	If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson.	X	
1	.49	When a student does better than usual, many times it is because I exerted a little extra effort.	X	
25	.49	If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him quickly.	X	

(table continued)

Table 1 (continued)

Item #	Factor	Question/statement	PTE	GTE
29	.48	If one of my students could not do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty.	X	
12	.46	When a student is having difficulty with an assignment, I am usually able to adjust it to his/her level.	X	
30	.45	Even a teacher with good teaching abilities may not reach many students.		X

such as home environment, family background, and parental influence (Gibson & Dembo, 1984). Gibson and Dembo (1984) suggest that this dimension reflects the teacher’s belief about general relationships between teaching and learning and is represented by the second factor item. Acceptable reliability coefficients only resulted in 16 of the original 30 items; therefore analysis of the study was based on the responses to the 16 of the original 30 items that yield significant loadings on one or the two factors (Gibson & Dembo, 1984). Results indicated that teacher efficacy, as measured by the Teacher Efficacy Scale, was multidimensional and comprises at least two clearly distinguishable factors, which are only moderately correlated (Gibson & Dembo, 1984).

### Summary

The literature supported that teacher personal efficacy plays an important role in student achievement. If schools have buildings filled with teachers with high levels of personal efficacy, they are more capable of providing students with engaging instruction and learning that assists the students in performing better on achievement tests. When teachers accept the belief they are providing meaningful instruction to impact student achievement, students will be more engaged in their learning and will improve their achievement.

Teachers with high levels of personal efficacy have higher expectations for their students and plan to ensure the students attain the curricula being taught. Administrators also need to

establish and reinforce personal teacher efficacy and general teacher efficacy in schools. The literature suggests teachers with high levels of efficacy positively affect student engagement and achievement.

Building levels of teacher general and personal efficacy to increase student engagement and learning is imperative. One way to accomplish this goal is the use of the coaching model which enables a coach to work with teachers to focus on specific content, model techniques and instructional practices, observe teacher practices, and dedicate consultative hours to working with teachers (Shidler, 2008). This method helps seasoned and new teachers believe in what they are doing, so they can help students. Administration also influences teacher efficacy and student achievement. Principals have the opportunity to build collective efficacy through the experiences they provide for teachers (Protheroe, 2008).

Goddard et al. (2000) suggested that another way school administrators improve student achievement is by working to raise the collective efficacy beliefs of their faculties. Goddard et al. (2000) also argued that, although master experiences are the most powerful efficacy changing forces, they may be the most difficult to deliver to a faculty with low collective efficacy. However, this issue can be remedied by providing efficacy-building mastery experiences through thoughtfully designed staff development activities and action research projects. Principals must intentionally help teachers develop a sense of efficacy as it is not enough to just hire and retain these teachers. Teachers must also believe they can successfully meet the challenges of the task at hand (Goddard et al., 2008). Principals can provide teachers with experiences by encouraging lead teachers and administrators to model exemplary classroom instruction to teachers with lower levels of self-efficacy.

Communicating the school's goals, increasing the availability of professional development opportunities and workshops, supervising and evaluating instruction followed by constructive feedback or instructional methods, monitoring student progress, and maintaining high levels of visibility in the school exemplify leadership tasks principals can use as forms of verbal persuasion to improve school collective efficacy (Fancera & Bliss, 2011). High levels of teacher personal efficacy lead to better instruction, better student engagement, and better student achievement.

Efficacy impacts all facets of education. When teachers and administrators have strong personal efficacy, they believe in what they are doing and strive to provide the best instruction,

so children can learn and be successful. Efficacy is also an important part of effective instruction. Findings in the literature suggest that people with strong self-efficacy beliefs are likely to be more motivated to pursue action, contribute more effort towards those actions, and persevere to a greater degree in the face of obstacles (Bandura, 1997). Effective teaching is necessary for effective learning and effective achievement. Research shows that efficacy plays an important role in the education process. The study sought the relevance of teacher efficacy and student achievement.

The purpose of this chapter was to review the literature that has relevance to how teacher efficacy (personal, general, and total) affects student achievement. This chapter also reviewed literature pertaining to school accountability, assessments, student achievement, student efficacy, student engagement, educational leadership and principal efficacy, and effective teaching. Each of these subjects has supporting literature demonstrating the importance of teacher efficacy and student achievement. The reviewed literature indicated that both personal teacher efficacy and general teacher efficacy can have a profound effect on a school environment and student achievement. The literature review supports the future study of teacher efficacy and the effect it has on student achievement.

## **Chapter 3**

### **Methodology**

#### **Introduction**

This quantitative study sought to determine the extent to which teacher efficacies (personal, general, and total) account for variability in 5<sup>th</sup> grade Virginia mathematics SOL achievement in one Virginia school division over and above that explained by teacher experience, teacher education, and class size. A non-experimental predictive/correlational study was used to answer the following three research questions:

1. To what extent does personal teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
2. To what extent does general teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
3. To what extent does total teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

#### **Research Design**

In order to make generalizations or test theories with a hypothesis, a quantitative method was used to compare data in a systematic way. The data were used to generalize the information extensively within and from a specific population. This study utilized a quantitative design that allowed the researcher to gather objective measurements and numerical analysis of data collected through achievement test scores and surveys. The data collected enabled the researcher to identify the connections between fifth grade Virginia SOL student mathematics achievement and the levels of teacher efficacy above and beyond that which can be explained by teacher experience, teacher education, and class size.

The three independent variables were: personal teacher efficacy, general teacher efficacy, and total teacher efficacy. The dependent variable was fifth grade Virginia SOL student

mathematics achievement. Also included in this study were three control variables: teacher experience, teacher education, and class size.

## **Setting**

This study took place in a northern Virginia public school division with over 11,000 students. In this school division, fifth grade mathematics teachers from the eleven elementary schools were asked to participate in the teacher survey. The school division included elementary schools that were rural and suburban. One Title 1 elementary school was a school improvement focus school. Due to this status, the Title 1 elementary school received additional funding and support from the Commonwealth of Virginia to improve and progress out of this status of the bottom ten percent of Title 1 schools.

## **Population**

The researcher used quota sampling for this study since the researcher's focus was on the division's fifth grade teachers and how to provide staff development on teacher efficacy. The population of this study consisted of a possibility of 27 general education fifth grade mathematics teachers from the eleven elementary schools in a rural/suburban school division located in northern Virginia. The 27 fifth grade mathematics teachers were asked to complete the Gibson and Dembo (1984) Teacher Efficacy Scale. Out of the 27 fifth grade mathematics teachers, 21 completed the survey (78% completion rate).

## **Instrumentation**

The Gibson and Dembo Teacher Efficacy Survey (see Appendix A) was administered to collect and analyze teacher efficacy data for the division's fifth grade math teachers. The survey was distributed to all 5<sup>th</sup> grade mathematics teachers in the division using Survey Monkey. The overall study design was correlational and predictive. Using a correlational and predictive design identified connections between teacher efficacy levels and student Virginia mathematics achievement above and beyond that which can be explained by the teacher experience, teacher education, class SES, and class size. This study provided additional insight and recommendations to help administrators and teachers understand the significance of efficacy on student achievement within the school division. The study also assisted in the division's professional development.

The instrument used to collect data for this study was the Gibson and Dembo (1984) 30-item (long form) Teacher Efficacy Scale. Gibson and Dembo (1984) developed a 30 item measure of teacher efficacy that confirmed the existence of two factors, personal teaching efficacy (PTE) and general teaching efficacy (GTE). The Gibson and Dembo (1984) Teacher Efficacy Scale has been an important instrument to study teacher efficacy. Researchers have used this tool to investigate the impact of teachers' sense of efficacy on their behaviors and attitudes and on student achievement as well as to examine relationships of teachers' efficacy to school structure and climate (Tschannen-Moran et al., 1998). Written permission has been received from Myron H. Dembo to use the Gibson and Dembo Teacher Efficacy Scale (see Appendix B).

## **Procedures**

As part of the doctoral program requirements, the researcher requested and received approval from Virginia Tech's Institutional Review Board (IRB) by submitting an IRB Proposal Request Application from the researcher's institution (see Appendix C). Prior to beginning the research, the researcher received approval of all persons participating in the study and met all the confidentiality requirements. Permission to conduct the study and collect the data was sought from and received by the district's superintendent (see Appendix D). Once permission was granted to conduct the study, the researcher contacted the associate superintendent of instruction and sought assistance in gathering the data needed to answer the three research questions. The researcher upheld confidentiality of all survey data and teacher data. During the data gathering and analysis phase, all data were retained and stored on a secure database. All teacher data that were collected from the division were stored on a database and was destroyed after the researcher's defense examination.

After the associate superintendent explained the research study and granted approval to the schools' elementary principals, a survey was sent through email to the division's fifth grade math teachers. The researcher asked the fifth grade math teachers to complete the survey. A time frame of one month was given for the completion of this survey with two reminders sent to encourage completion. The researcher also asked the schools' principals to discuss with the fifth grade teachers the purpose and the importance of completing the survey. The completed surveys were collected by the researcher through Survey Monkey. Teachers' email addresses were attached to the survey and enabled the researcher to identify which teacher completed the survey.

After collecting the survey data, personal efficacy, general efficacy, and total efficacy averages were calculated for each respondent. The score for the general teacher efficacy was inverted in order to correctly average the score. The average efficacy scores were used to run correlations and multiple regressions.

Information about teaching experience, race, gender, and education were collected through records maintained in the division's Human Resource Department. Class sizes were obtained through the school division's student information system and provided individual teacher's class data. Virginia SOL mathematics student achievement results were collected from the associate superintendent and division testing director. All data collected were kept confidential and were destroyed once the researcher completed the defense of his dissertation.

### **Data Analysis**

A multiple-regression research model was utilized to answer the research questions in order to determine the best combination of independent (predictor) variables to predict the dependent (predicted) variable. In the multiple-regression, three regressions were used to determine the extent to which the key independent variables of personal teacher efficacy (PTE), general teacher efficacy (GTE), and total efficacy (TE) accounted for the fifth grade Virginia SOL mathematics achievement above and beyond that explained by the independent variables of teacher experience, teacher education, and class size. All variables were expressed in an interval scale assigning a number to represent the identification of values. Teacher experience was represented by the number of years the teacher had taught. Teacher education was identified by: bachelor degree = 0, master's degree = 1, and doctorate degree = 2. Class size was identified by the amount of students in the class. The dependent variable (SOL Math Scores) was expressed in an interval scale of 0-600. Zero represented the lowest score possible on the SOL Math test. 600 represented the highest (perfect) score on the SOL Math test, and a score of 400 and above is considered a passing score. The average class 5<sup>th</sup> grade mathematic SOL score was used. PTE was the average score of the nine PTE survey questions and the GTE was the average score of the seven GTE survey questions. The range of the scores was determined by adding up the PTE and GTE question rankings (1-Strongly Disagree – 6-Strongly Agree). There were nine questions that represented PTE and seven questions that represented GTE. The nine PTE scores were totaled and averaged to give the average PTE score for each teacher. GTE scores were inverted



and totaled to determine the GTE average. GTE and TTE scores were also totaled and averaged, so that each teacher had an average PTE, GTE, and TTE scores. The average scores were used to find the correlations and multiple regression outcomes. Statistical Package for the Social Sciences (SPSS) was the statistical software package used for data analysis related to this study. The SPSS program is designed to focus on exploratory analytics, enabling users to investigate and to explore data to find the significance of the research data for their study. The data provided answers the research questions.

### **Summary of Methodology**

The researcher conducted a quantitative, statistical study. The researcher gathered data from eleven elementary schools from one county in the Commonwealth of Virginia. The eleven elementary schools consisted of suburban and rural schools with one Title 1 elementary school in school improvement. The data were gathered through surveys administered to fifth grade mathematics teachers, which sought the levels of PTE, GTE, and TTE in each elementary school. The data collected enabled the researcher to identify the correlations of fifth grade student Virginia SOL mathematics achievement and the levels of teacher efficacy above and beyond that which can be explained by teacher experience, teacher education, and class size. The data were analyzed, so that the findings could be developed into relative conclusions that will assist future research and professional development. Chapter Four presents the results of the data and what the results of the data revealed. Chapter Five provides findings, implications, and recommendations on the study for practice and further research.

## **Chapter 4**

### **Presentation of the Data, Analysis, and Results**

The purpose of this study was to determine the extent to which teacher efficacies (personal, general, and total) account for variability in 5<sup>th</sup> grade Virginia mathematics SOL achievement in one Virginia school division over and above that explained by teacher experience, teacher education, and class size. The purpose of this chapter is to present the results of the survey, the analysis of data, and conclusions of the analysis. IRB approval of the study was granted (see Appendix C), so data concerning the use of fifth grade Virginia Standards of Learning Mathematic scores, years of teaching experience, class size, and teacher education were archived data stored within the school division's administrative offices and were analyzed with permission from the superintendent of the school division (see Appendix D). Data related to PTE, GTE, and TTE were collected from 21 fifth grade teachers in a mid-sized, rural division located in Northern Virginia. Data were collected and analyzed. The assistant superintendent of instruction provided the teacher experience and teacher education data. She also discussed the importance of the study with the division elementary principals. All identifying information was removed from the data that were provided.

An overview of the survey methodology as described in Chapter 3 is also presented in this chapter. The descriptive/correlational study sought to determine the relationship between key independent variables (PTE, GTE, and TTE) and the variability in the dependent variable (fifth grade Virginia SOL mathematic scores) over and above that which might be explained by the control variables (teacher experience, teacher education, and class size).

#### **Descriptive Statistics**

Data for this analysis come from survey responses of 21 fifth grade teachers from one rural/suburban school division in Northern Virginia. There were two measures of teacher efficacy, Personal Teacher Efficacy and General Teacher Efficacy. There was also a third measure (Total Teacher Efficacy), which is an aggregate of the first two.

There were three control variables used in this study: teacher education, teaching experience, and class size. As presented in Table 2, fifty-seven percent of the teachers had a master's degree as their highest level of education attainment, with the remaining 43 percent

having earned at least a bachelor's degree. The average number of years teaching experience for a teacher in this study was 11 years, with a standard deviation of 8.11 years meaning that there was sizeable variety of years teaching experience from the average years teaching. Four teachers (19%) had over 20 years teaching experience, but 13 teachers (61%) had less than ten years of teaching experience. This means that the sample was composed of primarily new teachers with less than ten years teaching experience. The average class size was 17.14 students, with a standard deviation of 3.62. Most of the classes did not have a large variability in the number of students and were close to the average class size. Classes consisted of students with multiple math abilities. The smaller classes had inclusion special education students mixed in with general students and the larger classes had gifted and talented students mixed in with the general education students.

### **Data Collection**

All teacher information, classroom information, and student information were gathered with the permission of the school division's superintendent. The assistant superintendent of instruction assisted in collecting the teacher and student information through records maintained within the school division's central office. The assistant superintendent provided the teacher and student data to the researcher, so the data could be used in the study. Student and classroom demographic data were collected via the school division's electronic student information system. The classroom sizes were comprised of inclusion special education students, general education students, and gifted and talented students. Some of the variability was also due to some classes being grouped by math abilities. The class sizes ranged from 11 students to 24 students. The teacher information (education and experience) was gathered through personnel records housed at central office. The fifth grade Virginia mathematics SOL scores were collected with the assistance of the division's testing director through the division's student SOL scores database. The class 5<sup>th</sup> grade mathematic SOL score averages were used in the study. The highest SOL average was 511 in a class of 21 students. The lowest average was 369 in a class of 17 students. Of the teachers with master's degrees, 10 out the 12 had at least five years of teaching experience.

Table 2 presents information regarding teacher experience, teacher education (0=bachelor's degree, 1= master's degree), class size, and SOL average.

Table 2

*Demographic Data of Teacher Experience, Teacher Education, and Class Size*

Teacher	Experience (years)	Education	Class Size	SOL Average
1	6	0	15	457
2	3	1	11	408
3	8	1	15	386
4	12	1	23	459
5	11	1	16	407
6	4	0	15	434
7	28	0	15	447
8	23	1	22	418
9	4	0	12	424
10	16	1	16	395
11	6	0	24	448
12	26	1	18	435
13	6	1	20	438
14	5	0	21	511
15	9	0	15	444
16	2	0	14	380
17	10	1	18	434
18	25	1	17	369
19	5	1	20	431
20	15	1	20	421
21	7	0	13	417

As presented in Table 2, nine teachers (43%) had a bachelor's degree and 12 teachers (57%) had a master's degree. Four of the teachers had over 20 years of teaching experience with the most experienced teacher having 28 years of experience. The least experienced teacher only

had two years of teaching experience. The average class size was 17.14 students. The largest class size was 24 students, and the smallest class size was 11 students. There were four classes out of the 21 classes with a SOL average score below the passing score of 400. Seventeen of the classes had SOL averages above the passing 400 score. The average class size of the four classes with SOL averages below 400 was 15.5 students. Three out of the four teachers of these classes had master’s degrees and over five years of teaching experience. The one teacher with only a bachelor’s degree had the smallest class of 14 students and only had two years teaching experience.

Twenty-seven 5<sup>th</sup> grade teachers were asked to complete the survey. Out of the 27, 21 teachers (78%) completed the survey. At least one fifth grade mathematics teacher from each of the 11 elementary schools completed the teacher efficacy survey.

In Table 3, the means and standard deviations for continuous research variables are presented. Table 3 includes descriptive statistics related to 5<sup>th</sup> grade mathematic SOL scores, personal teaching efficacy, general teaching efficacy, and total teaching efficacy along with the control variables of teacher experience, teacher education, and class size.

Table 3  
*Descriptive Statistics-Control Variables*

Variable	<i>M</i>	<i>Mdn</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Control Variables					
Teaching Experience	11.00	8.00	8.11	2.00	28.00
Teacher Education (1 = master’s degree)	.57	1.00	0.51	0.00	1.00
Class Size	17.14	16.00	3.62	11.00	24.00

In Table 3, the mean years of teaching experience was 11.00 with a standard deviation of 8.11. Class size ranged from a minimum of 11 students to a maximum of 24 students. The mean class size was just over 17 students. Most of the class sizes were similar in size with the mean of class size being 17.14. Teaching experience had a mean of 11 years with a standard deviation of 8.11. The average number of years teaching experience for a teacher in this study was 11 years,

with a standard deviation of 8.11 years. There was a sizeable range of year's teaching experience with the minimum years' teaching experience at two years and the maximum at 28 years' teaching experience.

Table 4

*Descriptive Statistics-Dependent and Independent Variables*

Variable	<i>M</i>	<i>Mdn</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Dependent Variable					
5 <sup>th</sup> Grade Math SOL Scores	427.23	426.00	31.27	369.5	511.20
Key Independent Variables-Teacher Efficacy					
Personal Teacher Efficacy	4.64	4.75	0.47	3.63	5.25
General Teacher Efficacy	3.52	3.43	0.71	2.14	4.43
Total Teacher Efficacy	4.12	4.07	0.42	3.47	4.87

In Table 4, TTE had the smallest standard deviation (.42), meaning there was little variability in the TTE results. PTE had a similar standard deviation of (0.47) as TTE. PTE had a slightly larger range between the minimum and maximum (3.63-5.25) than TTE (3.47-4.87). GTE had the largest standard deviation (0.71) with the scores ranging from 2.14 (minimum) to 4.43 (maximum). The PTE average score was 4.64, with a standard deviation of 0.47. The GTE average score was 3.52, with a standard deviation of 0.71. Lastly, the aggregate measure, TTE, had a mean score of 4.22, with a standard deviation of 0.42. The 5<sup>th</sup> Grade Math SOL Scores had a mean score of 427.23 with a standard deviation of 31.27. The range of the 5<sup>th</sup> Grade SOL Scores was a minimum score of 369.5 and a maximum score of 511.20.

**Research Questions**

The purpose of this study was to examine the relationship between 5<sup>th</sup> grade mathematics SOL scores and teachers' efficacy levels (PTE, GTE, and TTE). The association between the mean of 5<sup>th</sup> grade mathematic scores and PTE, GTE, and TTE were examined. Pearson's Correlation was used for this analysis. All analyses were conducted using SPSS statistical software.

Table 5 reports the correlation coefficient between the independent variables of interest (PTE, GTE, and TTE), control variables (teacher experience, teacher education, and class size), and the dependent variable (5<sup>th</sup> mathematics SOL scores).

Table 5

*Bivariate Correlations for 5<sup>th</sup> Grade SOL Scores and Teacher Efficacy (n = 21)*

Variable	SOL AVG	Years' Experience	Class Size	PTE AVG	GTE AVG	TTE AVG
SOL AVG	1	-.154	.424*	-.014	.151	.112
Sig. (1-tailed)		.253	.028	.475	.257	.314
Years' Experience	-.154	1	.206	.357	.268	.421*
Sig. (1-tailed)			.185	.056	.120	.029
Class Size	.424*	.206	1	-.266	.430*	.177
Sig. (1-tailed)		.185		.122	.026	.221
PTE AVG	-.014	.357	-.266	1	.038	.625**
Sig. (1-tailed)		.056	.122		.436	.001
GTE AVG	.151	.268	.430*	.038	1	.803**
Sig. (1-tailed)		.120	.026	.436		.000
TTE AVG	.112	.421*	.177	.625**	.803**	1
Sig. (1-tailed)		.029	.221	.001	.000	

Note. \* $p < 0.05$ . \*\* $p < 0.01$ .

In Table 5, PTE was not positively associated with the fifth grade mathematics SOL score average at a significant level. There was no statistical significant correlation between PTE and fifth grade mathematics SOL scores,  $r = -.014$ ,  $n = 21$ ,  $p = .475$ . GTE and fifth grade mathematics SOL scores also had no statistical significant correlation,  $r = .151$ ,  $n = 21$ ,  $p = .257$ , but had a positive association. Lastly, the final key independent variable, TTE, had no statistical significant correlation with fifth grade mathematic SOL scores,  $r = .112$ ,  $n = 21$ ,  $p = .112$ , but did have a positive association. Out of all the predictor variables, only class size had a statistically significant association with fifth grade mathematic SOL scores,  $r = .424$ ,  $n = 21$ ,  $p = .028$ . Years'

experience had a negative association with fifth grade mathematics SOL score average was not statistically significant,  $r = -.154$ ,  $n = 21$ ,  $p = .253$ .

A multivariate regression was used to analyze the association between PTE, GTE, and TTE with fifth grade mathematics SOL scores, controlling for teaching experience, teacher education, and class size. A multiple regression was used to test whether the bivariate associations held true under more stringent modeling standards. The results from the multivariate analysis are reported in Table 6.

Table 6  
*Analysis of Variance*

Model Summary				
Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate
1	.750	.563	.417	23.8776

ANOVA <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	F	Sig.
1					
Regression	11005.591	5	2201.118	3.861	.019
Residual	8552.076	15	570.138		
Total	19557.667	20			

a. Dependent Variable: SOL AVG

b. Predictors: (Constant), TTEAVG, Class Size, Education, Years' Experience, PTEAVG

In order to answer the research questions, a multiple regression was used to determine the relationship between the independent variables and the dependent (fifth grade math SOL scores) variable. The study sought to determine the relationship between key independent variables (PTE, GTE, and TTE) and the variability in the dependent variable (fifth grade Virginia SOL mathematic scores) over and above that which might be explained by the control variables (teacher experience, teacher education, and class size). In Table 6, the multiple regression model with all predictor variables produced  $R^2 = .563$ ,  $F(5, 15) = 3.86$ ,  $p = .019$ . The multiple correlation coefficient was .75 and  $R^2$  was .563, indicating approximately 56 % of the variance



of the 5<sup>th</sup> grade mathematics SOL scores could be accounted for by class size, teacher education, teacher experience, PTE, and TTE. GTE (see Table 7) did not enter into step two of the analysis ( $t = -1.63, p = .125$ ).

The multiple regression results for the association between 5<sup>th</sup> grade mathematic SOL scores and teacher efficacy are reported in Table 7.

Table 7

*Regression Output for Association between 5<sup>th</sup> Grade Math SOL scores and Teacher Efficacy*

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	234.018	74.269		3.151	.007
Years Exp.	-.928	.772	-.241	-1.202	.248
Education	-35.445	11.696	-.575	-3.031	.008
Class Size	6.442	1.840	.746	3.500	.003
PTEAVG	26.475	17.385	.399	1.523	.149
TTEAVG	-2.361	18.360	-.032	-.129	.899

a. Dependent Variable: SOLAVG

Excluded Variables <sup>a</sup>					
Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
GTEAVG	-22.949 <sup>b</sup>	-1.631	.125	-.400	.000

a. Dependent Variable: SOLAVG

b. Predictors in the Model: (Constant), TTEAVG, Class Size, Education, Years' Experience, PTEAVG

A multiple regression was utilized to determine the relationship between teacher efficacy and fifth grade Virginia SOL math achievement in order to answer the following research questions.

1. To what extent does personal teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

PTE did not account for fifth grade math achievement over or above that explained by the three control variables. It was found that education ( $B = -35.45, p < .05$ ) and class size ( $B = 6.44, p < .05$ ) were the only significant predictors of 5<sup>th</sup> grade math SOL achievement. The remaining variables, PTE ( $B = 26.48, p > .05$ ), GTE ( $B = -22.95, p > .05$ ), TTE ( $B = -2.36, p > .05$ ), and years' experience ( $B = -.93, p > .05$ ) were not found to be significant predictors of 5<sup>th</sup> grade mathematics SOL achievement.

2. To what extent does general teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

GTE did not account for fifth grade math achievement over or above that explained by the three control variables. It was found that education ( $B = -35.45, p < .05$ ) and class size ( $B = 6.44, p < .05$ ) were the only significant predictors of 5<sup>th</sup> grade math SOL achievement. The remaining variables, PTE ( $B = 26.48, p > .05$ ), GTE ( $B = -22.95, p > .05$ ), TTE ( $B = -2.36, p > .05$ ), and years' experience ( $B = -.93, p > .05$ ) were not found to be significant predictors of 5<sup>th</sup> grade mathematics SOL achievement.

3. To what extent does total teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

TTE did not account for fifth grade math achievement over or above that explained by the three control variables. It was found that education ( $B = -35.45, p < .05$ ) and class size ( $B = 6.44, p < .05$ ) were the only significant predictors of 5<sup>th</sup> grade math SOL achievement. The remaining variables, PTE ( $B = 26.48, p > .05$ ), GTE ( $B = -22.95, p > .05$ ), TTE ( $B = -2.36, p > .05$ ), and years' experience ( $B = -.93, p > .05$ ) were not found to be significant predictors of 5<sup>th</sup> grade mathematics SOL achievement.

In conclusion, since class size was a significant predictor of higher 5<sup>th</sup> grade mathematics SOL scores in this study. With larger class sizes, 5<sup>th</sup> grade mathematic SOL scores were expected to be higher. This study indicated that classes larger in size had higher 5<sup>th</sup> grade mathematics achievement. PTE, GTE, and TTE had no significant correlations with 5<sup>th</sup> grade mathematic SOL scores above and beyond that of the class size, teacher education, and teacher experience variables. Multiple regressions indicated that class size and teacher education had significant correlations out of the three control variables of class size, teacher experience, and teacher education, indicating that class size and teacher education were more likely to predict higher 5<sup>th</sup> grade mathematic SOL scores than teacher efficacy. An independent-samples T-test was also conducted for teacher education to test the significance between student achievement and teacher education (See Table 8). T-test results indicated that there is no significance between levels of education and student achievement. An independent-samples t-test was conducted to compare student achievement in teacher education (bachelor's and master's degree). There was no significant difference in the scores for bachelor's degree ( $M = 440.6$ ,  $SD = 35.0$ ) and master's degree ( $M = 417.2$ ,  $SD = 25.1$ );  $t(14) = 1.71$ ,  $p = 0.110$ . However, given the small sample size and with the T-test approaching significance, practical significance was measured using Cohen's  $d$  ( $d = .78$ ). The Cohen's  $d$  result showed moderate to high effects for level of education on student achievement.

## Summary

In summary, a multiple regression and correlation were used to determine the relationship between the independent variables and the dependent (fifth grade math SOL scores) variable to answer the three research questions. The study sought to determine the relationship between key independent variables (PTE, GTE, and TTE) and the variability in the dependent variable (fifth grade Virginia SOL mathematic scores) over and above that which might be explained by the control variables (teacher experience, teacher education, and class size). The data presented in this chapter suggested that teacher efficacy does not have a significant effect on 5<sup>th</sup> grade mathematic SOL scores. A T-test was also run to see if there was any significance between teacher education (bachelor's and master's degrees) and student achievement. Findings of this study, conclusions based on these findings, implications, and recommendations for further research are presented in Chapter Five.

Table 8

*Group Statistics*

Education		N	Mean	Std. Deviation	Std. Error Mean
SOL AVG	Bachelor's	9	440.620	35.0287	11.6762
	Master's	12	417.187	25.0775	7.2392

*Education Degree Significance and Effect Size*

	Levene's Test for Quality of Variances		T-test for Equality of Means					95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2 tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal Variance Assumed	.184	.673	1.791	19	.089	23.43	13.09	-3.96	50.82
Equal Variance Not Assumed			1.706	13.85	.110	23.43	23.43	-6.06	52.93

## **Chapter 5**

### **Summary, Findings, and Implications**

The purpose of this chapter is to summarize the purpose and findings (interpretation, context, and implications) of the study. The summary focused on the analysis of the three research questions and other findings that were revealed. This study sought to determine the extent to which teacher efficacies (personal, general, and total) account for variability in 5<sup>th</sup> grade Virginia mathematics SOL achievement in one Virginia school division over and above that explained by teacher experience, teacher education, and class size. This chapter also provides implications and recommendations for future research.

#### **Summary**

Educational leadership has been challenged with the accountability of closing the achievement gap and improving student achievement. Assessment has become a key process in education and student achievement. Assessment has become the nation's way of discovering if instruction has had its intended effect (Wiliam, 2010). All those with a stake in the outcomes of education--learners, teachers, parents, other taxpayers, employers, and the wider community--want to know what students have learned, and it seems plausible that it can easily be measured through the use of straightforward and familiar instruments, such as achievement tests (Wiliam, 2010). The use of criterion-referenced assessments has become a norm for holding teachers, schools, and districts accountable for student achievement. How much of a factor does teacher efficacy play in improving student achievement?

Teachers play an important role in students' academic success (Guskey, 1984). Teacher efficacy (personal, general, and total) is the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). When a teacher has high personal efficacy, it impacts how a student will perform in the classroom (Guskey, 1984). Teachers' confidence in their ability to perform the actions leading to student learning represents one of the few individual teacher characteristics that reliably predict teacher practice and student outcome (Ross, Cousins, & Gadalla, 1996). However, there is little research that seeks to measure teacher efficacy and variability in 5<sup>th</sup> grade mathematic SOL scores.

## **Purpose**

The purpose of this study was to determine the extent to which personal efficacy, general efficacy, and total efficacy account for fifth grade Virginia Standards of Learning mathematics achievement over and above that explained by teacher experience, teacher education, and class size.

## **Summary of Findings**

The study was conducted in a Northern Virginia school division with approximately 11,000 students. Fifth grade math teachers were surveyed in the division's eleven elementary schools. Twenty-one out of a possible 27 of the division's 5<sup>th</sup> grade teachers (78%) participated in the study and completed the survey. The survey instrument utilized was the Gibson and Dembo (1984) Teacher Efficacy Scale.

**It was found that PTE (B = 26.48, p > .05), GTE (B = -22.95, p > .05), TTE (B = -2.36, p > .05) were not statistically significant predictors of 5<sup>th</sup> grade mathematics SOL achievement.**

**The study did find that education (B = -35.45, p < .05) and class size (B = 6.44, p < .05) were statistically significant predictors of 5<sup>th</sup> grade math SOL achievement.**

**Also, the years' experience (B = -.93, p > .05) finding was not a statistically significant predictor of 5<sup>th</sup> grade mathematics SOL achievement.**

The following findings did not support the study's three research questions. **No statistically significance was found for PTE, GTE, and TTE impacting 5<sup>th</sup> grade mathematics SOL scores.** These findings were somewhat inconsistent and do not support the previous research on teacher efficacy. Previous research suggested that teacher efficacy does impact student achievement. It was difficult to have significant findings with the following limitations: teacher efficacy levels were based on self-report, only one school division and small sample size (N = 21), and no student factors including prior achievement were accounted for in the regression, which could have influenced the outcomes. Also student class make-up (special education inclusion and gifted and talented) could have factored into the findings of the study.

Teacher's experience did not have a statistically significant impact on SOL 5<sup>th</sup> grade mathematics achievement. Teachers had anywhere from two years teaching experience to 28 years teaching experience in this study. Only one teacher with two years of teaching experience

taught a class of 14 students with an SOL 5<sup>th</sup> grade mathematics average of 380, which was below the passing score of 400. This teacher only had a bachelor's degree. Seventeen out of the 21 teachers had five or more years of teaching experience. Once again, the limitations of the small sample size, class size, and special education inclusion or gifted and talented class make-ups could have factored into these findings.

It has been noted that class size was a significant predictor of increased student achievement in this study. Since class size was a significant predictor of increased 5<sup>th</sup> grade mathematics SOL scores, with increase in class size, 5<sup>th</sup> grade mathematic SOL scores were expected to be higher. Often, educators emphasize how important it is to keep the class size down. This finding showed the opposite and indicated that increased class sizes had increased student achievement. The range of the class size was the smallest class with 11 students and the largest class with 24 students. It is important to caution the reader that the largest class was only 24 students and the average class size was 17 students, so one needs to keep this in mind when reviewing this finding. **But, this could be of interest for future research on the impact of class size.**

Teacher education was also found to be a significant predictor of student achievement. However, it was noted that the coefficient was negative. In this study, teachers with master's degrees had lower 5<sup>th</sup> grade mathematic SOL score averages. Considering new teachers are more likely to have a master's degree based on how degrees have been awarded in the last 15-20 years, this was inconsistent with the findings of previous research. This could lead to an investigation of year's teaching as related to a degree. The teachers in the study that had master's degrees had at least five years teaching experience and taught three out of the four classes that had SOL averages below the passing 400 score. The other nine teachers with master's degrees had SOL averages above the passing 400 score. Based on changes in teacher preparation programs, more new, young teachers are starting their teaching careers with a master's degree, so this investigation would also need to examine veteran teacher's degrees and differentiate between those who received a master's degree as part of original coursework and those that chose to pursue a master's degree after gaining experience teaching.

## Discussion

There were three primary research questions in this study:

1. To what extent does personal teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
2. To what extent does general teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?
3. To what extent does total teacher efficacy account for fifth grade Virginia SOL math achievement over and above that explained by teacher experience, teacher education, and class size?

**Finding one. The findings from the statistical analysis conducted demonstrated that there was no statistically significant relationship between teacher efficacies (personal, general, and total) and fifth grade Virginia SOL math achievement.** In other words, when a teacher displays strong personal teaching efficacy, it makes an individual student no more or no less likely to achieve a higher or lower score on a 5<sup>th</sup> grade mathematics SOL achievement test. Even when controlling for class size, teacher education, and teacher experience, the findings remained unchanged. Compared to previous findings in literature, the findings in this study demonstrated a slight deviation. PTE pertains to a teacher's belief she or he possesses teaching skills to bring success in students. The extent to which teachers believe they have the capacity to affect student performance has been conceptualized as personal teacher efficacy (Ashton & Webb, 1986). Erdems and Demirel (2007) conducted a study that focused on teachers' personal teaching efficacy. The study found that teachers with strong PTE were often more motivated and successful in their teaching careers and improving student achievement with these beliefs, but in this study PTE was not found significant in increasing student achievement.

GTE is the belief that the teachers are able to bring about student change despite outside school constraints (Ross, Cousins, & Gadella, 1996). GTE differs from PTE in that the teacher holding the belief does not necessarily believe he or she is able to perform the actions thought to be productive. Teachers who believe external factors children bring to school (home environment, socioeconomic conditions, etc.) have negative effects on student achievement are



said to have lower GTE efficacy. The findings from the statistical analysis conducted demonstrated that there was no statistical relationship between GTE and fifth grade Virginia SOL math achievement. When a teacher displays strong general teaching efficacy, it makes an individual student no more or no less likely to achieve a higher or lower score on a 5th grade mathematics SOL achievement test. Tschannen-Moran and Barr (2004) conducted a study to determine whether a relation existed between teacher efficacy and achievement of middle school student in Virginia. The researchers found that there was a significant positive relationship between teachers' efficacy and student achievement as measured by Grade 8 Math, Writing, and English SOL tests (Tschannen-Moran & Barr, 2004). The Bruce et al. (2010) study on teacher efficacy found that there is an indirect but powerful relationship between increasing teacher efficacy and increasing student achievement (Bruce et al., 2010, p. 1607). Bruce et al. (2010) also theorized that teacher efficacy, mediated by contextual factors, impacted what teachers learned from the professional learning opportunity and how they learned. The Bruce et al. (2010) study illustrated that sustained professional learning programs that are collaborative and classroom-embedded support effective professional learning that leads to substantial student achievement gains and the related gains in teaching quality, but in this study teacher efficacy (personal, general, and total) was not a significant predictor of student achievement.

A limitation that had an impact on the results was no prior student achievement was accounted for in the regression. This made it difficult to measure the impact of PTE on overall student achievement with the SOL math score as the dependent variable. A student may have benefited from PTE and improved his/her math score, but the gain would not have shown with the overall math SOL score since there was no previous score to compare with in the dataset.

Another limitation was that class sizes were of mixed math ability, ranging from 11-24 students. Special education students tended to be in the lower sized inclusion classes and gifted and talented students tended to be in the larger classes.

Other limitations that could have factored into the findings were that teacher efficacy levels were based on self-report and the sample size was small limiting the generalizability of the results due to the focus of the study being on one Virginia school division.

In summary, this study indicated there was no relationship between teacher efficacies and 5<sup>th</sup> grade mathematics SOL scores. Teacher efficacies had no impact, above or beyond that explained by other variables, on student achievement on new Virginia mathematics SOL test

scores. Although statistical significance was not found for PTE, GTE, and TTE in relation to the three control variables, there was practical significance in the findings for school division leadership. As stated in the literature review, school division leadership could benefit from professional development on leadership qualities and teaching strategies that improve student achievement. Efficacy, through previous literature, has been significantly linked to educational leadership, effective instruction, and student achievement even though this study did not find significant relationships with teacher efficacies and student achievement.

**Finding two. The findings from the statistical analysis conducted demonstrated that there was a significant statistical relationship between class size and fifth grade Virginia SOL math achievement.** According to the analysis, increased class size was associated with higher math SOL scores. Basically, the analysis indicated that when there when there was a larger class size, higher 5th grade mathematic achievement was accomplished. Even though the class sizes were of mixed math abilities, the class sizes were not heterogeneously grouped and tended to have special education students in the smaller sized inclusion classes and gifted and talented students in the larger classes. The smallest class size was 11 students and the largest class size was 24 students. These factors need to be taken into consideration when reviewing this finding of the study. Previous research supported positive effects and academic gains when class size reduction programs in the primary grades are well-designed and properly implemented. However, other studies identified through literature searches found no convincing evidence linking reduced class size and increased student achievement. This might be a topic to consider for future research since many educators believe smaller class sizes will produce better student achievement. But, the stakes are high when undertaking these initiatives since debates continue about the ability of reduced class size to fuel student achievement, making it critical to approach the issue armed with credible research that helps inform decision-making. Research, for the most part, tends to support the belief in the benefits of small classes. While not all studies on the subject have shown that students learn more in smaller setting, most have linked smaller classes to improvements in achievement. Although, reducing class size has become a perennial education improvement strategy, often popular with teachers and parents for its ability to give teachers more individual instructional time with students, states and districts have struggled to keep smaller class sizes with tight budgets. More policymakers and researchers have begun to turn away from straight class-size reduction in favor of other methods to increase individual

instruction time, such as restructured class formats, co-teaching, and distance learning. The findings in this study support focusing on the ideal class size for student achievement. Even though increased class sizes had higher student achievement in this study, factors such as inclusion classes of special education students, gifted and talented students' classes, and mixed mathematical ability grouping, need to be examined to find out if these types of factors make an impact on the significant finding.

**Finding three. Teacher education had a significant relationship with 5th grade mathematic SOL scores. Teachers with bachelor's degrees had higher student achievement than teachers with master's degrees.** This suggested that teachers with a master's degree had a lower student achievement average than the teachers with bachelor's degrees. But, when a T-test was used to compare student achievement and teacher education, no statistically significance for the level of education was found. Given the small sample size and with the T-test approaching significance, practical significance was measured using Cohen's d. This result showed moderate to high effects for level of education on student achievement. As the demand for higher academic achievement and accountability in public education grows, it is important to determine whether teachers who hold advanced degrees such as a master's degree in education are more effective than those who have bachelor's degrees when trying to improve student achievement. Public elementary school administrators have an interest in hiring the best teachers for their schools, especially since Americans increasingly demand results and accountability for public education spending. As the findings of this analysis indicate, hiring teachers who hold master's degrees was less likely to result in higher 5<sup>th</sup> grade math achievement. The limitations need to be taken into consideration when reviewing this finding. With little statistical research available for evaluating which type of training and teaching degree has the best effect on student achievement, this may also be another topic to consider for future research.

**Finding Four. Teacher experience had no statistically significant impact on 5th grade mathematics SOL achievement.** Teachers averaged two years teaching experience to 28 years teaching experience in this study. Only one teacher with two years of teaching experience taught a class of 14 students with an SOL 5th grade mathematics average of 380, which was below the passing score of 400. This teacher only had a bachelor's degree. Seventeen out of the 21 teachers had five or more years of teaching experience. The limitations of the small sample

size, class size, and special education inclusion or gifted and talented class make-ups could have affected these findings.

## **Implications**

The results of this study suggest that no significant relationship exists between teacher efficacies and 5<sup>th</sup> grade mathematics SOL scores. The study suggested no statistically significant relationship, yet one has to consider the limitations of the study. This study has limitations that may have affected the validity of the findings. The study was done with one school division and had a small sample size (only 21 teachers) complete the survey. No previous student factors were included in the study, including prior achievement, which could have impacted the outcomes. Class sizes were of mixed math ability, ranging from 11-24 students. Special education students tended to be in the smaller inclusion classes and gifted and talented students tended to be included in the larger classes. With these limitations, the ability to form generalizations is limited.

Research has demonstrated that efficacy impacts student achievement (Aston & Webb, 1986). Even though the results of this study are not consistent with current theories and research in the field, teacher efficacies play an important part of student achievement. Teacher efficacy can act as a further mediator to support higher student achievement (Bruce et al., 2010).

**Implication one. School leaders may want to focus on professional development programs that are designed to improve teacher performance and quality based on teacher needs.** Even though this study did not find significance with teacher efficacies and 5<sup>th</sup> grade mathematics achievement, research suggests that efficacy is an integral part of teacher performance. Research demonstrates that teacher perceptions and beliefs matter in the context of student achievement (Ashton & Webb, 1986). When teachers believe they have the ability to enhance student success, no matter what the obstacle, they are more likely to improve instruction, learning, and student achievement. In this study, no significance was found with teacher efficacies and student achievement. Professional development may want to focus on the improvement of instructional strategies and student achievement with a focus on teacher efficacy for improving instructional strategies in the classrooms. Instead of looking at an overall 5<sup>th</sup> grade math SOL scores, prior student achievement should be considered when tracking student progress. By providing professional development, teachers can be guided and assisted in

improving instruction and learning in the classroom to enhance student achievement. Once a teacher believes in his/her ability to promote student success, professional development can incorporate multiple instructional strategies to provide the teachers with the skillsets to improve overall student achievement. Professional development programs should be linked to school and division goals and objectives that focus on improving student achievement. School leaders should also provide new teacher professional development stressing the value of effective instruction and student achievement. School administration needs to understand and promote the qualities of a strong effective teacher and provide support to enhance student achievement within their school and school division by examining the needs of the teachers.

It is important that time is taken to provide training for administrators and central office staff in the identification and enhancement of effective instruction to improve student achievement. In order to improve student achievement at the school level, administrators and central office staff need to understand the importance of effective instruction and learning, personal and general efficacy, so they can assist the schools in developing highly effective teachers willing to do whatever it takes to promote student success. The findings in this study demonstrated that teacher efficacies are not significant for student achievement in this division but teacher efficacies should be considered when developing professional development in improving the instruction and learning occurring in the classrooms. If the school leaders of this division want to increase student achievement, a focus on professional development of instructional strategies that include teacher efficacies to improve instruction is recommended.

**Implication two. School leaders should examine the significance of class sizes.** Class sizes in this study ranged from 11 students to 24 students, with higher scores in the larger class sizes. Factors such as special education inclusion classes (usually the smaller classes), classes with gifted and talented classes (larger in this division), and multi-ability grouping made up the structure of the classrooms. Typically, assignment of students to a given class was not random and was purposive. Characteristics of the students were not matched across classes. It is noted that a more ideal class size was closer to 24 students in this study. If teachers are trained properly with the skillsets to differentiate instruction and provide small group instruction, could the class sizes be larger and still successful? School leaders of this division should consider professional development that includes instructional strategies for working with larger class sizes. Teachers would need to be trained on classroom management, small group instruction, differentiation, and

include teacher personal efficacy in order to address the needs of the students in a larger class size. With the recent budget cuts, class sizes have increased, so it is important to provide teachers and schools with the professional development to address these larger class sizes. Teachers need to be equipped with the ability to adapt to the varying factors of the class size, so they can believe they are doing what is needed to make a difference and improve student achievement.

**Implication three. University leaders and/or school human resources personnel should examine the master's programs that are offered as a one year extension of a bachelor's program.** According to the findings of this study, teachers with master's degree had lower student achievement than teachers with bachelor's degrees. Are our college/university programs that do a combined bachelor's and master's degrees program providing adequate training for our teachers? Even though these teachers start their careers with master's degrees, they still may lack the teaching experience to provide instructional strategies that can help students be successful. Colleges and universities that promote this type of program might want to consider having teachers teach for 3-5 years with a bachelor's degree before they can attend a master's program. With more university teacher preparation programs providing new teachers with a master's degree, research is recommended to take into consideration on whether this method provides more effective teachers than teachers graduating with bachelor's degrees, gaining experience teaching, and later receiving a master's degree. Human Resource departments of school divisions could also consider this as an opportunity to understand if hiring a teacher with a master's degree is more or less beneficial than hiring a teacher with only a bachelor's degree. It should be noted that the limitations of this study factored into the findings. The teachers in the study that had master's degrees had at least five years teaching experience and taught three out of the four classes that had SOL averages below the passing 400 score. The other nine teachers with master's degrees had SOL averages above the passing 400 score. Based on changes in teacher preparation programs, more new, young teachers are beginning their teaching careers with a master's degree, so this investigation would also need to examine veteran teacher's degrees and differentiate between those who received a master's degree as part of original coursework and those that chose to pursue a master's degree after gaining experience teaching.

### **Recommendations for Future Research**

The study's findings create the following recommendations for research:

1. Conduct a similar study using SOL scores and previous student achievement SOL scores to discover if improvement was made instead of the average of the test scores.
2. Increase the study's sample size. Use multiple divisions and grade levels instead of just one school division and its 5<sup>th</sup> grade achievement. Possibly use existing data if available.
3. Incorporate school divisions with differing demographics.
4. Use a different teacher efficacy instrument to measure efficacy.
5. Because class size had a positive significance with student achievement, future research might want to examine the ideal class size role and its possible implications for student achievement. It should include the make-up factors of the class sizes (inclusion special education students, gifted and talented students, heterogeneous or homogenous, ability grouping, etc.).
6. Conduct a similar study using student achievement from elementary, middle, and high schools.
7. Because teacher education had teachers with bachelor's degrees having higher student achievement averages than those teachers with master's degrees with student achievement in this study, future research might want to examine the teacher preparation programs to see if new teachers graduating with master's degrees are more effective than teachers graduating with bachelor's degrees, gaining teaching experience, and later receiving a master's degree.
8. Examine the importance of efficacy with educational leaders.
9. Conduct a study that examines the relationship between efficacy and differentiated instruction.
10. Conduct a study on teacher education to see if a teacher with a master's degree has more of an impact on student achievement than a teacher with only a bachelor's degree.
11. Replicate this study with a recommendation of examining the make-up of the classes.

## **Reflections**

The findings of my study did not turn out the way I expected. I was satisfied that I chose teacher efficacy for my study. It is my belief that teachers who possess beliefs about their ability

to reach each and every child are the ones that make the biggest difference in student success. The study results were due to the nature of the study, in particular the limitations. Because only one school division's 5<sup>th</sup> grade teachers were surveyed (N =21), the population was small. Also, the use of an average 5<sup>th</sup> grade SOL scores, instead of comparing the score with a previous achievement score, did not give the results I expected. I still believe that teacher efficacy is an integral part of instruction and student achievement. A study of teacher efficacy, effective instruction, and student achievement might have given me the results I expected. If future research is done, it will be important to include the instructional aspect instead of just looking at teacher efficacy and student achievement. With regards to class size, I was surprised that increased class size had a positive relationship to student achievement. Although the limitations of a small sample, class size range from 11-24, mixed math ability grouping, and special education inclusion classes (smaller in size) and gifted and talented classes (larger in size) factored into the finding, I believe class size requires further research. Future research can examine this effect on class size on student achievement to determine the reliability and validity of this finding of my study. The examination of teacher's education should be further considered as well. With a larger sample size, I believe a validated study can be done to determine if there is a difference between a teacher receiving a master's degree in a five year combined bachelor's and master's program compared to gaining teaching experience and later attaining a master's degree.

Even though this experience has been challenging for me, it has been rewarding. I have benefited by broadening my knowledge of teacher efficacy. I believe that self-efficacy is an important part in education. Efficacy makes an impact on student success when administrators, teachers, and students possess strong self-efficacy beliefs. I am concluding my research study with questions that have made me curious on how answers of these questions will impact future education and future research.



## References

- Alveraz, M. E. & Frey, A. J. (2012). Promoting academic success through student engagement. *Children and Schools, 34*(1), 1-2. doi: 10.1093/cs/cdr005
- Anderson, D. W., Krajewski, H. T., Goffin, R. D., & Jackson, D. N. (2008). A leadership self-efficacy taxonomy and its relation to effective leadership. *The Leadership Quarterly, 19*, 595-608.
- Ashton, P. T., & Webb, R. B. (1986). *Making a difference: teachers' sense of efficacy and student achievement*. New York: Longman.
- Axelson, R. D., & Flick, A. (2011, January/February). Defining student engagement. *Change*. Retrieved from <http://www.changemag.org>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117-148.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Bandura, A. & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88*, 87-99.
- Borich, G. (1992). *Effective teaching methods* (2nd. Ed.), New York: Merrill.
- Bost, L. W., & Riccomini, P. J. (2006). Effective instruction. *Remedial and Special Education, 27*(5), 301-311.
- Bruce, C. A., Esmonde, I., Ross, J., Dookie, L., & Beatty, R. (2010). The effects of sustained classroom-embedded teacher professional learning on teacher efficacy and related student achievement. *Teacher and Teacher Education, 26*, 1598-1608.  
doi:10.1016/j.tate.2010.06.011
- Cantrell, P. (2003). Traditional vs. retrospective pretests for measuring science teaching efficacy beliefs in preservice teachers. *School Science and Mathematics, 103*(4), 177-185.
- Chen, G. (2007). *Understanding No Child Left Behind*. Retrieved from <http://www.publicschoolreview.com/articles/4>

- Cizek, G. J. (2005). High-stakes testing: Contexts, characteristics, critiques, and consequences. In R. P. Phelps (Ed.), *Defending Standardized Testing* (pp. 23-54). Mahwah, NJ: Erlbaum.
- Dai, D. Y. (2010). *The nature and nurture of giftedness. A new framework for understanding gifted education*. New York, NY: Teachers College Press.
- Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist, 38*(4), 207-234.
- Day, D. V. (2001) Leadership development: A review in context. *The Leadership Quarterly, 11*, 581-614.
- Dee, T. & Jacob, B. (2010). *Evaluating NCLB*. Retrieved from <http://educationnext.org/evaluating-nclb/>
- Dibapile, W. T. S. (2011). A literature Review on Teacher Efficacy and Classroom Management. *Journal of College Teaching and Learning, 9*(2), 79-92.
- Dixon, F. A., Yssel, N., McConnell, J. M., & Hardin, T. (2014). Differentiated instruction, professional development, and teacher efficacy. *Journal for the Education of the Gifted, 37*(2), 11-127.
- Dow, P. B. (1991). *Schoolhouse politics: Lessons from the Sputnik era*. Cambridge, MA: Harvard University Press.
- Ellis, E. S., Worthington, L., & Larkin, M. J. (1994). *Executive summary of research synthesis on effective teaching principles and the design of quality tools for educators* (Technical Report No. 6, University of Oregon, National Center to Improve the Tools of Educators). Retrieved from <http://idea.uoregon.edu/~ncite/documents/techrep/other.html>
- Erdem, E. & Demirel, O. (2007). Teacher self-efficacy belief. *Social Behavior and Personality, 35*(5), 573-586.
- Fancera, S. F. & Bliss, J. R. (2011). Instructional leadership influence on collective teacher efficacy to improve school improvement. *Leadership and Policy in Schools, 10*, 349-370. doi: 10.1080/15700763.2011.585537
- Fredricks, J.A., Blumefeld, P.B., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Education Research, 74*, 59-109. Retrieved from <http://rer.aera.net>

- Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*, 569-582.
- Goddard, R. G., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*, 479-508.
- Guskey, T. (1984). Staff development and the process of teacher change. *Educational Research, 15*(5), 41-47.
- Hall, T., Strangman, N., & Meyer, A. (2009). *Differentiated instructional strategies*. Thousand Oaks, CA: Corwin Press.
- Hannah, S. T., Avolio, B. J., Luthers, F., & Harms, P.D. (2008). Leadership efficacy: Review and future directions. *The Leadership Quarterly, 19*, 669-692.
- Hallinger, P., & Heck, R. H. (1996). Reassessing the principal's role in school effectiveness: A review of the empirical research. *Educational Administration Quarterly, 32*(1), 27-31.
- Harlen, W. & Deaking-Crick, R. (2002). A systematic review of the impact of summative assessment and tests on students' motivation for learning. In EPPI-Centre (Ed.), *Research evidence in education library* (1.1 ed., p. 153). London, England: Institute of Education Social Science Research Unit.
- Hiefetz, R. A. (2006). Educational leadership: Beyond a focus of instruction. *The Phi Delta Kappan, 87*(7), 512-513.
- Hoy, A. W. (2000) *Changes in teacher efficacy during the early years of teaching*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.
- Hoy, W. K., & Woolfolk, A. E. (1990). Socialization of student teachers. *American Educational Research Journal, 27*, 279-300.
- Jeck, D. C. (2009). *The relationship between levels of teacher efficacy and variability in instructional strategies* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Database. (UMI No. 343589)
- Jerald, C. D. (2007). *Believing and achieving (Issue Brief)*. Washington, DC: Center for Comprehensive School Reform and Improvement.
- National Commission on Excellence in Education (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Department of Education.

- Nebesniak, A. L., (2013). Effective instruction: A mathematics coach's perspective. *The Mathematics Teacher*, 106(5), 354-358.
- Osborne, E. (2005). Education reform as economic reform. *Cato Journal*, 25(2), 297-316.
- Phelps, R. P. (2005). The rich, robust research literature on testing's achievement benefits. In R.P. Phelps (Ed.), *Defending standardized testing* (pp. 55-90). Mahwah, NJ: Erlbaum.
- Protheroe, N. (2008, May/June). Teacher efficacy: What is it and does it matter? *Principal*, Retrieved from <http://www.naesp.org>
- Qureshi, M. A. & Niazi, H. K. (2012). Impact of effective teachers on students' academic achievements. *Journal of Educational Research*, 15(1), 30-38.
- Resnick, L. B. (1987). *Education and learning to think*. Washington, DC: National Academy Press.
- Ross, A., Cousins, J. B., & Gadalla, T. (1996). Within-teacher predictors of teacher efficacy. *Teacher and Teacher Education*, 4, 385-400. doi: 0742-051X (95)00046-1
- Schunk, D. H. (1989). Self-efficacy and achievement behaviors. *Educational Psychology Review*, 1(3), 173-208.
- Shaughnessy, M. F. (2004). An interview with Anita Woolfolk: The educational psychology of teacher efficacy. *Educational Psychology Review*, 16(2), 153-175.
- Shidler, L. (2008). The impact of time spent coaching for teacher efficacy on student achievement. *Early Childhood Education*. 36, 453-460. doi: 10.1007/s10643-008-0298-4
- Tomlinson, C. A. (2000). Reconcilable differences: Standards-based teaching and differentiation. *Educational Leadership*, 58(1), 6-11.
- Tomlinson, C. A. (2008). Differentiated instruction. In J. A. Plucker and C. M. Callahans (Eds.), *Critical issues and practices in gifted education: What the research says* (pp. 167-179). Waco, TX: Prufrock Press.
- Tomlinson, C. A., & Jarvis, J. (2009). Differentiation: Making curriculum work for all students through responsive planning and instruction. In J. S. Renzulli, E. J. Gubbins, K. S. McMillen, R. D. Eckert, & C. A. Little (Eds.), *Systems and models for developing programs for the gifted and talented* (pp. 599-628). Storrs, CT: Creative Learning Press.
- Tschannen-Moran, M., & Barr, M. (2004). Fostering student learning: the relationship of collective teacher efficacy and student achievement. *Leadership and Policy in Schools*, 3(3), 189-209. doi: 10.1080/15700760490503706

- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher-efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.
- Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248.
- U.S. Department of Education (DOE) (2002). *No Child Left Behind Act of 2001*. Retrieved from <http://www.ed.gov/nclb/overview/intro/execsumm.pdf>
- U.S. Government Accountability Office (GAO). (2009). *Student achievement: Schools use multiple strategies to help students meet academic standards/ especially schools with high proportions of low-income and minority students*. Retrieved from <http://www.gao.gov/products/GAO-10-18>
- VanTassel-Baska, J. (1997). Excellence as a standard for all education. *Roeper Review, 20*, 9-12.
- Versland, T. M. (2013). Principal Efficacy: Implications for rural “grow your own” leadership programs. *Rural Educator, 17*, 13-22.
- Virginia Department of Education (VDOE). (2013). *Accountability and Virginia Public Schools*. Retrieved from [http://www.doe.virginia.gov/statistics\\_reports](http://www.doe.virginia.gov/statistics_reports)
- Virginia Department of Education (VDOE). (2010). *What parents and students should know about the new Virginia Mathematics Standards of Learning*. Retrieved from [http://www.doe.virginia.gov/testing/sol/standards\\_docs/mathematics/parents\\_students\\_should\\_know.shtml](http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/parents_students_should_know.shtml)
- Wahlstrom, K., Seashore-Louis, K., Leithwood, K., & Anderson, S. (2010). *Learning from leadership: Investigating the links to improved student learning*. Minneapolis, MN: Center for Applied Research and Educational Improvement, The Wallace Foundation.
- Weiner, H. M. (2003). Effective inclusion: Professional development in the context of the classroom. *Teaching Exceptional Children, 35*(6), 12-18.
- William, D. (2010). Standardized testing and school accountability. *Educational Psychologist, 45*(2), 107-122. doi: 10.1080/00461521003703060
- Woolfolk, A. (1998) *Educational Psychology* (7<sup>th</sup> ed.). USA: Allyn and Bacon.
- Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*, 81-91.

Woolfolk Hoy, A., & Davis, H. (2005). Teachers' sense of efficacy and adolescent achievement. In T. Urdan & F. Pajares (Eds.), *Adolescence and education: Vol. 5 Self-efficacy beliefs during adolescences*, 117-137. Greenwich, CT: Information Age.

## Appendix A

### Gibson and Dembo Teacher Efficacy Survey

Directions: Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate numeral to the right of each statement.

1 = Strongly agree, 2 = Moderately agree, 3 = Disagree slightly more than agree, 4 = Agree slightly more than disagree, 5 = Moderately agree, 6 = Strongly agree

- |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1. When a student does better than usual, many times it is because I exerted a little extra effort.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. The hours in my class have little influence on students compared to the influence of their home environment.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. If parents comment to me that their child behaves much better at school than he/she does at home, it would probably be because I have some specific techniques of managing his/her behavior which they may lack. | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. The amount that a student can learn is directly and primarily related to family background.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. If a teacher has adequate skills and motivation, she/he can get through to the most difficult students.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. If students are not disciplined at home, they aren't likely to accept my discipline.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. I have enough training to deal with almost any learning problem.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. My teacher training program and/or experience has given me the necessary skills to be an effective teacher.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. Many teachers are stymied in their attempts to help students by lack of support from the community.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. Some students need to be placed in slower groups so they are not subjected to unrealistic expectations.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. Individual differences among students account for the wide variations in student achievement.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. When a student is having difficulty with an assignment, I am usually able to adjust it to his/her level.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. If one of my students cannot remain on task for a particular assignment, there is little that I could do to increase his/her attention until he/she is ready.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. When a student gets a better grade than he usually gets, it is usually because I found better ways of teaching that student.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. When I really try, I can get through to most difficult students.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. A teacher is very limited in what he/she can achieve because a student's home environment is a large influence on his/her achievement.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. Teachers are not a very powerful influence on student achievement.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 18. If students are particularly disruptive one day, I ask myself what I have been doing differently.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 19. When the grades of my students improve, it is usually because I have found more effective teaching approaches.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 20. If my principal suggested that I change some of my class curriculum, I would feel confident that I have the skills to implement the unfamiliar curriculum.  | 1 | 2 | 3 | 4 | 5 | 6 |

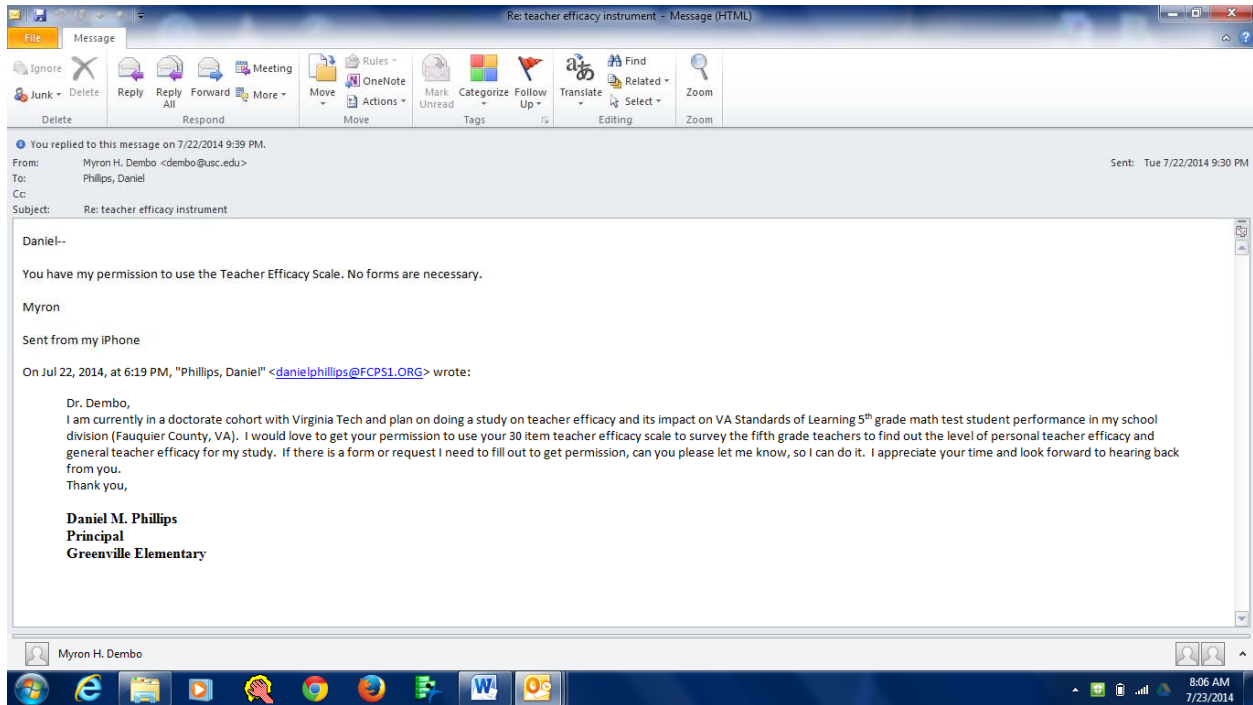
1 = Strongly agree, 2 = Moderately agree, 3 = Disagree slightly more than agree, 4 = Agree slightly more than disagree, 5 = Moderately agree, 6 = Strongly agree

21. If a student masters a new math concept quickly, this might be because I knew the necessary steps in teaching that concept.	1	2	3	4	5	6
22. Parent conferences can help a teacher judge how much to expect from student by giving the teacher an idea of the parents values toward education, discipline, etc.	1	2	3	4	5	6
23. If parents would do more with their children, I could do more.	1	2	3	4	5	6
24. If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson.	1	2	3	4	5	6
25. If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him quickly.	1	2	3	4	5	6
26. School rules and policies hinder my doing the job I was hired to do.	1	2	3	4	5	6
27. The influences of a student's home experiences can be overcome by good teaching.	1	2	3	4	5	6
28. When a child progresses after being placed in a slower group, it is usually because the teacher has had a chance to give him/her extra attention.	1	2	3	4	5	6
29. If one of my students could not do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty.	1	2	3	4	5	6
30. Even a teacher with good teaching abilities may not reach many students.	1	2	3	4	5	6



## Appendix B

### Permission to use Gibson and Dembo Teacher Efficacy Survey



## Appendix C

### IRB Approval Letter



Office of Research Compliance  
Institutional Review Board  
North End Center, Suite 4120, Virginia Tech  
300 Turner Street NW  
Blacksburg, Virginia 24061  
540/231-4606 Fax 540/231-0959  
email [irb@vt.edu](mailto:irb@vt.edu)  
website <http://www.irb.vt.edu>

#### MEMORANDUM

**DATE:** September 22, 2014  
**TO:** Ted S Price, Daniel Michael Phillips  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)  
**PROTOCOL TITLE:** The Relationship between Teacher Efficacy Levels and Virginia Standards of Learning Fifth Grade Math Achievement in One Virginia School Division  
**IRB NUMBER:** 14-877

Effective September 19, 2014, the Virginia Tech Institutional Review Board (IRB) Chair, David M Moore, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

#### PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 5,7**  
Protocol Approval Date: **September 19, 2014**  
Protocol Expiration Date: **September 18, 2015**  
Continuing Review Due Date\*: **September 4, 2015**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

#### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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## Appendix D

### Superintendent Study Approval



## Fauquier County Public Schools

David C. Jeck, Ed.D., Division Superintendent  
320 Hospital Drive, Suite 40  
Warrenton, VA 20186-3037  
(540) 422-7000-phone  
(540) 422-7059-fax  
[djeck@fcps1.org](mailto:djeck@fcps1.org)

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Sept. 9, 2014

Daniel M. Phillips  
Greenville Elementary Principal  
Fauquier County Schools  
Fauquier, VA 20181

Dear Mr. Phillips,

I am happy to approve your request to access 5<sup>th</sup> grade teacher efficacy, teacher education, teacher experience, and other related data collected from Fauquier County School Division. I understand the data will be collected through an email survey and through the Assistant Superintendent of Instruction. It is understood that you are accessing this data for analytical purposes related to your dissertation study and all data will remain confidential.

Best wishes as you pursue this important work. Please do not hesitate to contact me if you have any additional requests.

Sincerely,

A handwritten signature in black ink, appearing to read "David C. Jeck".

Dr. David C. Jeck  
Division Superintendent