4-7-2014

Exploring the Relationship between Professional Development and Student Achievement

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EXPLORING THE RELATIONSHIP BETWEEN PROFESSIONAL DEVELOPMENT AND STUDENT ACHIEVEMENT

by

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A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

Major: Instruction and Curriculum Leadership

The University of Memphis

May 2014

Dedication

I can do all things through Christ which strengtheneth me. Philippians 4:13

- To God, first I want to thank you for saving me and loving me enough to let your son (Jesus) die for my sins (John 3:16). Thank you, Heavenly Father, for giving me the strength, faith, courage, and ability to persevere through tears, sleepless nights, frustration, and uncertainty in completing this dissertation. Lord, you have blessed me to be the first in my family to receive a doctorate degree and I am truly thankful!
- To my husband, Curtis Jackson, you have always been there to support and encourage me while I sought to achieve each milestone of obtaining my college degrees. We will be married 24 years on March 22, 2014 and I thank God for giving me a godly husband and father that is loving, kind, dedicated, and committed to not only his family but to God's word too. I thank you for praying for me, listening to me, comforting me, and that shoulder to cry on when this research study got tough. I will always love you Curtis!
- To my two daughters, Kristin and Taylor, the joy of my life. Children are truly a gift from God and I thank him for giving me two of the most beautiful, loving and caring girls in the world! I thank you both for always encouraging and telling me on separate occasions, "Momma, I'm so proud of you." I have always prayed and asked God to make me the mother and role model he would have me to be so that you two would be enriched by His word. I pray my journey will encourage you both to see the importance of a good education and instill in you to attain as much education as you can. Now that you two girls are reaching young adulthood,

remember to always keep God first in all that you do! Always remember our family verse: But seek ye first the kingdom of God, and his righteousness; and all these things shall be added unto you (Matthew 6:33). I will always love you, Kristin and Taylor!

- To my parents, Maxine and James Jones, it was your unity in marriage that gave me life. I thank God for blessing me with two loving parents. Mom, it is because of you, that I am a Christian mother to my two girls. I thank you for making sure I attended church, Sunday school, and bible study on a regular basis. You allowed God to lead, guide and direct your life and in turn, followed the same path in raising Lindsey and I. You have always believed that I could achieve any goal I set to accomplish. You tell me every day how proud you are of me! I will always love you, Mom! Dad, I thank you for your love and support as I began to reach adulthood. You will always have a special place in my heart. I will always love you, Dad!
- I also want to dedicate this to the other special people in my life, my brother, Lindsey Jones, my late grandmother, Blanche Harris, my grandmother, Frances Jones and my mother-in-law, Annie Jackson and father-in-law, Cornelius Jackson for your love, support, and encouraging words.

Acknowledgements

The road to success in completing my doctoral degree was not an easy task. I want to thank those who worked diligently with me as I stumbled, but managed to keep my balance while walking this road. I give special thanks to my dissertation committee: Dr. Celia Rousseau Anderson, Committee Chair, Dr. Ebenezer George, Dr. Cathy Meredith, and Dr. Angiline Powell. It was God who touched your hearts in making this milestone happen. It was an honor working with you all!

- A special extension of my gratitude goes to Dr. Celia Rousseau Anderson. Your guidance, direction, knowledge of research, and productive feedback was enriching and it taught me a lot! I appreciate all the time and interest you dedicated to the development and completion of my research. Although you may not know, you taught me how to use my struggles and frustrations as a way to persevere through the many challenges I faced then and will continue to face in the future. I appreciate all that you did to help me achieve this goal and that is from the bottom of my heart!
- I would also like to extend my sincere gratitude to Dr. Ebenezer George. Words cannot express how grateful I am to you for agreeing to be on my dissertation committee. I want to thank you again for agreeing to become my statistician when I had no one else to turn to. Throughout this research, you equipped me with the necessary tools I needed to accomplish the goal of this quantitative study. Thank your for being the missing “key” that unlocked the door for the completion and success of my research study.

- I would also like to extend my sincere gratitude to Dr. Cathy Meredith. I started my educational journey with you years ago in the Pathways program. As my professor and great mathematician, you inspired me to reach for the stars and never give up! I am so glad I took your advice and you were able to see the final results. I will forever be grateful to you for your encouraging words and believing in me.
- I would also like to extend my sincere gratitude to Dr. Angiline Powell. I thank you for assisting me with the first phase of my dissertation study. I appreciate your guidance in advising me in making those difficult academic decisions. Your expertise in urban mathematics is phenomenal! I will always be grateful to you for helping me through the beginning of this challenging, learning, and rewarding experience.
- I want to further extend special thanks to my spiritual leaders. Pastor Richmond Savage and Pastor Calvin Whitlock, I thank God for the both of you, your spiritual guidance and your spiritual leadership. The both of you have been a blessing to my family! I am thankful to God for the "good" sound doctrine, based on God's word (the bible) that you both have given me. As a result, I have grown in my faith, knowledge, and understanding of God's word! I appreciate and am so thankful that you two allow God to lead, guide, and direct your paths in delivering the word to his people (Proverbs 3: 5-6). Neither of you ever believed in "sugar coating", "watering", or "taking away" from God's word. I thank you both for allowing only "the truth" to be the foundation for the preaching and teaching of God's word.

- Lastly, I want to thank and acknowledge the following people for being role models, mentors or just special people who have impacted this journey of success: Donna Bohannon, Dr. Beverly Cross, Bonnie Cummings, Marvin Kendrick, Rev. Albert Okunade, Shelby Tate, and Myra Whitney. I thank you all for your encouragement and support!

Abstract

Jackson, Tamora LaShawn. Ed.D. The University of Memphis. May 2014. Exploring the Relationship between Professional Development and Student Achievement. Major Professor: Dr. Celia Rousseau Anderson

The purpose of this research was to explore the relationship between professional development and student achievement by addressing three major standards of professional learning: content, process, and context. This study included 276 teachers from 28 middle schools. Data from this study was gathered using the Standards Assessment Inventory (SAI) survey instrument designed by the Southwest Educational Development Laboratory (SEDL) and publicly available achievement data from the Tennessee Comprehensive Assessment Program (TCAP), a criterion-referenced achievement test. The Standards Assessment Inventory (SAI) was used to examine teachers' perceptions of professional development at the school level.

The overall purpose of this study was to collect, analyze, and use existing data to answer the following research question: *Based on the National Staff Development Council (NSDC) professional learning standards, is there a positive correlation between teachers' perception of professional development at a school-based level and student achievement?*

The following sub-questions guided this research:

(1) Is there a relationship between the "context" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(2) Is there a relationship between the "process" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(3) Is there a relationship between the "content" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

Data for this research was analyzed using statistical computational methods. The results from the data analysis determined that there were several positive significant relationships between the National Staff Development Council standards of professional learning and student achievement.

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Chapter 1: Introduction

The quality of teacher professional development and its impact on student achievement continues to be a major concern that is expressed at all levels (Kronley & Handley, 2001). It is clear that, in order to meet the demand of teacher accountability, professional development should be structured so that it addresses the needs of teachers in order to improve the learning of all students (Guskey & Sparks, 1996; NSDC, 2001; NCLB, 2001; U.S. Department of Education, 1996). However, what is the ideal structure for professional development? How can schools design, structure, and organize meaningful and beneficial professional development that addresses teachers' accountability with respect to student achievement?

Background

Professional development is not new in the field of education. In fact, several evolutions of the types of professional development have taken place over time. It has evolved from an initial focus on teachers' classroom management skills to a present focus specifically on increasing student achievement (Smith, Hofer, Gillespie, Solomon, & Rowe, 2003). Based on the existing research, the timeline reflecting the change of professional development extends over a period of 30 years. During this period, the focus of professional development was based on four major themes: teacher behavior, school improvement, student achievement, and teacher quality. *Teacher behavior* was the primary focus of professional development during the 1960s and 70s. At that time, there was a need to help teachers adopt and change their behavior and attitude towards new advances in education (Andrews & Anfara, 2003). However, as time progressed, the focus shifted to *school improvement* during the 1980s due to the need for school reform

(Smith et al., 2003). Yet again, a change of direction took place during the early 1990s that aimed at increasing *student achievement*, possibly due to the increased accountability for teachers (Elmore, 2002). More recently, during the late 1990s, the focus of professional development made a final shift towards *teacher quality* as a key indicator of the impact it has on student achievement.

Research Problem

Statewide accountability has placed increased pressure on schools and districts to provide targeted professional development for teachers that will possibly improve student achievement (Huffman & Thomas, 2003). However, the link between professional development and student achievement has been difficult to clearly establish. Research studies regarding the impact professional development has on student achievement have been limited for two reasons. First, it is difficult and expensive to study professional development. Second, the link between professional development and student achievement makes the research more complex to conduct (Huffman & Thomas, 2003).

The majority of research conducted on professional development has focused on instructional practices, teachers' knowledge, beliefs, and attitudes, as well as other variables that may be indirectly linked to student achievement (Loucks-Horsley & Matsumoto, 1999). Similar research conducted by Guskey and Sparks (1996) examined professional development based on teacher knowledge and practices, administrator knowledge and practices, and parent knowledge and practices, which are all variables that have an indirect impact on student achievement. Although these variables are still important, more research is needed that examines the direct relationship between professional development and student achievement (Huffman & Thomas, 2003).

Although the connection between professional development and student achievement has not been clearly established, authors have posited the nature of professional development that would be considered high quality and likely to impact student achievement. For example, Guskey and Sparks (1996) and the National Staff Development Council (2008) suggested that the quality of professional development is related to the context, process, and content of professional development. They further implied that more research needs to be done to explore the quality of professional development, teachers' professional development experiences, and the impact it has on student achievement.

Additionally, research involving the quality of professional development and the impact it has on student achievement continues to be more descriptive in nature (Sawchuk, 2010). For that reason, it is imperative that more quantitative correlational studies be conducted to determine if a relationship exists between quality professional development and student achievement on the middle school level. Therefore, research on the relationship between quality professional development and student learning might help improve and lead to student achievement.

Purpose of the Study

The purpose of this research is to explore the relationship between professional development and student achievement addressing three major standards of professional learning: content, process, and context. Drawing from the frameworks of the NSDC (2008) and Guskey and Sparks (1996), a combined conceptual framework which focuses on these three dimensions and provides the foundation for exploring what teachers perceive about their professional development experiences and the relationship between

these perceptions and student achievement has been created. The three main themes that support the quality of professional development are expanded and structured in the following ways: (1) context (the *who*, *when*, *where*, and *why* of professional learning as it pertains to learning communities, leadership, and resources); (2) process (the *how* of professional learning as it pertains to whether it is data-driven and research-based as well as the approaches to evaluation, design, learning and collaboration); and (3) content (the *what* of professional learning as it pertains to equity, quality teaching and family involvement).

The goal of this study is to better understand the relationship between professional development and student achievement. The outcome of this study will be beneficial as a way of meeting the professional needs of teachers due to the accountability of having to show academic improvement for all students. Furthermore, this study will give insight and provide an opportunity for school districts, universities, public agencies, and many organizations to enhance or measure professional learning as an effective tool to increase student achievement.

Research Questions

Specifically, the overall purpose of this study is to collect, analyze, and use existing data to answer the following research question: *Based on the National Staff Development Council (NSDC) professional learning standards, is there a positive correlation between teachers' perception of professional development at a school-based level and student achievement?*

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The Definition of Professional Development

Professional development, commonly referred to as staff development or in-service training, is "any activity or process intended to change any combination of teachers' beliefs, attitudes, knowledge and classroom practices" (Clarke, 1991, p.1). Sowder (2007) focuses on the outcomes of professional development, offering an image of professional development as "a marked change in teachers' knowledge, beliefs, and instructional strategies" (p. 161). Focusing attention on the inputs, Guskey (2000) defines professional development as "those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might in turn, improve the learning of students" (p. 16). Speck and Knipe (2005) define professional development as "a sustained collaborative learning process that systematically nourishes the growth of teachers, through an adult learning – job embedded process with a focus on the development of teachers' skill and in-depth knowledge for improving student

achievement" (p. 15). Although these definitions differ somewhat in their focus, the general themes involve change in teacher knowledge, beliefs, and practices that are intended to lead to improved student achievement.

For the purpose of this study, the definition of professional development used is that of the National Staff Development Council (2008): "a comprehensive, sustained, and intensive approach to improving teachers' and principals' effectiveness in raising student achievement" (p. 1). Additionally, the NSDC standards outline the context, process, and content of professional development which "improves the learning of all students" (NSDC, 2008, p. 1). This definition of professional development and the associated standards provided by NSDC form the framework used in this study to understand the impact of professional development.

Chapter Summary

This chapter addressed information that is pertinent for developing this study. Information regarding the state of quality professional development in addition to existing research was presented to offer more insight and a better understanding. The current state of quality professional development was discussed with the focus presently on increasing student academic achievement and teacher quality. The foundation for this study is based on the lack of research conducted on quality professional development and student achievement. The need for additional research in this area is further established through a review of the literature in Chapter 2.

Chapter 2: Literature Review

The purpose of this chapter is to present a literature review that discusses current and relevant information surrounding quality professional development that builds communities of learning conducive to student growth. Therefore, a distinction between business-as-usual and quality professional development must be established (National Comprehensive Center for Teacher Quality, 2011). In other words, the business-as-usual approach pertains to the traditional in-service professional development such as continuing education classes or obtaining an advanced degree for licensure. On the other hand, quality professional development pertains to meeting the needs of teachers and students. The National Staff Development Council (2008), as well as authors Guskey and Sparks (1996), suggests that there are three main components needed to build a high quality professional development model: *context*, *process*, and *content*. These three components serve as the foundation of the conceptual framework used for this study and will be used to frame this review. Specifically, the chapter begins by first outlining these components and the research associated with them. The researcher then provides a brief overview of research relating professional development with student growth, including studies that have explored this relationship using measures of the NSDC framework.

Conceptual Framework

For some time now, districts and schools have made crucial efforts to refine, assess, and measure effective professional development. One ongoing educational policy question seeks to find answers as to whether invested resources put into quality professional development influence improvements in student learning. One framework for assessing the quality of professional development involves consideration of the

context, *process*, and *content* of professional development. Adopted by both Guskey and Sparks (1996) and NSDC (2008), the components of context, process, and content are viewed as the primary links to improving student learning. Given the primacy of these factors in both models, the conceptual framework for this study will include the three components shared by both Guskey and Sparks (1996) and the NSDC (2008).

The model outlined by Guskey and Sparks (1996) can be a possible starting point for schools to utilize in order to enhance the quality of professional development and improve student learning. Specifically, it provides a framework for staff development that improves the learning of all students (Guskey & Sparks, 1996; NSDC, 2008). Similarly, the framework outlined by the NSDC (2008) is also intended to provide a model for effective professional development. In both models, the two central components consist of the quality of professional development and student learning outcomes. In essence, the factors in the models not only affect the relationship between professional development and improvements in student learning, but they also fall within a school's sphere of influence.

Guskey and Sparks (1996) characterize the *context* standards as the "who", "when", "where", and "why" of professional development. This includes the organization, system or culture in which the professional development takes place. Similarly, NSDC (2008) *context* standards focus on the need for professional learning communities, leadership support, and the use of available resources. The *process* standards characterized by Guskey and Sparks (1996), also known as the "how" of professional development, focus on the planning, organization, and follow-up to the activities teachers engage in during professional development. Likewise, NSDC (2008)

process standards address the use of data, evaluation, and research along with lesson design, teacher learning and collaboration. Finally, the *content* standards characterized by Guskey and Sparks (1996), also known as the "what" of professional development, pertain to the conception of new knowledge, skills, and an in-depth understanding of specific pedagogical knowledge and content of subject matter, equal opportunity for all students, and engaging families in supporting student achievement (Guskey & Sparks, 1996). Similarly, the *content* standards for NSDC (2008) describe staff development that promotes equity in education, quality teaching, and family involvement. According to Guskey and Sparks (1996) and NSDC (2008), it is important for professional development to consist of all three components. These authors suggest that if any one of these components is missing, there is little to no chance that improvement of student learning will occur (Guskey & Sparks, 1996; NSDC, 2008). Figure 1 represents a visual model of the relationship between quality professional development and student learning based on the combined frameworks of Guskey and Sparks (1996) and NSDC (2008).

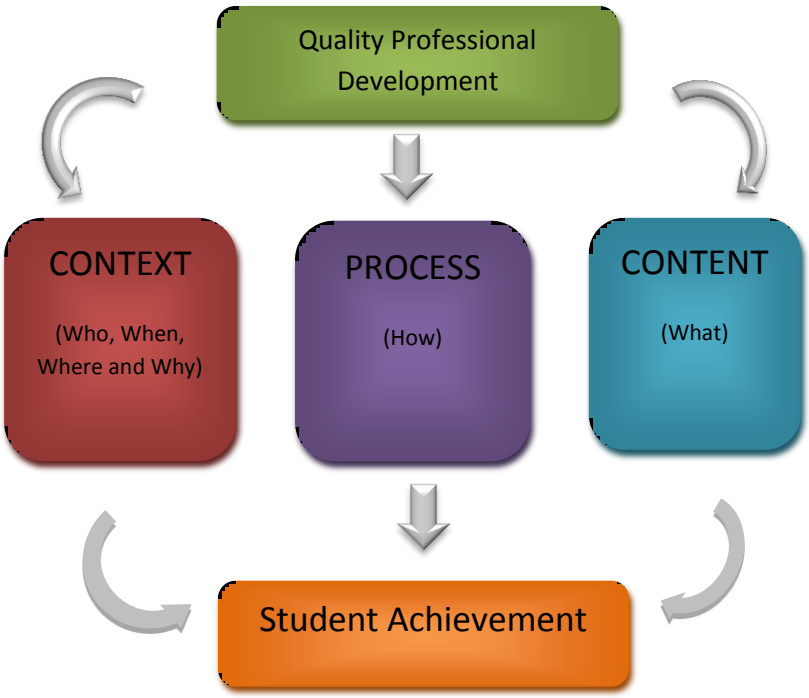

Figure 1. Model combining professional development frameworks of Guskey and Sparks (1996) and NSDC (2008) modified by Tamora Jackson.

Standards for Quality Professional Development

Professional development for teachers has sometimes been characterized as: "one-shot" workshops; "drive-by" workshops; "one day does it"; "one-size-fits-all"; and "same topic-different speaker". So then, what is quality professional development? According to Carpenter, Fennema, Frank, Levi, and Empson (2000), the key factor in improving student academic achievement is the quality professional development provided to educators. According to the National Comprehensive Center for Teacher Quality (2011), to be considered quality, professional development must be delivered in a way that yields direct impact on teacher practice. In order to influence student achievement, the teacher practice designated for change must clearly relate to student learning so that professional development will result in more students learning the content at *higher* levels (p. 3).

Furthermore, there has been a call for educational polices and laws to provide or define the key characteristics that give meaning to quality professional development. For example, quality professional development is one of the goals established by the federal mandate of No Child Left Behind (NCLB). According to the NCLB Act (2001), professional development should be based on activities that impact teacher learning and student achievement. Similarly, a call for reform and quality professional development for teachers is included in the Goals 2000: Educate America Act (2000). These are but two of the many policies highlighting the importance of quality teacher professional development.

Key characteristics of quality professional development have been proposed, embraced, and developed by several researchers, the state, and federal government (Goals 2000: Educate America Act, 2000; Guskey & Sparks, 1996; NCLB, 2001; NSDC, 2001; U.S. Department of Education, 1996; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). According to these sources, quality professional development consists of the following characteristics: (1) activities and strategies that are scientifically research-based; (2) instructional and teaching strategies aligned with improving student academic achievement; (3) strategies that increase the knowledge and teaching skills of teachers; (4) content that is aligned with the curriculum and goals of the school district; (5) instruction on how to involve all stakeholders, such as the teachers, administration, district, community, and parents in ways to improve student achievement; (6) instruction on the use of data and assessments to guide classroom instruction and practice; (7) on-going professional development with follow-up and feedback provided to teachers; and

(8) a community of learners in which collaboration is among teachers of the same subject or grade-level.

One response to these calls for increased quality in professional development has involved the development of standards. The National Staff Development Council (NSDC) represents one group involved in the standards movement in professional development. NSDC is a private, nonprofit organization committed to aligning quality professional development standards to support teachers' and students' learning (NSDC, 2001). The standards were revised in 2001 to the 12 that are presently in place and will be used throughout this review as a framework for the study. Developing effective policies at all three government levels (federal, state, & local) to obtain quality professional development and improved student learning is the main focus for NSDC (2008). The NSDC standards for staff development are categorized into three major themes: *context*, *process*, and *content*. All three themes have a combined total of 12 sub-standards for teachers to engage in quality professional learning that can ultimately improve student learning (NSDC, 2001). The research surrounding each component of the model will be described in the following sections.

Characteristics of Context Standards

The context characteristics focus on the "who, when, where, and why" of professional development that address learning communities, leadership, and resources. It includes the organization, system, and culture of location in which the professional development takes place where teachers, school and district leaders are organized into learning communities with common goals aligned with the school and district (Guskey & Sparks, 1996; NSDC, 2001). In addition, the area of resources which focus on time,

funding, and materials, can aid in continuous instructional improvement for teacher learning in order to have a direct impact on student growth. Generally speaking, the context standards emphasize the need for continuous support, participation, and collaboration among the administrators, teachers, district leaders, and support staff in order to improve the quality of teacher and student learning.

Research indicates that the context in which professional development operates has a significant impact on the outcome of its success (Kronley & Handley, 2001). It further suggests that the context of quality professional development is only effective if it entails a mutual agreement between all parties involved (Harwell, 2003). For this reason, the setting or context of the professional development relies heavily on the support of the principals, school and district leaders (McLaughlin & Marsh, 1978). In other words, there must be a mutual understanding of a need for change to occur that exists between both teachers and the administration in order for a productive outcome to take place. Figure 2 summarizes the *context* characteristics of quality professional development.

Figure 2. Summary of the Context Characteristics of Quality Professional Development (NSDC, 2001).

Learning Communities

According to Dufour, Dufour, Eaker, and Many (2006), learning communities can have a profound impact on improving student learning coupled with job embedded learning for teachers. NSDC (2001) states that, "staff development that improves the learning of all students organizes adults into learning communities whose goals are aligned with those of the school and district" (p. 1). Research suggests that the success of teachers depends heavily on their engagement in a professional community in which teachers have an opportunity to examine new materials, explore how learning takes place, and discuss what is learned and strategies for teaching (McLaughlin & Talbert, 1993; Putnam & Borko, 2000). For example, in a study involving learning community practices, Hill (2007) concluded that teachers are likely to make better use of the schools or district's instructional goals or curriculum to improve student learning if their

professional development is linked to those same goals. In other words, as suggested by other researchers, learning communities should operate with a shared vision to actively engage their members in what is important for improving daily performance to reach the school and district goals for student achievement (Hord, 1997; NSDC, 2001). For example in a study involving learning communities, Garet, Porter, Desimone, Birman and Yoon (2001) indicated that K–12 teachers gained more knowledge and changed practices more often when there was a match between school or district standards and goals. Therefore, according to a study conducted by Elmore (2002), it is important for teachers to engage in professional development that supports student achievement and the curriculum, instruction, and assessment practices of the school and district. Furthermore, the establishment of learning communities cannot be accomplished in a single meeting, but is an ongoing process which schools and districts can use as a venue for focusing on student learning (Fullan, 1993). According to Newmann and Wehlage (1995), this ongoing process can not only enhance but increase student achievement through a shared purpose of standards and goals between educators and school districts. While schools and districts may be still pondering the importance of learning communities that are job embedded, Reeves (2005) concluded that they have the potential of becoming an essential element of quality professional development. Lastly, other researchers have concluded that learning communities can be a powerful form of quality professional development that provides structure and opportunities for meaningful learning for teachers as a way to increase student achievement (Kepner, 2008; NSDC, 2001).

Leadership

Leadership has been identified as one of the necessary ingredients for professional development to translate into improved student achievement (Roy & Hord, 2003). According to NSDC (2001), "staff development that improves the learning of all students requires skillful school and district leaders who guide continuous instructional improvement" (p. 2). Research suggests that school leadership plays an important role in preparing teachers for change by creating a positive culture that lets teachers' attitudes change naturally when they see how and whether a new practice helps improve student achievement (NSDC, 2001; Sparks, 1995; Taylor, Pearson, Peterson, & Rodriguez, 2005). For example, in a study on effective urban schools, Mendez-Morse (1992) found that successful schools rely heavily on a skilled principal whose primary goal is to improve teaching and learning through allowing teachers more autonomy in decision making and professional needs. Likewise, in a study of elementary school leadership, Sebring and Bryk (2000) found three common elements among the principals of productive schools: developing the skills and knowledge of teachers, strengthening parental and community involvement, and promoting a school-based community of professional learners.

These findings reflect a shift in the role of the principal. According to Elmore (2000), school leadership no longer holds the primary responsibility of budgeting, organizing, and managing disruptive behaviors within their school. Instead, they must be able to coach, teach, and develop the teachers in their school by having a more in-depth knowledge of the curriculum, instruction, and assessment of student progress in order to raise student achievement. Lastly, Shapiro and Laine (2005) conclude from their study

that, according to teachers, ongoing professional development combined with supportive school leadership was excellent motivation for wanting to enhance their quality of teaching.

Resources

Available resources also shape the context of professional development. "Staff development that improves the learning of all students requires resources to support adult learning and collaboration" (NSDC, 2001, p. 3). Research suggests that, despite the costs, professional learning for teachers acts as an essential long-term investment in successfully teaching all students to high standards (Guskey & Sparks, 1996; NSDC, 2001; Vaden-Kiernan, Jones, & McCann, 2009). For example, Odden, Goetz, and Picus (2008) constructed an evidence-based model that outlines the necessary resources that support teachers' engagement in professional development. The model suggests the need for coaches to provide follow-up training from professional development, summer training for more in-depth learning, and additional expenses to cover trainers, conferences or travel. Thus, "given the importance of professional development to student achievement and the link between improving teacher learning and professional development, the greater investment is likely to lead to greater levels of student achievement" (Archibald, Coggshall, Croft, & Goe, 2011, p. 27).

Research further suggests that time allocated for professional learning is another significant investment. For example, in a study involving the duration of professional development conducted by Yoon, Duncan, Lee, Scarloss, and Shapley (2007), they found professional development with a duration of 30 to 100 hours was more likely to have a positive impact on student achievement. Specifically, Yoon et al. reviewed nine studies

of professional development and found a positive link between the contact hours and duration of professional development and student achievement. In four of the studies, the contact hours ranged from 5 to 10 hours with duration of 2 months to 1 year. For example, an Integrated Mathematics Assessment program described by Saxe, Gearhart, and Nasir (2001) provided about 60 hours of professional development over a 6-month period, while McCutchen and colleagues (2002) provided about 100 hours over a 10-month period. Carpenter, Fennema, Peterson, Chiang, and Loef (1989) provided 83 hours of professional development over a 4-month period, while Cole (1992) provided more than 40 hours over the span of a year. The research findings showed that professional development had a positive and significant effect on student achievement when the professional development lasted more than 14 hours. In contrast, there was no significant effect on student achievement in the remaining five studies that provided less than 14 hours of professional development. Although this study does not provide confirmation that longer duration of professional development yields increased student achievement, evidence from other research gives us reason to believe that the longer teachers are given the opportunity to engage in instructional and teaching strategies and implement them in their classroom with feedback, the higher the chance of increasing student performance (Garet et al., 2001). For example, other researchers have concluded that consistent effects are found when teachers receive at least 50 hours of professional development (Banilower, Boyd, Pasley, & Weiss, 2006). These findings on the importance of time provide some evidence of the significance of resources in the professional development process.

Characteristics of Process Standards

The process characteristics focus on the "how" of professional development that is data-driven, evaluated, research-based, properly designed, incorporates human learning and change, and involves collaboration (Guskey & Sparks, 1996; NSDC, 2001). According to NSDC (2001), the design of professional development should be based on research-documented practices that improve student learning and teacher effectiveness (Joyce & Showers, 2002; Marzano, Pickering, & Pollock, 2001). According to research from multiple studies, the process of professional development should: (a) provide opportunities that will allow teachers to construct their own content and pedagogical knowledge; (b) be based on research that will engage adults in learning experiences they will use in their classrooms; (c) allow teachers opportunities to improve their practices by collaborating with other colleagues; and (d) include a design that is data driven and based on student learning, that will include continuous evaluation and improvement (Fernandez, 2003; Joyce & Showers, 2002; Poglinco et al., 2003; Reeves, 2004; Seagall, 2004; Sparks & Hirsch, 2000; Wheelan, 2005). Furthermore, according to NSDC and others, in order for professional development to be successful under the process standards, it is crucial that all of these components be addressed and carefully planned (Darling-Hammond & Sykes, 1999; Guskey & Sparks, 1996; NSDC, 2001).

Figure 3. Summary of the Process Characteristics of Quality Professional Development (NSDC, 2001).

Data-Driven

State mandated standardized tests have been the primary tool used for accountability purposes to determine if schools are meeting federal requirements for student improvement (Hayes & Robnolt, 2007). Due to recent changes in accountability and testing policies, educators now have access to an overwhelming amount of student-level data. So then, how can teachers make good use of this abundance of data? To address this question, NSDC (2001) firmly states "staff development that improves the learning of all students uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement" (NSDC, 2001). Research suggests that teachers need to engage in professional development that consists of analyzing data and setting instructional goals based on that data to improve student

learning (Schmoker, 2002). For example, Sanborn (2002) conducted a study in an Iowa school district that triggered the school and district leaders to focus on professional development embedded in data-driven evidence. Based on findings from the study, only 30% of the students scored proficient or advanced on a state administered standardized test. Due to the disappointing results, the teachers developed an action plan and engaged in professional development that was designed to assist them in using disaggregated student data to identify and address problem areas discovered from the data. After the students were tested again a year later, 80% of them scored at the proficient or advanced level. According to Sanborn (2002), many of those teachers developed a passion and drive to analyze data that will assist them in data-driven instruction and improved student achievement.

Similar results were found in a study conducted by Hayes and Robnolt (2007) based on data-driven professional development of a two-year literacy grant provided by the Reading Excellence Act (REA). Initially, in the first year of the study, the professional development for the teachers focused on assessment-driven instruction. Subsequently, the second year professional development for the teachers was based on analyzing disaggregated student achievement data on kindergarten through fourth grade students. As a result of the findings during the first year of the REA grant, 47% of the third grade students met passing standards, while 65% met the passing standards in the second year of the grant.

As research suggests, using data to determine student progress can be an effective way to monitor continuous improvement and personalize instruction to the needs of all students (Halverson, Grigg, Prichett, & Thomas, 2007). For example, Nichols and Singer

(2000) along with Schmoker (2002), concluded that in order to identify and target the specific needs of students, school leaders must make sure professional development is embedded in disaggregating existing student achievement data. Similarly, Walpoe and McKenna (2004) also concluded that teachers need to be provided the opportunity to review and analyze student achievement test data so that they can recognize and address instructional needs in order to improve academic achievement for all students. In fact, Darling-Hammond and Sykes (1999) and Schmoker (2002) found that having ongoing discussions about student achievement data will help teachers in choosing the appropriate teaching and instructional strategies as well as provide an avenue of determining its effectiveness by connecting their professional development to student learning. Thus, research suggests that data-driven professional development can assist schools and district leaders in their efforts of providing their teachers with ways to assess student learning and growth to determine which students are making progress towards benchmarks and goals via quality professional development (Hayes & Robnolt, 2007; Knapp, Swinnerton, Copland, & Monpas-Huber, 2006).

Evaluation

According to NSDC (2001), improving the role of evaluation in professional development will provide a plethora of resources that can assist in properly implementing the process standards. NSDC (2001) suggests, "staff development that improves the learning of all students, uses multiple sources of information to guide improvement and demonstrate its impact" (p. 5). Moreover, a good evaluation requires planning, excellent questioning techniques and a basic understanding of how to find valid answers (Guskey, 2000; NSDC, 2001). According to research, in order to improve student learning, the

evaluation process must expand beyond the initial collection of data on participants' reactions (Guskey, 2000; NSDC, 2001). In other words, the evaluation design should include additional sources for gathering information such as teachers' acquisition of new knowledge and skills, how the learning affects teaching, how the changes in teaching practices affect student learning and how staff development affects school culture and other organizational structures (Guskey, 2000; NSDC, 2001). Furthermore, research suggests that if the design of the professional development is relatively intense and the duration promotes substantial changes for the teachers, it is possible to measure the impact of professional development on student learning from the evaluation following the professional development (Killion, 2002).

Killion (2002) outlined one process for developing an effective evaluation of professional development: (1) assess evaluability (strengths, worth, goals, objectives) of the professional development program to determine its likelihood of producing the intended results; (2) formulate evaluation questions that focus on the programs' goals and objectives; (3) construct a framework on collecting the evidence (from what, whom, how and where) and how to analyze the evidence; (4) use the collected data to answer evaluation questions; (5) organize and analyze data in multiple formats; (6) with the help of all stakeholders, interpret the data to make sense of it, draw conclusions, assign meaning and formulate recommendations; (7) report findings and make recommendations according to the needs of multiple audiences; and (8) evaluate the evaluation by identifying the strengths and weaknesses of the professional development programs (Killion, 2002). This process is intended to ensure that the evaluation of professional

development provides information about the impact of the professional development as well as insight into opportunities for improvement.

Research-Based

According to research findings, research-based professional development programs for teachers are more likely to produce effects on student learning (Shavelson & Towne, 2002). NSDC (2001) states, "staff development that improves the learning of all students prepares educators to apply research to decision making" (p. 6). Research suggests that teachers need specific instruction on both theory and strategies; teachers need to see how those strategies were used; and teachers need to practice using those strategies themselves (Loucks-Horsley, Hewson, Love, & Stiles, 1998; Quick, Holtzman, & Chaney, 2009).

In conjunction with NSDC (2001), to address the need for improving the preparation of teachers, current research on policies at the national, state, and local levels have strongly encouraged schools and districts to design their professional development programs based on research evidence (Council of Chief State School Officers, 2008). For example, the NCLB Act (2001) states that professional development activities must advance teacher understanding of effective instructional strategies that are based on scientifically based research. Thus, it is desirable and highly recommended that teachers as well as administrators are knowledgeable of educational research when choosing the process and content of professional development (NSDC, 2001).

In addition, according to Spark's (2001) adult learning theory, teachers must have a conceptual understanding of the research-based strategy, skill, or concept that is presented during professional development. Likewise, not only must schools and school districts base the content of professional development programs on sound research, but

good adult learning theory must be applied to the delivery of that content as well (American Federation of Teachers, Council of Chief State School Officers, National Education Association, & National Staff Development Council, 2010). With that being said, only the ideas, strategies, and tasks that are supported by scientific research and proven to improve student achievement should be included in the content of professional development (Armbuster & Osborne, 2001).

Research points to the positive impact of professional development that is research-based. For example, a study conducted by Mouza (2009) found that research-based professional development not only changed how and what teachers understood about different strategies but the way they used those same strategies in the classroom. Likewise, as concluded by Borko (2004) and Hill, Schilling, and Ball (2004), research-based professional development that is focused on the specific knowledge teachers' need for student learning is the key to quality professional development.

Design

NSDC (2001) specifically states, "staff development that improves the learning of all students uses learning strategies appropriate to the intended goal" (p. 7). Therefore, according to NSDC (2001), professional development leaders and planners must be aware of and skillful in selecting appropriate adult learning strategies to achieve the intended outcome of the training and understand the prior knowledge and experience of the participants. For example, prior research has suggested that a well-designed extended summer institute with follow-up sessions throughout the school year will deepen teachers' content knowledge and is more effective, than a workshop held for two hours after school (Carpenter et al., 1989; NSDC, 2001). A study founded by Garet et al., 2001

suggests that professional development activities of a longer duration provide teachers with more opportunities for active learning, a longer period to gain more in-depth knowledge of their content area, and more opportunities to link their learning with other experiences.

Additionally, the use of technology provides possibilities for enhancing the design of professional development (Lefevre, 2004). Research suggests that the use of videos in professional development enables teachers to see what quality teaching and classroom practices should look like (Lefever, 2004). For example, Borko, Jacobs, Eiteljorg, and Pittman (2008) conducted a study of teachers reviewing videos of themselves teaching. After an extensive study, the researchers concluded that the "teachers were able to engage in reflective conversations about the videos and that those conversations became richer and more extensive overtime" (p. 2). Furthermore, it allowed the teachers to see and address the need for changes in areas that impacted student learning (Borko et al., 2008). However, when using video clips for professional development, caution should be taken to ensure the material selected specifically address the goals of the program (Brophy, 2004). In summary, the design of professional development should be embedded with activities that are carefully planned to scaffold teachers' progress toward the main goals that are set forth to increase student achievement (Seidel et al., 2005).

Learning

When teachers are afforded the opportunity to engage in professional development to learn new strategies for teaching to rigorous standards, they report changes of their teaching and classroom practices (Alexander, Heaviside, & Farris, 1999). Therefore, according to research, it is important that the learning methods teachers employed in

professional development are similar to what teachers are expected to use in their classrooms with their students (NSDC, 2001). As stated by NSDC (2001), "staff development that improves the learning of all students applies knowledge about human learning and change" (p. 8). Research suggests that adult learning is most successful when it takes place in a collaborative setting, creating an environment for teachers to share similar experiences; brainstorm and problem solve (Brockett, 2006). For example, in a study involving professional development based on adult learning, Oji (1980) found that teachers want to discuss, practice, problem solve, and get feedback on new skills learned from their colleagues. In addition, the study revealed that teachers want to engage in learning experiences they could immediately practice in their classrooms. As a result of these interactive conversations, teachers were able to reflect, grow and adapt throughout their teaching careers (as cited in Trotter, 2006, p. 12).

Additional research suggests that regardless of how the professional development is designed, it will not be effective unless it is grounded in sound theories of learning, particularly adult learning (Knapp, 2004; Knight, 2002; Mewborn, 2003). For example, in a meta-analysis study involving adult learning, findings revealed six significant characteristics associated with student achievement and teacher professional development. The following six characteristics were: (a) gaining new knowledge; (b) demonstration and modeling; (c) practicing; (d) evaluation; (e) reflection; and (f) mastery (Dunst & Trivette, 2009). In summary, quality professional development approaches teacher learning in a manner similar to the way teachers are intended to approach student learning – with consideration of the ways that learners learn best.

Collaboration

According to NSDC (2001), it is essential that professional learning focused on helping teachers work together successfully in a group setting within schools and districts be given a high priority. For this reason, NSDC (2001) suggest that, "staff development that improves the learning of all students provides educators with the knowledge and skills to collaborate" (p. 9). Research suggests that when educators interact with each other in a community setting and participate through discourse, it deepens their conceptual understanding of solving complex problems of teaching and learning (Cobb, 1994; Lave & Wenger, 1991; NSDC, 2001). For example, in a 5-year qualitative study involving 25 schools that included 44 teachers in high performing schools and 11 teachers in average performing schools, Langer (2000) concluded that professional development contributes to high performance when it focuses on groups of teachers within schools, especially where school culture supports the professional learning of the teachers. In another study, Linek, Fleener, Fazio, Raine, and Klakamp (2003) revealed findings from a 5-year study on teacher collaboration from 36 in-service and 60 pre-service teachers. The study showed an increase in student achievement which indicated that programs focused on collaborative groups and student learning were an effective component of professional development. Goddard, Goddard, and Taschannen-Moran (2007) conducted a study from a large urban school district on the impact teacher collaboration improvement practices had on student achievement in reading and math. The study involved 452 teachers in 47 elementary schools serving 2,536 fourth graders. The researchers found that a positive relationship existed between teacher collaboration and student achievement.

The importance of collaboration is further supported by evidence from a longitudinal study of middle school science teachers conducted by Johnson, Kahle, and Fargo (2007) that involved determining the relationship between teacher participation in whole-school sustained, collaborative professional development and student achievement in science. Results indicated that students of teachers participating in whole-school sustained, collaborative professional development showed significant gains in science scores over students in schools without this type of professional development. In summary, according to Olson, Butler, and Olson (1991), when teachers are given the opportunity to interact with their colleagues, they gain the knowledge and skills on how to collaborate by sharing and agreeing on how to effectively use teaching and instructional strategies.

Characteristics of Content Standards

The content characteristics address the "what" of professional development. It brings attention to equity, the quality of teaching, and family involvement (Guskey & Sparks, 1996; NSDC, 2001). According to Joyce and Showers (2002), in order for professional development to be effective, the curriculum and instructional strategies must have a high impact on a student's ability to learn, as well as how and what they learn based on a number of factors. Therefore, the content of professional development should focus on several areas. Those areas include things such as teachers' knowledge of subject matter, classroom practices, and relevant situations associated with the planned professional development. Succinctly put, professional development should focus mainly on tasks and experiences that are proven and would ultimately have a positive impact on

student achievement (Harwell, 2003). Figure 4 summarizes the *content* characteristics of quality professional development.

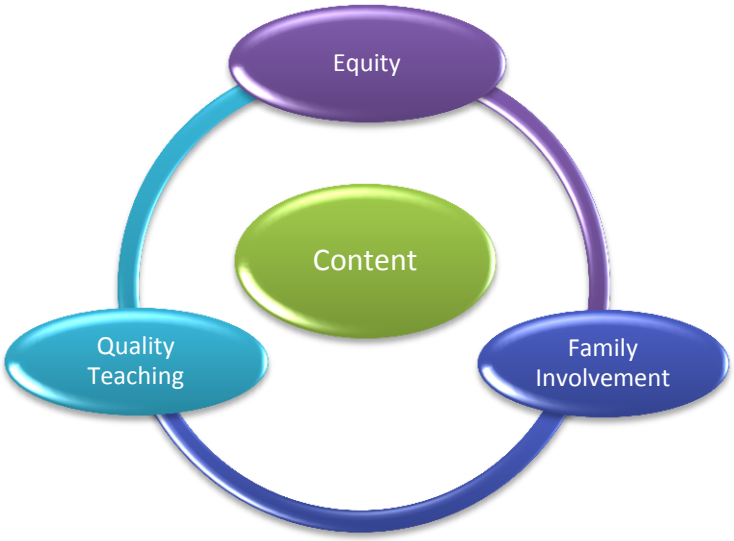

Figure 4. Summary of the Content Characteristics of Quality Professional Development (NSDC, 2001).

Equity

Based on research, quality professional development affords teachers the opportunity to learn about the cultural backgrounds of their students and gain an appreciation of how diversity in the classroom is beneficial for not only interpersonal and social development, but academic success as well (NSDC, 2001). According to NSDC (2001), "staff development that improves the learning of students prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement" (p. 10). However, according to research, teachers must be willing to adopt and apply principles of multicultural education in their classroom practices (Borman & Kimball, 2005).

The term *educational equity* holds a variety of meanings accompanied by several viewpoints on its definition. However, one of the primary definitions of educational equity focuses on student academic achievement. Research suggests that this type of equity in the classroom ensures that students are expected to make appropriate academic growth each year (Kennedy, 1998). According to Sanders and Rivers (1998), although the rate of academic growth is a function of the effectiveness of schools and districts, research concludes that the most important role is played by teachers. For example, according to a study conducted by Rowan, Correnti, and Miller (2002), achievement inequality for students is not a product of student learning; rather it is a result of teacher effectiveness. Other researchers have reached similar conclusions, noting that when teachers create a learning environment that is well structured in which all students are held to high expectations, improved student learning takes place (Klem & Connell, 2004). According to Klem and Connell (2004) and Geiger (2007), a positive relationship is established when the teachers show their students they care and take pride in their learning.

Research has shown that a structured and disciplined learning environment is associated with student academic achievement (OECD, 2009). However, when teachers lack this skill, students suffer, resulting in poor student performance (Marzano, Marzano, & Pickering, 2003). Therefore, as indicated by research, a learning environment embedded in effective instructional and teaching strategies promotes increased student achievement and equity (DiMartino & Miles, 2004). In further support of this notion, Jennings, Snowberg, Coccia, and Greenberg (2011) point to the role of professional development as an intervention to improve teachers' ability to maintain a structured

learning environment that promotes optimal instructional support for their students. Thus, attention to equity in achievement and the learning environment is one important focus of the content of professional development.

Quality Teaching

Improving the quality of teaching to improve student academic achievement has become the main agenda of our nation's educational policy (Wilson et al., 2008). NSDC (2001) states, "staff development that improves the learning of all students deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately" (p. 11). Research suggests that professional development embedded in raising student achievement not only deepens teachers' conceptual understanding of specific subject content, but also provides them with a rich knowledge of how to teach it (Cohen & Hill, 2000). Specifically, two of the most important professional development features for enhancing teacher knowledge and self- reported changes in classroom practices focus on content knowledge and student learning (Garet et al., 2001; Yoon et al., 2007). For example, in a study involving professional learning and what teachers need to learn, researchers found that teachers' content knowledge is crucial and provides a more in-depth understanding for teachers as the main ingredient for effective teaching (Clermont, Krajcik, & Borko, 1993; Grossman, 1990). Similarly, in a study based on data from the Eisenhower Professional Development Program, Garet et al. (2001), identified key features of quality professional development and examined how they affected teacher practices. The study indicated that three core features of professional development have a significant impact on teachers'

knowledge, skills, and practices. Content knowledge was one of the three primary features.

However, research also suggests that the precise approach to promoting quality teaching through professional development may not yet be fully understood. For example, professional development programs studied by Carpenter et al. (1989), Saxe et al. (2001) and McCutchen et al. (2002) that focused on deepening teachers' content knowledge, how students learn, and how to assess student learning revealed mixed findings. Both Carpenter et al. (1989) and McCutchen et al. (2002) showed positive effects on student achievement. Mixed effects (positive and negative) were found by Saxe et al. (2001). One part of the study showed a statistically significant effect on student achievement; whereas, the other part revealed a negative and not statistically significant effect on student achievement.

Despite the inconclusive results on the precise approach to focusing on quality teaching in professional development, the importance of teachers' knowledge of content and teaching seems well established. Consequently, after years of working to establish rigorous student achievement standards, educational policies have gone into effect to bring awareness to quality teaching and its role in professional development (American Federation of Teachers, Council of Chief State School Officers, National Education Association, & National Staff Development Council, 2010).

Family Involvement

According to NSDC (2001) and Guskey and Sparks (1996), the content of quality professional development must focus not only on developing skills in instruction but also on ways to more effectively involve families. Moles (1993), asserts that developing a

partnership between the school, the home, and the community requires knowledge and skills. Likewise, according to NSDC (2001), "staff development that improves the learning of all students provides educators with knowledge and skills to involve families and other stakeholders appropriately" (p. 12). Furthermore, research suggests that when teachers are skilled at involving families and the community in a child's education, they can help promote a positive learning environment as a result of positive influences on family practices at home, parent and student attitudes towards school, and student academic achievement (Sanders & Epstein, 2005). For example, in a study involving 27 elementary teachers participating in a professional development program on family involvement, teachers discovered how family values and commitments towards education contributed to their child's education and school environment. As a result, teachers were able to devise a plan of events for parents that involved their child's school life, school environment, and academic achievement (Reali & Tancredi, 2004).

Research suggests that educators must be skillful in creating a bond with the family that supports student learning between the home and school (Cooper, Jackson, Nye, & Lindsey, 2001). For example, in a study involving teachers who did and did not participate in a parental involvement program conducted by Groff and Knorr (2010), findings revealed that teachers who participated in the program showed a stronger commitment to sharing power and involving parents as partners in their child's education than those teachers who did not receive training. A study conducted by Cooper et al., 2001 suggests that home and school relationships provide parents with information they need to support their child's learning and success, express to parents the importance of education to teachers and students, and lay the foundation for increasing family

involvement. Similarly, Bouffard and Stephen (2007) found that it is important for educators to be sensitive to the cultural and contextual factors unique to their school, students and their families, and surrounding communities.

In addition, NSDC (2001) asserts that when educators have an understanding of their students' cultural background and family challenges, they are more likely able to communicate clearly, have respect for the family values, and demonstrate a genuine interest of the welfare of both the student and their family (NSDC, 2001). Therefore, preparing teachers and offering them continuing professional development on effective family engagement practices can have an enormous influence on how they feel about engaging and working with families, and what they do as practicing educators (Katz & Bauch, 1999).

Additional Studies of Professional Development and Student Achievement

In the preceding sections, the conceptual framework and the characteristics of quality professional development included in this framework have been outlined. Several studies of the relationship between quality professional development and student achievement were included in the preceding review. However, because a primary goal of this study is to examine this relationship in greater detail, I devote additional space in this section to a brief overview of the empirical research on professional development and student achievement.

Despite the multitude of studies on professional development, the relationship between professional development and student achievement is not entirely clear. Several studies have demonstrated a positive effect in one or more subjects. For example, Cole (1992) tested the effects professional development had on student achievement in math,

reading and language arts using the Mississippi Teacher Assessment Instrument. Specifically, the study focused on organizing instruction to address individual differences among learners, and gathering and using information about the needs and progress of individual learners. Although all three subjects had positive effects, only math and reading showed a statistically significant effect on student achievement. However, the results for language arts were not significant. Hasty (2010) conducted a study on quality professional development and the effect it had on fourth grade scores from a state standardized test called the Assessment of Skills and Knowledge (ASK) in science, mathematics, and language arts. The design of the study included a pre-test and post-test control group of two cohorts of fourth grade students that were taught by teachers that did and did not engage in quality professional development. Results of the study found that quality professional development had a positive impact on the ASK scores.

Yet, other studies (some of which have been previously described in earlier sections of this chapter) do not demonstrate a positive effect. For instance, Kennedy (1998) conducted a meta-analysis on 93 studies regarding the effect professional development had on student achievement. Only 12 of the studies showed that professional development positively impacted student achievement.

Other meta-analyses have limited their scope only to studies with particular designs. For example, Yoon et al. (2007) reviewed over 1,300 studies of professional development. Those studies measured student achievement from standardized assessments in the following content areas: reading and language arts, mathematics, and science. However, after examining these studies, researchers determined that only nine possessed the characteristics for potentially addressing the effect professional

development had on student achievement and met the standards of credibility set forth by the What Works Clearinghouse (Yoon et al., 2007). Those characteristics included standardized assessments of achievement as well as researcher-developed measures of students' knowledge (Yoon et al., 2007). The credibility status of each study is based on the following evidence criteria: (a) strong evidence (meets evidence standards); (b) weaker evidence (meets evidence standards with reservations); and (c) insufficient evidence (does not meet evidence standards). Randomized controlled trials (RCTs) are considered research studies that provide strong evidence; whereas, quasi-experimental (QED) designs only meet standards with reservations. Of the nine studies considered by the authors to meet the target criteria, all nine showed a positive relationship between professional development and improvements in student achievement. Notably, the primary focus of these studies was on elementary schools. Thus, while many studies of professional development report increased student achievement, very few studies meet the higher criteria for quantitative research in order to draw conclusions about causality.

SAI Related Studies on Professional Development and Student Achievement

In addition to the more general studies of the relationship between professional development and student achievement, other research has explored the association between professional development standards and student achievement. Specifically, NSDC (2001) has explored measuring tools to provide evidence on how quality professional development increases the odds that schools will meet high-stakes student achievement goals. After investing time and effort in examining a variety of measuring tools on how the quality of professional development affects student achievement, NSDC (2001) decided to invest in developing an instrument to assess the alignment of a school's

professional development with the NSDC standards. The Standards Assessment Inventory (SAI) was developed by Southwest Educational Development Laboratory (2003) for the National Staff Development Council (NSDC) and grounded in their professional learning standards. The SAI is a 60-item survey taken by teachers and used to assess the quality of professional development at the school level as a way to improve teachers' professional development that will, in turn, have a positive and sustained effect on student achievement (Vaden-Kiernan et al., 2009).

SEDL (2008) conducted a study on the tested school-level SAI score in relation to student achievement in reading and language arts on Georgia's Criterion Referenced Competency Test (CRCT) using exploratory factor analysis from 429 Georgia elementary schools. Findings from the study showed the average score on the total SAI was a positive predictor of grades 1-5 student achievement. Specifically, the emerging factors from the study showed high quality development "process" and "equity" as having significantly positive relationships with student achievement in reading and language arts. The nature of the factor structure indicates that the SAI mostly captures one large factor – high quality professional development (SEDL, 2008). Furthermore, the analysis found support for the importance of teacher-reported experience of professional development, as measured by the school level average on the SAI, as a contributor to student achievement.

SEDL (2008) also replicated the Georgia study with four districts in Alabama. SAI data was collected on 103 schools; and academic achievement data was obtained from the school district and state that was available to the public. Like the Georgia results, the average scores on the total SAI were positive predictors of grades 3-5 reading student

achievement. The overall findings were promising and provided researchers and teachers with confidence that the SAI measure, when aggregated as a total sum school-level variable, is a reliable and valid instrument that has demonstrated significant associations with student achievement (Vaden-Kiernan et al., 2009). Thus, these results provide some indication that professional development aligned with the NSDC standards (as self-reported by teachers) is positively associated with student achievement.

Chapter Summary

In this chapter, the components of the conceptual framework and the associated research base involving quality professional development have been described. The conceptual framework, which is based on the NSDC (2001) standards and the work of Guskey and Sparks (1996), focuses on three broad categories: context, process, and content. These broad categories are further broken down into twelve sub-categories. According to Guskey and Sparks and NSDC, in order for quality professional development to be effective and increase student achievement, the program must embrace all three components and all 12 sub-components. This assertion is critical to the dissertation study, as it forms the basis of the question to be explored in this research.

The literature has been used in three ways in this chapter. First, the literature was explored to understand the role of context, process, and content. Specifically, the research related to each of the sub-components to acknowledge how these features of professional development have been demonstrated to contribute to teacher learning and student achievement was examined. This review confirmed the importance of these factors and the strength of the conceptual framework used to understand quality professional development.

Second, a broader view of the relationship between professional development and student achievement was taken, seeking to understand the status of research on this issue. This review of the research helped me to recognize that, while there is significant research on the relationship between professional development and student achievement, the picture is not entirely clear. Thus, there is a need for additional research on this topic.

Finally, I focused on research specifically related to the NSDC framework. The examination of the research on the SAI informed not only my understanding of the potential connection between the framework components and student achievement. It also provided validation of the significance of the Standards Assessment Inventory (SAI) survey. In summary, this literature review not only helped me to understand the purpose and significance of my study, but, most importantly, it guided the development of my research design, research questions, and the instruments used to collect data.

Chapter 3: Methodology

The purpose of this study was to explore the relationship between professional development standards and student achievement based on National Staff Development Council's three major standards of professional learning: context, process, and content, which are all based on staff development that improves the learning of all students (NSDC, 2008). The context standards are based on the following notions: (a) *learning communities*; (b) l*eadership*; and (c) *resources* (NSDC, 2008). The process standards focus on the following characteristics of professional development: (a) *data-driven professional development*; (b) *evaluation*; (c) *research-based professional development*; (d) *design*; (e) *learning;* and (f) *collaboration* (NSDC, 2008). The content standards address: (a) *equity*; (b) *quality*; and (c) *family involvement* (NSDC, 2008). The characteristics of each standard are described in greater detail in the previous chapter. However, the three larger standards and the 12 sub-standards provide the framework of the investigation to be conducted in this study.

For the purpose of this study, the researcher utilized a quantitative approach. A quantitative approach uses numerical data collected in the form of surveys, scores, scales, or ratings from samples of the general population (Garwood, 2006). Additionally, quantitative research tends to be associated with the realist epistemology. That is to say, real things do exist, can be measured, and have meaningful numerical values assigned as an outcome measure (Garwood, 2006).

Quantitative research is grounded in scientific investigations that include experiments or other systematic methods using quantified measures of performance (Proctor & Capaldi, 2006). These measurements and statistics are the heart of quantitative

research that connects the relationship between empirical observations and mathematical models (Hoy, 2010). In this study, quantitative research was used to explore relationships between an independent variable (teachers' perception of professional development) and a dependent variable (student achievement).

Research Design

This study explored the correlation between student achievement scores in grades 6-8 and teachers' responses on the SAI (Standard Assessment Inventory) scales (total and subscales). A correlational design is an important form of educational research for exploring the nature of the relations between a collection of variables by recognizing trends and patterns in the data (Lomax, 2007). The correlational approach examines variables that already exist and determines if or to what degree a relationship exists between two or more of those variables (Gay, 1996; Lomax, 2007). Correlational research is not causal research. Therefore, it is important to note that a cause and effect relationship is never established and not the intention of this study.

Research Questions

The following sub-questions guided this research:

(1) Is there a relationship between the "context" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(2) Is there a relationship between the "process" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(3) Is there a relationship between the "content" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

Context of Study – School District

This study was conducted in a large K-12 school district located in West Tennessee. The district is comprised of approximately 107,314 students, 7,104 teachers, 95 elementary schools, 38 middle schools, and 41 high schools. The schools are located throughout the district in suburban and urban regions. Student population is 86% African American, 7% White, 5% Hispanic, 1% Asian, and 1% Native American with 69% of the students receiving free or reduced lunch. The average daily attending (ADA) expenditure is about $10,000/student with 44% from local funding, 15% from federal funding, and 41% from state funding. The average student-teacher ratio in this school district is 17:1; whereas, the average student per classroom ratio is 25:1. Approximately 39% of the teachers have a bachelor's degree, 55% have a master's degree, 4% have an education specialist's degree, and 2% have a doctoral degree. The average teacher salary is $46,000 and ranges from $38,000 to $60,000 (Tennessee Department of Education, 2013).

Participants

The target population for this study included 28 selected middle schools. For the purpose of this study, only middle schools that serve grades 6-8 were used. As a result, the sample for the Standards Assessment Inventory (SAI) teacher survey consisted of 276 teachers. The 28 middle schools ranged in size from 105 students to 1,131 students with an average school population of 645. Additionally, the student population of the 28

schools was predominantly African American. The percentage of African American enrollment in the sample schools ranged from 90.7% to 100% with an average of 99.2%.

Data Collection

This study was based on previously collected data. The data accessed for this study included the results of the SAI survey and the school-level results of the Tennessee Comprehensive Assessment Program (TCAP) test. The results of the survey were collected by NSDC and provided to the school district. The researcher was given a login key by the school district's professional development director to access the data for the 2008 school year. Student achievement data from the 2008 TCAP, which is public information, was retrieved from the Tennessee Department of Education website.

Tennessee Comprehensive Assessment Program (TCAP) Achievement Test

The TCAP is a criterion-referenced test given to students in grades 3-8 in the spring of each school year. The TCAP test uses multiple choice questions that are intended to provide a measure of knowledge and application skills in reading, language arts, science and mathematics. The TCAP Achievement test results are public data accessible via the Tennessee Department of Education website; therefore, granted permission was not needed to use the data in this study.

The publicly available achievement data provided information on the percentage of students who fall within the three levels of proficiency in math and reading achievement on the TCAP. Students' overall scores are aggregated to the school level by three achievement levels: below proficient, proficient, and advanced. For the purpose of this study, the combined percentage of scores at the proficient and advanced levels was treated as the outcome variable of interest.

Standards Assessment Inventory (SAI)

The SAI was the teacher survey instrument used in this study. In 2003, the instrument was designed by SEDL researchers so schools could determine if alignment with NSDC standards was related to positive student achievement (NSDC, 2008). The survey consists of 60 questions categorized around three themes and 12 standards (see Table 1): *context* (learning communities, leadership, resources); *process* (data-driven, evaluation, research-based, design, learning, collaboration); and *content* (equity, quality teaching, family involvement). Each question was designed using a 5-point Likert Scale ranging from Never (0 points), Seldom (1 point), Sometimes (2 points), Frequently (3 points) to Always (4 points). All questions are positively worded so that a "4" (Always) represents the optimal response.

The Standards Assessment Inventory (SAI) survey asks teachers to reflect on their perception of the implementation of the NSDC professional learning standards in their schools. The survey is strictly confidential and voluntary. Participants are sent an email invitation to complete the survey using a specific login token. To further ensure anonymity, a username and password are established by the participant. It takes approximately 20 minutes to complete the survey, however, if the participant chooses not to complete the survey in one sitting, they may save their results and return to the survey at a later time to complete within the time frame given. All respondents in this study were full-time teachers holding transitional, apprentice, and/or professional licenses through the Tennessee Department of Education. Permission to use the existing SAI teacher responses was requested and granted via email from the Professional Development Coordinator of the studied school district.

Validity and Reliability

The validity and reliability of the SAI has been previously established. The content validity was determined through expert advice on the instrument's clarity and relevance to the characteristics of each of the standards and the teachers' experiences. The criterion-rated validity was supported by experts and indicated that teachers' ratings of their school's professional development program alignment with NSDC standards were comparable in rating to their school (SEDL, 2003). Construct validity was determined through a factor analysis conducted in 429 Georgia elementary schools during the Spring of 2006. The factor analysis revealed high quality professional development (process) and school level factors (leadership and equity) that were relevant to the study and worth further exploration (SEDL, 2003).

The predictive validity was tested in relation to student achievement in reading and language arts on Georgia's Criterion-Referenced Competency Test (CRCT). The CRCT is designed to measure how well students acquire the skills and knowledge according to Georgia's standards and curriculum (SEDL, 2003). The results of the correlation analysis revealed the importance of teacher-reported experience of professional development measured by the school level average, as an important correlate to student achievement (SEDL, 2003). The various testing of the validity of the SAI provide confidence in the effectiveness and use of the instrument for this study. The stratification of each question number grouped by standard and the standard category is displayed in Table 1.

Table 1

Stratification of Each Question Number Grouped by Standard and Standard Category

CONTEXT		
Learning Communities	Leadership	Resources
9	1	2
29	10	11
32	18	19
34	45	35
56	48	49
PROCESS		
Data-Driven	Evaluation	Research-Based
12	3	4
26	13	14
39	20	21
46	30	36
50	51	41
Design	Learning	Collaboration
15	5	6
22	16	23
38	27	28
52	42	43
57	53	58
CONTENT		
Equity	Quality Teaching	Family Involvement
24	7	8
33	17	31
37	25	40
44	54	47
59	60	55

The reliability of the instrument was determined using the Cronbach's alpha. Cronbach's alphas for overall instrument reliability (see Table 2) were consistent and high across all three pilot studies ($\alpha = .98$). Reliability estimates for all 12 standards (see

Table 3) ranged from good to strong (α = .71 to .85). Overall, the reliability from the pilot studies revealed consistency in the SAI survey.

Table 2

Overall SAI Instrument Reliability

A	Items	Cases
.98	60	297

Table 3

Overall SAI Sub-scale Reliability

Standard	α
Learning communities	.79
Leadership	.85
Resources	.71
Data Driven	.84
Evaluation	.81
Research-based	.84
Design	.83
Learning	.80
Collaboration	.83
Equity	.77
Quality Teaching	.81
Family Involvement	.76

Analysis

This study was intended to replicate and support initial findings regarding the relationship between teachers' perception of professional development and student achievement. The study most closely mirrors the procedures followed by the Alabama

study that is described in greater detail in the previous chapter (SEDL, 2008). Like the Alabama study conducted by SEDL, this study used school-level achievement data as the outcome of interest. For this study, school-level data was used to explore the relationship between student achievement scores in mathematics and reading/language arts for middle grades 6-8 and teachers' responses on the SAI survey. Research questions aligned with corresponding SAI questions are displayed in Table 4. Analyses were conducted on data from 28 middle schools.

Data collected for this study was analyzed using the following statistical computations: descriptive analysis and Pearson's correlation analysis. The descriptive analysis was used to show percent, mean, and standard deviation to describe the basic features of the data in a study. They provided simple summaries about the sample and the measures. In other words, the use of descriptive analysis in a research study allows large amounts of data to be presented in a simpler more manageable form (Trochim, 2006). The Pearson's correlation analysis was used to determine the strength and direction of all relationships between study measures and student achievement scores. The combination of proficient and advanced levels of achievement was used as the outcome of interest for the analysis.

Table 4

Research Questions Aligned with Corresponding SAI Questions

Research Question	Corresponding Survey Questions
1. Is there a relationship between the "context" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?	1, 2, 9, 10,11, 18, 19, 29, 32, 34, 35, 45, 48, 49, 56
2. Is there a relationship between the "process" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?	3, 4, 5, 6, 12, 13,14, 15, 16, 20, 21, 22, 23, 26, 27, 28, 30, 36, 38, 39, 41, 42, 43, 46, 50, 51, 52, 53, 57, 58
3. Is there a relationship between the "content" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?	7, 8, 17, 24, 25, 31, 33, 37, 40, 44, 47, 54, 55, 59, 60

Chapter Summary

One of the most important components of a study is the methodology section. Therefore, an explanation on how data was collected and analyzed was crucial in order to find meaning for this study. This chapter provided information on characteristics of the school district, detailed demographic characteristics of the participants and procedures, and detailed information pertaining to the research instrument. Finally, the analysis

provided an overall outline of how the research questions will be addressed and answered.

Chapter 4: Data Analysis

The purpose of this research study was to explore the relationship between professional development and student achievement. Both Guskey and Sparks (1996) and NSDC (2008) suggests that there are three main components needed for a successful professional development program: *context, process, and content*. Based on these components, the questions guiding this study were:

(1) Is there a relationship between the "context" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(2) Is there a relationship between the "process" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(3) Is there a relationship between the "content" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

In this study, data was analyzed using descriptive analysis and Pearson's correlation analysis. Descriptive analysis was used to describe the basic features of the data such as percentages, mean, and standard deviation. Next, the researcher examined the relationship between the school-level average on the SAI survey and school-level achievement. Finally, the study tested the NSDC's professional learning standards based on the averages of each component from the SAI survey and their relationship to student achievement in math and reading/language arts as measured by TCAP scores using Pearson's correlation.

Descriptive Analysis

Data was collected from 28 schools and then analyzed using SPSS (Statistical Package for Social Sciences), Version 22 for Windows software. The targeted population for this study consisted of 276 middle school teachers who taught grades 6-8. The data was examined using descriptive analysis which included the mean, minimum and maximum values. Those values provided the central tendency for the school average score on the SAI and the TCAP overall student performance. In addition, the standard deviation provided an explanation of how dispersed the school average scores on the SAI and the TCAP overall student performance were from the mean of the population.

The mean for school average score on the total SAI was 2.29, with the lowest average scores reported at 1.27 and the highest average scores at 3.11 from the 0-4 Likert Scale responses (see Table 5). The standard deviation for the mean for the school average score is .693. A low standard deviation indicates that the data set is close to the mean. On the other hand, a high standard deviation indicates that the data set is spread out over a large range of values. In this case, with a standard deviation of .693, the SAI scores of most of the schools were between 1.60 and 2.98.

Table 5

Descriptive Statistics for Mean for School Average Score

	N	*Minimum*	*Maximum*	*Mean*	*SD*
School Average Score on Total SAI	28	1.27	3.11	2.2893	.693
Valid *N*	28				

The average TCAP percentage for the overall student performance for the proficient and advanced levels of achievement is displayed in Table 6. In math grades 6-8 school TCAP performance, the minimum percentage was 47.9% with the maximum percentage reaching 100%. The mean ranged from 81.8% to 84.8%.The results show that both 7th and 8th grade math had schools where the overall percentages of students in the proficient and advanced levels of achievement were 100%. In reading/language arts grades 6-8 student TCAP performance, the minimum percentage was 53.7% with a maximum percentage of 100%. Likewise, grades 6 and 7 in reading/language showed student performance at 100%. The mean ranged from 84.2% to 88.9%.

The standard deviations ranged from 6.95 to 11.02 for math and reading/language arts grades 6-8. Standard deviation can be thought of as a way of measuring how far the data values lie from the mean. For example, with a standard deviation of 6.95, the overall performance of most of the schools in 6th grade reading/language arts fell between 81.9% and 95.9% proficient and advanced. On the other hand, with a standard deviation of 11.02, the overall performance of most of the tested schools in 8th grade math fell between 70.8% and 92.8% proficient and advanced.

Table 6

Descriptive Statistics for Average TCAP Overall Student Performance Percentage

	N	*Minimum*	*Maximum*	*Mean*	*SD*
6th Grade Math P/A	28	52.5%	98.6%	84.8%	8.63
7th Grade Math P/A	28	47.9%	100%	82.7%	10.94
8th Grade Math P/A	28	46.8%	100%	81.8%	11.02
6th Grade RLA P/A	28	65.0%	100%	88.9%	6.95
7th Grade RLA P/A	28	53.7%	100%	84.1%	10.06
8th Grade RLA P/A	28	57.0%	98.0%	87.8%	8.51
Valid *N*	28				

*Data reflects the 2008 school year prior to a change in state standards and the TCAP assessment.

Data Analysis Results

The results of the correlation analysis revealed that the school average SAI for all schools was significantly related to the percentage of students in the proficient and advanced achievement levels (see Table 7). In addition, each of the correlation coefficients was positive, indicating a positive association (as the SAI scores increased, achievement increased).

Table 7

Correlations between Grades 6 -8 Proficient/Advanced and Overall School-level SAI

	Overall School-level SAI
6th Grade Math Proficient and Advanced	.622**
7th Grade Math Proficient and Advanced	.807**
8th Grade Math Proficient and Advanced	.870**
6th Grade Reading/Language Arts Proficient and Advanced	.829**
7th Grade Reading/Language Arts Proficient and Advanced	.751**
8th Grade Reading/Language Arts Proficient and Advanced	.801**

** Correlation is significant at the 0.05 level (2-tailed).

Next, Pearson's correlation was used to examine the relationship between the specific components of NSDC's professional learning standards and student achievement in math and reading/language arts as measured by TCAP. The results provided a direct answer to the three research questions.

The tables in this section reflect the results of Pearson's correlation measuring the strength of the relationship between two variables. One variable is listed in the row and the other is listed in the column. For example, in Table 8 "context" is listed in the row and "the grade, subject and proficiency levels" are listed in the columns. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. However, a variable correlated with itself will always have a correlation coefficient of 1 (Hinkle, Wiersma, & Jurs, 2005).

Scales for interpreting Pearson's *r* can vary according to the field of study. However, for the purpose of this study, the researcher utilized the most commonly used scale for interpreting Pearson's *r* as suggested by Green and Salkind (2008). The scale suggested by Green and Salkind (2008) for interpreting Pearson's *r* is as follows: (a) .80 to 1.0 or -.80 to -1.0 (very strong positive/negative relationship); (b) .60 to .80 or -.60 to -.80 (strong positive/negative relationship); (c) .40 to .60 or -.40 to -.60 (moderate positive/negative relationship); (d) .20 to .40 or -.20 to -.40 (weak positive/negative relationship); and (e) .00 to .20 or -.00 to -.20 (very weak or no relationship).

For example, in Table 8, since Pearson's r was 0.840, the results indicated that the variables (context and grade 8 math proficient and advanced) were strongly correlated. On the other hand, results indicated a moderate positive correlation with a Pearson's r of 0.586 for context and grade 6 math proficient and advanced. The Sig (2-tailed) value will show if there is a statistically significant correlation between two variables (Hinkle, Wiersma & Jurs, 2005). For example, in Table 8, the Sig (2-tailed) value is .000. If the Sig (2-tailed) value is greater than or equal to .05, there is not a statistically significant correlation between the two variables. That is to say, increases or decreases in one variable are not significantly related to increases or decreases in the second variable. In contrast, if the Sig (2-tailed) value is less than .05, there is a statistically significant correlation between the two variables. Therefore, increases or decreases in one variable are significantly related to increases or decreases in the second variable. The *N* value is the number of cases (schools) that was used in the correlation (Hinkle et al., 2005).

Research Question 1

The first research question asked whether there is a relationship between the "context" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. Responses to this question addressed the sub-standards *learning communities, leadership,* and *resources* of the context component. Respondents answered questions using a 5-point Likert-type scale: 0 – never, 1 – seldom, 2 – sometimes, 3 – frequently, and 4 – always. To examine research question 1, Pearson's correlation was calculated to determine if a relationship existed between "*context*" and student achievement. The analysis results are displayed in Table 8 for grades 6-8 in math and reading/language arts. With the exception of 6th grade math, student achievement in mathematics revealed a very strong positive relationship with "context." Correlation results revealed a strong to very strong positive relationship with "context" across grades 6-8 in reading/language arts.

Table 8

Correlations for Context and Math/RLA Grades 6 thru 8 Proficient (P) and Advanced (A)

Correlations								
		Context	Grade 6 Math P &A	Grade 7 Math P & A	Grade 8 Math P & A	Grade 6 RLA P & A	Grade 7 RLA P & A	Grade 8 RLA P & A
Context	*Pearson Correlation*	1	.586**	.821**	.840**	.828**	.751**	.797**
	Sig. (2-tailed)		.001	.000	.000	.000	.000	.000
	N	28	28	28	28	28	28	28

**Correlation is significant at the 0.05 level (2-tailed).

Research Question 2

The second research question asked whether there is a relationship between the "process" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. Responses to this question addressed the sub-standards *data-driven*, *evaluation*, *research-based*, *design*, *learning*, and *collaboration* of the process component. Respondents answered questions on a 5-point Likert-type scale: 0 – never, 1 – seldom, 2 – sometimes, 3 – frequently, and 4 – always. To examine research question 2, Pearson's correlation was calculated to determine if a relationship existed between "*process*" and student achievement. The analysis results are displayed in Table 9 for grades 6-8 in math and reading/language arts. With the exception of 8th grade math, the results revealed a moderate to strong positive relationship between mathematics achievement and "process." On the other hand, results revealed a strong positive relationship between students' achievement and process across grades 6-8 in reading/language arts.

Table 9

Correlations for Process and Math/RLA Grades 6 thru 8 Proficient (P) and Advanced (A)

Correlations								
		Process	Grade 6 Math P &A	Grade 7 Math P & A	Grade 8 Math P & A	Grade 6 RLA P & A	Grade 7 RLA P & A	Grade 8 RLA P & A
Process	*Pearson Correlation*	1	.581**	.677**	.791**	.687**	.645**	.664**
	Sig. (2-tailed)		.001	.000	.000	.000	.000	.000
	N	28	28	28	28	28	28	28

** Correlation is significant at the 0.05 level (2-tailed).

Research Question 3

The third research question asked whether there is a relationship between the "content" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. Responses to this question addressed the subgroups *equity*, *quality teaching* and *family involvement* of the content component. Respondents answered questions using a 5-point Likert-type scale: 0 – never, 1 – seldom, 2 – sometimes, 3 – frequently, and 4 – always. To examine research question 3, Pearson's correlation was calculated to determine if there was a significant relationship between "*content*" and student achievement. The analysis results are displayed in Tables 10 for grades 6-8 in math and reading/language arts. With the exception of 6th grade math, correlation results revealed a very strong positive relationship between mathematics achievement and "content." Across grades 6-8 in reading/language arts, results revealed a strong to very strong positive relationship between student achievement and "content".

Table 10

Correlations for Content and Math Grades 6 thru 8 Proficient (P) and Advanced (A)

Correlations								
		Content	Grade 6 Math P &A	Grade 7 Math P & A	Grade 8 Math P & A	Grade 6 RLA P & A	Grade 7 RLA P & A	Grade 8 RLA P & A
Content	*Pearson Correlation*	1	.616**	.816**	.851**	.848**	.764**	.820**
	Sig. (2-tailed)		.001	.000	.000	.000	.000	.000
	N	28	28	28	28	28	28	28

** Correlation is significant at the 0.05 level (2-tailed).

Chapter Summary

This chapter outlined an overview of the data analysis, procedures, and results. The results of the data analysis were presented. The main focus of this study was to determine if there was a relationship between the context, process, and content of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. The data suggested that there was a positive and significant relationship between school-level professional development and student achievement.

Chapter 5: Discussion

Improvements in education are ongoing. The Race to the Top initiative has a goal of increasing student achievement and places a renewed focus on improving and developing great classroom teachers (Tennessee Department of Education, 2013). With the stress of increased statewide accountability, schools have been pressured to provide targeted professional development for teachers in order to improve student achievement (Huffman & Thomas, 2003). It is clear that, in order to meet the increasing demand of accountability for teachers, professional development should be structured so that it is most effective (NSDC, 2001).

In education, the term professional development typically refers to a way for teachers to enhance their professional growth by way of workshops, team meetings, and/or in-service trainings. In the past, professional development often consisted of one-day workshops or short-term courses. Presently, it has expanded into a system of rigorous learning for teachers to continue their education (National Comprehensive Center for Teacher Quality, 2011). Professional development opportunities are increasingly becoming more long term and aligned with standards (Guskey & Sparks, 1996). This reflects a shift from the "one-size fits all" concept to professional development that addresses teachers' needs and ultimately impacts student learning.

The conceptual framework for this study used the combined professional development model suggested by Guskey and Sparks (1996) and the National Staff Development Council (2008). The model consisted of a set of three major standards with 12 sub-groups that all professional development models should follow. The *context* standard is associated with the "who, when, where, and why" of professional

development and it addresses learning communities, leadership, and resources. The *process* standard is linked with the "how" of professional development that is data-driven, research-based, evaluated, based on teacher learning and involving collaboration. Finally, the *content* standard focuses on the "what" of professional development. It includes equity, quality teaching, and family involvement.

The purpose of this study was to explore the relationship between professional development and student achievement addressing the National Staff Development Council's (NSDC) three major standards of professional learning: content, process, and context. Specifically, the overall research question was: *Based on the National Staff Development Council (NSDC) professional learning standards, is there a positive correlation between teachers' perception of professional development at a school-based level and student achievement?* The following sub-questions guided this research:

(1) Is there a relationship between the "context" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(2) Is there a relationship between the "process" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

(3) Is there a relationship between the "content" of school-level professional development based on the NSDC standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores?

To answer these questions, data from 28 middle schools was analyzed. Previously collected data from the Standards Assessment Inventory (SAI) as well as school-level

achievement data were used. The survey instrument measured the teachers' perception of school-level professional development based on a Likert-type scale, ranging from 0 = never, 1 = sometimes, 2 = frequently, 3 = sometimes, and 4 = always. Quantitative research methods were used to answer the research questions and identify the significance of the findings. After the results of the survey were analyzed, a Pearson's correlation analysis was conducted to see if a relationship existed between the context, process, and content of professional development and student achievement.

The results of the teachers' perception of professional development provided valuable information that gave the researcher a more in-depth insight of what teachers felt about their school-based professional development. Prior to this study, the researcher predicted that all three of NSDC's professional learning standards would have a relationship with student achievement. Although the study does not confirm a causal relationship between school-level professional development and student achievement, results revealed moderate to strong associations between professional development and student achievement, suggesting that the presence of professional development aligned with the standards can predict student achievement outcomes.

Findings

The major goal of this study was to determine if there was a relationship between professional development and student achievement. The two main variables used for this study were teachers' perception of professional development (independent variable) and student achievement (dependent variable). To ensure the accuracy of answering each of the research questions, they were addressed and answered separately as seen below.

First, Pearson's correlation was used to determine if a relationship existed between the overall SAI scores and student achievement levels. As stated in Chapter 3, only the proficient and advanced achievement levels were used as the outcome of interest for this analysis. The results of the correlation analysis revealed that the overall SAI at the school level was significantly related to the percentage of students in proficient and advanced achievement levels, with values of the correlation coefficient ranging from .622 to .870 in grades 6-8. Since the Pearson's correlation coefficient was close to +1, the results indicated that a strong positive correlation existed.

Next, tests were conducted to determine if a relationship existed between each of the three categories of the NSDC professional learning standards and student achievement. The first research question was asked to determine if there was a relationship between the "context" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. With the exception of 6th grade math, the results revealed a very strong positive relationship between student achievement in mathematics and "context." Correlation results revealed a strong to very strong positive relationship between student achievement and "context" across grades 6-8 in reading language arts. The overall analyses indicated that the school-level professional development "context" standard had a positive, significant relationship with student achievement.

The second research question sought to determine if there was a relationship between the "process" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. With the exception of 8th grade

math, the results revealed a moderate to strong positive relationship between math achievement and "process." On the other hand, results revealed a strong positive relationship across grades 6-8 between "process" and student achievement in reading/language arts. Overall, it was concluded that the school-level professional development "process" had a positive, statistically significant relationship with student achievement.

The third research question sought to determine if there was a relationship between the "content" of school-level professional development based on the NSDC professional learning standards and student achievement in mathematics and reading/language arts, as measured by TCAP scores. With the exception of 6th grade math, correlation results revealed a very strong positive relationship between "content" and student achievement in mathematics. Across grades 6-8 in reading/language arts, results revealed a strong to very strong positive relationship between student achievement and "content". Overall, it was concluded that the school-level professional development "content" had a positive, statistically significant relationship with student achievement.

Limitations

The purpose of this section is to acknowledge and present several limitations to this study. First, the study was limited to 28 middle schools in one school district. The study did not include elementary, high, charter, private, or alternative schools. Since this study was limited to only public middle schools, the results were not generalizable to other school types. In other words, it would have been more advantageous to the study if data was collected and analyzed from a more diverse group of teachers and types of schools. Secondly, due to the study being limited to teachers' perception of professional

development, teachers' practice of professional development was not determined. Additionally, this study did not collect data to compare teachers' perception of professional development at the school level based on their years of teaching. Therefore, it would be beneficial to compare years of teaching (0-5 years, 6-10 years, 11+ years) to teachers' perception of professional development at the school level.

Furthermore, data collection of teacher responses from the SAI was limited to archived data from the 2008 school year and data collection of student achievement was limited to publicly available data reports. The use of archived data limited the access to obtain specific data (individual student scores). Because the publicly available data reports reveal only the percentage of student achievement for each school, results could not be determined based on the performance of each student on the criterion-referenced test (TCAP) used in the study. The limitation to school-level data created a problem for the original research design for this study. Lastly, this study was limited to quantitative research; the inclusion of qualitative research may have enhanced the quality of the study, in addition to clarifying any misconceptions or underlying questions that emerged from the study.

Implications and Conclusions

The results of this study clearly indicate that NSDC professional learning standards (context, process, and content) have a positive, statistically significant relationship with student achievement. This study results have implications for the federal, state, and local educational levels for those who view the role of professional development as becoming extremely critical. One call for educational policies and laws was for increased quality professional development to involve the development of standards. Another call was for

educational policies and laws to provide or define the key characteristics that give meaning to quality professional development.

The federal government's NCLB Act (2001) mandated that teachers' professional development be based on activities that impact teacher learning and student achievement (Goals 2000: Educate America Act, 2000). In addition, other groups have embraced several key characteristics of quality professional development (Goals 2000: Educate America Act, 2000; Guskey & Sparks, 1996; NCLB, 2001; NSDC, 2001; U. S. Department of Education, 1996; Wei et at., 2009). According to these sources, quality professional development consists of the following characteristics: (a) activities and strategies that are scientifically research-based; (b) instructional and teaching strategies aligned with improving student academic achievement; (c) strategies that increase the knowledge and teaching skills of teachers; (d) content that is aligned with the curriculum and goals of the school district; (e) instruction on how to involve all stakeholders, such as the teachers, administration, district, community, and parents in ways to improve student achievement; (f) instruction on the use of data and assessments to guide classroom instruction and practice; (g) on-going professional development with follow-up and feedback provided to teachers; and (h) a community of learners in which collaboration is among teachers of the same subject or grade-level. While this study does not investigate all of these individual elements directly, it does provide additional information on what factors may be important to consider in designing school-based professional development opportunities for teachers.

NSDC (2008), as well as researchers Guskey and Sparks (1996), suggested that there are three main professional development standards needed for quality professional

development: context, process, and content. Adopted by both Guskey and Sparks (1996) and NSDC (2008), the standards are viewed as primary links to improving student learning. The focus of this study was on exploring the relationships between those components and student achievement. Moreover, each of the components reflected in the standards also has an existing research based that supports inclusion in the framework.

The context standard consists of the following sub-standards: learning communities, leadership, and resources. Research indicated that the context in which professional development operates has a significant impact on the outcome of its success (Kronley & Handley, 2001). For example, research suggests that professional development is only effective if it entails the support of principals, school and district leaders (Harwell, 2003; Mclaughlin & Marsh, 1978). Another piece of the context that has been demonstrated to influence the effectiveness of professional development is the presence of learning communities. For example, in a study involving learning community practices, Hill (2007) concluded that teachers are likely to make better use of the school's or district's instructional goals to improve student learning if their professional development is linked to those same goals. In other words, as suggested by other researchers, learning communities should operate with a shared vision that engages teachers in what is important for improving classroom practices that is aligned with the school and district goals for student achievement (Hord, 1997; NSDC, 2001). Thus, previous research has demonstrated the significance of context in teachers' professional development.

The process standard consists of the following sub-standards: research-based, design, data-driven, evaluation, learning, and collaboration. According to research from

multiple studies, the process of professional development should: (a) provide opportunities that will allow teachers to construct their own content and pedagogical knowledge; (b) be based on research that will engage adults in learning experiences they will use in their classrooms; (c) allow teachers opportunities to improve their practices by collaborating with other colleagues; and (d) include a design that is data driven and based on student learning, that will include continuous evaluation and improvement (Fernandez, 2003; Joyce & Showers, 2002; Poglinco et al., 2003; Reeves, 2004; Seagall, 2004; Sparks & Hirsch, 2000; Wheelan, 2005). Furthermore, according to NSDC and others, in order for professional development to be successful under the process standards, it is crucial that all of these components be addressed and carefully planned (Darling-Hammond & Sykes, 1999; Guskey & Sparks, 1996; NSDC, 2001). For example, using data to determine student progress can be an effective way to monitor continuous improvement and personalize instruction to the needs of all students (Halverson et al., 2007). Walpoe and McKenna (2004) concluded from their study that teachers need to be provided the opportunity to review and analyze student test data so that they can recognize and address instructional needs in order to improve academic achievement for all students. Furthermore, research suggested that data-driven professional development can assist schools and district leaders in their efforts to provide teachers with ways to assess student learning via quality professional development (Hayes & Robnolt, 2007; Knapp et al., 2006). Again, the existing research supports the importance of the process characteristics in designing effective professional development.

The content standard consists of the following sub-standards: equity, quality teaching and family involvement. According to Joyce and Showers (2002), the content of

professional development should focus on teachers' content knowledge, classroom practices, and other components that have a positive impact on student achievement. Research further suggested that professional development embedded in raising student achievement not only deepens teachers' conceptual understanding of specific subject content, but also provides them with a rich knowledge of how to teach it (Cohen & Hill, 2000). For example, in a study involving professional learning and what teachers need to learn, researchers found that teachers' content knowledge was crucial and provides a more in-depth understanding for teachers as the main ingredient for effective teaching (Clermont et al., 1993; Grossman, 1990). Subsequently, after years of working to establish rigorous student achievement standards, educational policies have gone in effect to bring awareness to quality teaching and its role in professional development (American Federation of Teachers, Council of Chief State School Officers, National Education Association, & National Staff Development Council, 2010). Similarly, previous research has also illustrated the importance of teachers' understanding of equity and family involvement. Based on existing research, these elements are important for the design of effective professional development.

The results of this research study have implications for individuals at the federal, state, and district levels that are looking at a professional development model as one to adopt. This study confirms the existing research insofar as each of the three standards was a significant indicator of student achievement. Based on previous research, the predictive value of all three components with respect to student achievement is not necessarily surprising. However, this finding is worth emphasizing for its practical significance. Those engaged in the design and implementation of professional

development will likely acknowledge the importance of the "process" of professional development. However, in practice, less emphasis is often placed on the "context" and "content" of professional development. For instance, sustained, high-quality professional development focused on equity and family involvement is likely not common practice in local schools. Therefore, since this study supports the significance of all three standards (context, process, and content), schools and districts should consider a professional development model that embraces each of them, as a means for increasing student achievement.

Professional development models often gain success through the promise of enhanced teacher learning and increased student achievement. Past reform efforts by Goals 2000, No Child Left Behind, and currently Race to the Top have all seen the need to increase teacher learning and student achievement through professional development. In the past, the promise of a new professional development program would surface and be quickly implemented in hopes of federal, state, and district leaders reaching their goal, which is, ultimately, the success of all schools. However, the swift implementation often occurs before any research-based data regarding the effectiveness of the program is collected and analyzed. With that being said, this makes this research study even more critical, as it adds to strengthening the structure of professional development and offers quantitative data for school districts to utilize when considering adoption. This is especially critical for school districts as it provides evidence for specific areas of need in regards to context, process, and content from teachers' perception when implementing the professional development. Specifically, districts and schools should consider

embedding all three of these standards when designing their planning professional development model, as the targeted goals for increasing student achievement.

Increased accountability associated with high-stakes testing along with the push for quality professional development for teachers at the school level continues to be a challenging issue for school districts. Therefore, in order to overcome those difficult obstacles, schools need to be provided with a professional development model that will effectively meet both the needs of the teachers and students. In turn, the success of schools and districts will begin to grow. This researcher suggests that school and district leaders utilize the information from this study to compare with other quantitative studies, in addition to the conceptual framework of the professional development model, to guarantee the future success of quality professional development. Specifically, leaders should consider the significance of context, content, and process as significant indicators of student achievement. In closing, the findings from this study could be beneficial for discussions among policy makers, school and district leaders to give them a better understanding on how to design and/or develop quality professional development trainings, seminars, or workshops. This will also aid in their search for opportunities to combine research-based data-driven professional development models in order to create one that will accomplish their goal.

Recommendations for Future Research

Research on the relationship between professional development and student achievement is still lacking. One of the biggest problems researchers face is being able to show how professional development has a direct, rather than indirect, relationship with student achievement. Since this study only conducted research on the three major

components of NSDC's professional learning standards, future research may be needed to test the twelve sub-groups (learning communities, leadership, resources, data-driven, evaluation, research-based, design, learning, collaboration, equity, quality teaching, and family involvement). For example, breaking down the components of the NSDC professional learning standards might give researchers a better understanding of how to structure and/or design future professional development research.

Furthermore, the relationships between professional development and student achievement need to be tested on all grade levels and subject areas. For instance, in this study, research was done at the middle school level in math and reading/language arts. Therefore, research should also be conducted at the elementary and high school level not only in math and reading/language arts, but other subject areas as well. In turn, this will allow researchers to have more in-depth and diverse understanding of the relationship between professional development and student achievement.

Continuous research on professional development is important for exploring the relationship it has with both teacher and student learning. In addition to quantitative research, professional development could be studied qualitatively in order for researchers to gain a better understanding of the learning experiences and practices of teachers. In conclusion, here are a few questions to be considered for future qualitative research.

1. What is the relationship between content-specific professional development and student learning?
2. What is the relationship between professional development and teacher practices?
3. Does the effectiveness of professional development vary based on the environment (school-level, online, out of town, etc.)?

4. Under what conditions do teachers perceive professional development as being a positive learning experience that meets their educational needs?

In order to meet the growing need of professional development for teachers, education reform needs to take place. One key principle to education reform is for educational leaders to take a step back and conduct an analysis on what constitutes quality professional development. Another key principle for educational leaders to consider would be the conditions under which teachers are more likely to learn from participating in professional development and make changes in their practices that will help improve student achievement. Although professional development is heading in the right direction, improvements are still needed. In order to reach the ultimate goal of increasing student achievement, reform needs to take place at the local, state, and federal level to design professional development with attention to context, process, and content.

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Appendix Standards Assessment Inventory

Standards Assessment Inventory (SAI)

	Never	Seldom	Sometimes	Frequently	Always
1. Our principal believes teacher learning is essential for achieving our school goals	0	1	2	3	4
2. Fellow teachers, trainers, facilitators, and/or consultants are available to help us implement new instructional practices at our school.	0	1	2	3	4
3. We design evaluations of our professional development activities prior to the professional development program or set of activities.	0	1	2	3	4
4. Our school uses educational research to select programs	0	1	2	3	4
5. We have opportunities to practice new skills gained during staff development	0	1	2	3	4
6. Our faculty learns about effective ways to work together.	0	1	2	3	4
7. Teachers are provided opportunities to gain deep understanding of the subjects they teach.	0	1	2	3	4
8. Teachers are provided opportunities to learn how to involve families in their children's education.	0	1	2	3	4
9. The teachers in my school meet as a whole staff to discuss ways to improve teaching and learning.	0	1	2	3	4
10. Our principal's decisions on school-wide issues and practices are influenced by faculty input.	0	1	2	3	4
11. Teachers at our school have opportunities to learn how to use technology to enhance instruction.	0	1	2	3	4
12. Teachers at our school learn how to use data to assess student learning needs	0	1	2	3	4
13. We use several sources to evaluate the effectiveness of our professional development on student learning (e.g., classroom observations, teacher surveys, conversations with principals or coaches).	0	1	2	3	4
14. We make decisions about professional development based on research that shows evidence of improved student performance.	0	1	2	3	4
15. At our school teacher learning is supported through a combination of strategies (e.g., workshops, peer coaching, study groups, joint planning of lessons, and examination of student work).	0	1	2	3	4

Please mark the responses that most accurately reflect your experiences at your school.

	Never	Seldom	Sometimes	Frequently	Always
16. We receive support implementing new skills until they become a natural part of instruction	0	1	2	3	4
17. The professional development that I participate in models instructional strategies that I will use in my classroom	0	1	2	3	4
18. Our principal is committed to providing teachers with opportunities to improve instruction (e.g., observations, feedback, collaborating with colleagues).	0	1	2	3	4
19. Substitutes are available to cover our classes when we observe each others' classes or engage in other professional development opportunities.	0	1	2	3	4
20. We set aside time to discuss what we learned from our professional development experiences	0	1	2	3	4
21. When deciding which school improvement efforts to adopt, we look at evidence of effectiveness of programs in other schools.	0	1	2	3	4
22. We design improvement strategies based on clearly stated outcomes for teacher and student learning.	0	1	2	3	4
23. My school structures time for teachers to work together to enhance student learning.	0	1	2	3	4
24. At our school, we adjust instruction and assessment to meet the needs of diverse learners.	0	1	2	3	4
25. We use research-based instructional strategies	0	1	2	3	4
26. Teachers at our school determine the effectiveness of our professional development by using data on student improvement.	0	1	2	3	4
27. Our professional development promotes deep understanding of a topic.	0	1	2	3	4
28. Our school's teaching and learning goals depend on staff's ability to work well together.	0	1	2	3	4
29. We observe each other's classroom instruction as one way to improve our teaching.	0	1	2	3	4
30. At our school, evaluations of professional development outcomes are used to plan for professional development choices.	0	1	2	3	4
31. Communicating our school mission and goals to families and community members is a priority.	0	1	2	3	4
32. Beginning teachers have opportunities to work with more experienced teachers at our school.	0	1	2	3	4

	Never	Seldom	Sometimes	Frequently	Always
33. Teachers show respect for all of the student subpopulations in our school (e.g., poor, minority).	0	1	2	3	4
34. We receive feedback from our colleagues about classroom practices.	0	1	2	3	4
35. In our school we find creative ways to expand human and material resources.	0	1	2	3	4
36. When considering school improvement programs we ask whether the program has resulted in student achievement gains.	0	1	2	3	4
37. Teachers at our school expect high academic achievement for all of our students.	0	1	2	3	4
38. Teacher professional development is part of our school improvement plan	0	1	2	3	4
39. Teachers use student data to plan professional development programs.	0	1	2	3	4
40. School leaders work with community members to help students achieve academic goals	0	1	2	3	4
41. The school improvement programs we adopt have been effective with student populations similar to ours.	0	1	2	3	4
42. At my school, teachers learn through a variety of methods (e.g., hands-on activities, discussion, dialogue, writing, demonstrations, practice with feedback, group problem solving).	0	1	2	3	4
43. Our school leaders encourage sharing responsibility to achieve school goals	0	1	2	3	4
44. We are focused on creating positive relationships between teachers and students.	0	1	2	3	4
45. Our principal fosters a school culture that is focused on instructional improvement.	0	1	2	3	4
46. Teachers use student data when discussing instruction and curriculum.	0	1	2	3	4
47. Our principal models how to build relationships with students' families.	0	1	2	3	4
48. I would use the word, empowering, to describe my principal.	0	1	2	3	4
49. School goals determine how resources are allocated.	0	1	2	3	4
50. Teachers analyze classroom data with each other to improve student learning.	0	1	2	3	4
51. We use students' classroom performance to assess the success of teachers' professional development experiences	0	1	2	3	4

	Never	Seldom	Sometimes	Frequently	Always
52. Teachers' prior knowledge and experience are taken into consideration when designing staff development at our school.	0	1	2	3	4
53. At our school, teachers can choose the types of professional development they receive (e.g., study group, action research, observations).	0	1	2	3	4
54. Our school's professional development helps me learn about effective student assessment techniques	0	1	2	3	4
55. Teachers work with families to help them support students' learning at home.	0	1	2	3	4
56. Teachers examine student work with each other	0	1	2	3	4
57. When we adopt school improvement initiatives we stay with them long enough to see if changes in instructional practice and student performance occur.	0	1	2	3	4
58. Our principal models effective collaboration	0	1	2	3	4
59. Teachers receive training on curriculum and instruction for students at different levels of learning.	0	1	2	3	4
60. Our administrators engage teachers in conversations about instruction and student learning.	0	1	2	3	4