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Investigation of the Relationship between a Job-Embedded Model of Professional Development and Reading Achievement of Elementary School Students.

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Investigation of the Relationship Between a Job-Embedded Model of Professional Development and Reading Achievement of Elementary School Students

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ABSTRACT

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The development of highly effective teachers is of interest to school systems because the quality of the teachers is associated with students' success. This study explored the relationship between teachers' participation in a job-embedded model of professional development and students' achievement in reading.

Teachers in the third grade and fifth grade at five different elementary schools received more than 100 hours of training. The reading achievement scores of students assigned to these teachers were compared to the scores of students whose teachers did not participate in the training. Findings in this study were mixed. Fifth-grade students whose teachers participated in the model achieved significantly higher reading scores; third graders of the study did not perform at a significantly higher rate than the control group.

The study provides an overview of models of professional development and reviews characteristics of high-quality designs. It might be helpful to school systems interested in implementing training based upon a coaching model of professional development.

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CHAPTER 1

INTRODUCTION

Since the National Commission on Excellence in Education's 1983 publication of *A Nation at Risk*, public debate has centered on the failure of the American public schools to produce a citizenry that demonstrates the skills associated with literacy competence. This failure is quantifiably evident in the continued poor reading performance of American students. A full 37% of the nation's fourth graders are unable to read and write at the most basic levels (Donahue, Finnegan, Lufkus, & Campbell, 2001). Kirsch, Jungeblut, and Kolstad (2004) reported that from 40 to 44 million of the 191 million Americans age 16 or older read at the lowest levels of literacy.

The political, economic, social, and legal sectors of society have placed increasing pressure upon schools to improve students' achievement in reading and writing. These pressures have resulted in a series of reform efforts to improve educational efficacy and although the past three decades are replete with such efforts at school reform, students' achievement in reading has not improved significantly (Grigg, Daane, Jin, & Campbell, 2003). Sparks and Hirsh (2004) stated,

> Virtually every effort to improve the quality of education since the publication of *A Nation at Risk* has focused on overcoming deficits in student knowledge or on reshaping the structure and organization of schooling. These reforms . . . have largely left the classroom untouched. (p. 1)

The social, emotional, and economic impacts of these literacy deficits are staggering.

Lambert (2003) posited that the ineffectiveness of the reform movements of the 1970s and 1980s resulted from their failure to recognize the importance of increasing teachers' skills and knowledge. Darling-Hammond (2000) intimated that the state of literacy in our country is predictable based on the training that preservice teachers receive in reading. Although 93% of elementary school teachers in the United States are certified to teach their students, most have

received only three credit hours of college coursework in reading (National Center for Educational Statistics, 1999). According to Moats (1999), this is insufficient preparation to teach the complex skills associated with literacy instruction. Furthermore, experienced teachers do not have access to continued training or information regarding best practices in the teaching of reading and writing. Moats wrote of a chasm that existed "between classroom instruction practices and the research knowledge base on literacy development" (p. 7). This chasm has been created through poor quality teacher-preparation programs and through poor quality professional development of existing teachers.

The National Commission on Teaching and America's Future (1996) highlighted this gap in the teaching-learning cycle and called for a redesign of previous reform efforts to focus on teachers' development. Recognizing that teachers do make a difference in their students' opportunities to learn, the Commission identified new premises for educational reform that looked to the teacher as the key change agent. A national goal for teachers' professional development was added to *Goals 2000* further indicating an understanding that the teacher is central to students' achievement (U.S. Department of Education, 2004). This is a paradigm shift from past reform efforts that looked to programs and organizational design as the key components of school improvement.

These issues have propelled professional development for teachers into the center of the debates surrounding school reform. If the teacher is the change agent, then the teacher's effectiveness must become the focal point of the new design of school reform. This principle has not been ignored by those who direct legislative and administrative educational policies. Continuing professional development has been mandated in all 50 states. Even though state departments of education and local education agencies have created a series of measures whereby teachers must account for their hours of professional development, they have failed to determine if these hours have impacted either teachers' effectiveness or students' achievement.

In this age of accountability, schools are beginning to recognize the importance of connecting professional development in the content areas to the process of improving students' achievement.

As school systems strive to increase the skills and knowledge base of teachers of reading, they are drawing on recent research in the content areas. In the past 15 years, a series of studies, commissions, and task forces have analyzed the teaching-learning cycle in terms of a student's development of reading skills. These studies have produced a considerable number of best practices that have great potential for increasing students' learning. If these practices are to impact students' achievement in reading, however, they must first be recognized by teachers and then translated into classroom practice. Currently, the transference of research into practice is problematic in education allegedly because, "The weak system of staff development does not bring these [practices] to the attention of teachers and administrators and does not include training designed to ensure that those strategies are mastered and used" (Joyce & Showers, 1988, p. 7).

Educators are concentrating on determining which delivery models of professional development will best impact teachers' practices. Sparks (1997) pointed out, " At a time when experts view staff development as an essential ingredient in school reform efforts that seek high levels of learning for all students, most staff development activities continue to leave teachers' knowledge and skills untouched" (p. 20). Lieberman (1995) stated that the conventional view of staff development as a "transferable package of knowledge to be distributed to teachers in bite-sized pieces needs radical transformation and rethinking" (p. 591).

School systems are being called upon to design comprehensive programs of professional development in order to create competent teachers of reading. Support for the professional development of educators has grown at the federal level during the past 10 years. Legislative acts such as the *Improving America's Schools Act* of 1994 and the *Goals 2000: Educate America Act* (1994) included sections that emphasized the value of professional development for teachers. In 1993 alone, the federal government spent $515 million on teachers' development in science,

math, and technology through the Eisenhower Professional Development Program and through Title II funds (Consortium for Policy Research, 1995). The *No Child Left Behind Act* (2001) placed an even stronger emphasis on professional development and connected Title II to improving students' achievement through efforts to enhance the preparation of both preservice and experienced teachers.

The federal requirements of *No Child Left Behind* focused on the provision of high-quality professional development that improves and increases teachers' knowledge and skills through sustained, intensive, and classroom focused models (Office of Elementary and Secondary Education, 2003). This requirement reflected the research of Joyce and Showers (1983) who found that "High quality training will give excellent results" (p. 2). Both teachers and students could benefit from changing the face of staff development from the traditional workshop model to a paradigm that creates an environment of successful teaching and learning. Combining scientifically based research as a foundation for best practices in literacy with effectively designed professional development offers schools a vehicle for meeting the accountability standards set forth by the *No Child Left Behind Act* of 2001.

Statement of the Problem

Quality professional development for teachers is needed to keep abreast of current strategies and trends and adequate training must be offered if educators are to confidently plan and implement best practices in literacy. Furthermore, continuing professional development has been mandated in all 50 states. School leaders need to develop a clear understanding of the role of professional development as they refine their strategies for increasing students' achievement (Guskey, 2000).

Elementary schools are mandated by the *No Child Left Behind Act* (2001) to ensure that all students make adequate yearly progress in their reading achievement. Professional development is recognized as a key component of the current initiative to improve teachers'

efficacy and students' achievement. Professional development is expensive in terms of both time and money; therefore, determining which model of professional development is most effective is a valuable step in allocating precious resources. School systems and administrators must continually evaluate the professional development they provide in terms of its impact on students' achievement.

This study focused on a comprehensive job-embedded model of professional development that has as its purpose increasing teachers' efficacy in literacy instruction. The purpose of this study was to determine if a relationship exists between teachers' participation in training designed to increase effectiveness in literacy instruction and the reading achievement of students at grades three and five.

Research Questions

The following questions relating to teachers' professional development and students' achievement were addressed:

1. Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement from third-grade students and fifth-grade students whose teachers do not participate in the same model?
2. Do third-grade students of poverty and fifth-grade students of poverty whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement from third-grade students of poverty and fifth-grade students of poverty whose teachers do not participate in the same model?
3. Do fifth-grade students whose teachers participate in a job-embedded model of professional development attain different gain scores in reading achievement from fifth-grade students whose teachers do not participate in the same model?

4. Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in math from third-grade students and fifth-grade students whose teachers do not participate in the same model?

Hypotheses

Null hypotheses were generated from the research questions. The following hypotheses were examined at the .05 levels of significance:

$H0_1$ There are no differences in the mean total reading achievement scores of third-grade students whose teachers participated in a job-embedded model of professional development and third-grade students whose teachers did not participate in the same model.

$H0_2$ There are no differences in the mean total reading achievement scores of fifth-grade students whose teachers participated in a job-embedded model of professional development and fifth-grade students whose teachers did not participate in the same model.

$H0_3$ There are no differences in the mean total reading achievement scores of third-grade students of poverty whose teachers participated in a job-embedded model of professional development and third-grade students of poverty whose teachers did not participate in the same model.

$H0_4$ There are no differences in the mean total reading achievement scores of fifth-grade students of poverty whose teachers participated in a job-embedded model of professional development and fifth-grade students of poverty whose teachers did not participate in the same model.

$H0_5$ There are no differences in the reading achievement gain scores of fifth-grade students whose teachers participated in a job-embedded model of professional development and fifth-grade students whose teachers did not participate in the same model.

$H0_6$ There are no differences in the mean total math achievement scores of third-grade students whose teachers participated in a job-embedded model of professional development and third-grade students whose teachers did not participate in the same model.

$H0_7$ There are no differences in the mean total math achievement scores of fifth-grade students whose teachers participated in a job-embedded model of professional development and fifth-grade students whose teachers did not participate in the same model.

Theoretical Perspective of the Study

Early models of professional development, those predating the 1980s, were based upon simplistic understandings of the teaching-learning process. These models concentrated on teachers' traits and used behavioral theories of shaping to improve teachers' performance. As researchers recognized the inadequacies of these models, they began to create new theoretical frameworks for designing professional development (Sprinthall, Reiman, & Theis-Sprinthall, 1996).

These models were variously based on theories of adult learning (Erikson, 1982), age and phase theories (Levinson, 1978), and career phases (Huberman, 1993). The craft model (Grimmett & MacKinnon, 1992) was introduced later. It relied on teachers' reflections to connect classroom experiences to best practices. The craft model underlay the theoretical design of professional networks and the school improvement process.

The expert model (Sparks, 1994) was another theoretical framework based on the belief that an expert teacher trainer shares a core of knowledge and skills that form the basis of new

understandings. The specific and rigid design of the expert models is frequently referred to as a process-product model.

Joyce and Showers (as cited in Sprinthall et al., 1996) introduced a model in the early 1980s that had as its purpose expanding the repertoire of teachers' skills. In contrast to the expert model, this model focused on “acquisition of instructional models” or “groups of strategies based on understandings about how teachers and children learn” (p. 685). The models of professional development that had been evaluated by researchers and showed a consistent transfer of knowledge and skills into the classroom were examined. The research of Joyce and Showers (1982) indicated that teachers who received training consisting of theory, demonstration, practice, feedback, and coaching demonstrated significantly greater transfers of instructional strategies into the classroom. Sparks (1986) corroborated many of their findings.

Therefore, a model of professional development that employed these strategies was chosen for a level-five evaluation of professional development, a study that assesses professional development in terms of its impact on students' achievement (Guskey, 2002). The specific model of professional development assessed in this study, The Learning Network ® (2004) was developed and marketed by Richard Owen Publishers.

The Learning Network® (2004) is a framework for staff development designed around the Joyce and Showers' (1982, 1983, 1988) training components of theory, demonstration, practice, feedback, and coaching. A consultant works with two participants from a school who are called teacher leaders. The consultant instructs the teacher leaders in best practice, provides demonstration lessons, supports teachers as they practice new strategies, and gives feedback to the teachers as they develop closer approximations to the demonstration lesson. The teacher leaders receive training in theory and practice associated with best practices in literacy instruction. The principal of the school attends training sessions with the teachers and serves as an observer during feedback and coaching sessions.

The Northwest Regional Educational Laboratory (NWREL) published a catalog of research-based models of effective school reform efforts in 1999. The NWREL first listed The Learning Network® as demonstrating "promising evidence of effectiveness" in its publication of the *Catalog of School Reform Models*. Models that ranked in this category must have been the focus of up to five studies with at least one third-party comparison group study. These studies must show statistically significant positive effects in order for the model to be considered promising. The Learning Network® was the focus of three studies that showed a weighted mean effect size of .22 (Northwest Regional Educational Laboratory) indicating a statistically significant, but small, effect of the model on students' achievement. Because of the limited number of studies that provided information about the impact of the model, generalizations could not be made with confidence. Further study was recommended to determine if there was practical significance associated with the model.

A key component to the theoretical base of this study was the differentiation of reading achievement between students whose teachers did not participate in a model of professional development that included all components of the Joyce and Showers (1982, 1983, 1988) model (e.g., theory, demonstration, practice, feedback, and coaching) and those who did participate as teacher leaders supported by The Learning Network® (2004). Recognizing that all teachers in the targeted schools participated in some type of professional development during the school year, the researcher endeavored to determine if the intensity, duration, and transferability of practice associated with the five components of theory, demonstration, practice, feedback, and coaching were reflected in increased achievement of the students of the teacher leaders.

Significance of the Study

Sum (1999) analyzed the *National Adult Literacy Survey* and found that 40% of the nation's adults who were actively employed scored in the lowest two levels of the five-level literacy scale. The number of citizens who cannot operate on the most basic levels of literacy

make the importance of improving reading instruction for the nation's students increasingly obvious. In this age of accountability, the public school system is charged with ensuring that all students achieve at the highest levels. While there is no "silver bullet" or no single strategy that will eliminate reading deficits in our population, a growing body of research indicates that teachers' effectiveness is the cornerstone of students' achievement (Ferguson, 1991; Sanders & Rivers, 1996).

Professional development programs are predicated on the assumption that students' learning can be increased through human resource development. Currently, the design and implementation of most professional development is "fragmented, episodic, and loosely related to overall systemic reform" (Choy & Chen, 1998, p. 7). Parsad, Lewis, and Farris (2002) reviewed data from the National Center for Education Statistics' *Fast Response Survey* and found that the typical model for professional development continued to be a workshop format. Little more than half (57%) of the teachers surveyed reported dedicating more than eight hours annually to the study of the subject area of their main teaching assignment. Only 23% of the teachers reported annually participating in more than 32 hours of professional development in their content area (Parsad et al.). This finding in 2002 mirrors Howey's (1985) 22-year-old study that showed only 20% of the respondents participated in any professional development outside of the after-school inservice or workshop.

School systems across the country are only beginning to reconsider the professional development that their teachers are receiving. This is especially important considering that some research indicates that many teachers' training models are not only ineffective but are also counterproductive to the teaching-learning cycle (Andrews & Rothman, 2002; Crandall, 1983). Although the *No Child Left Behind Act* (2001) reflects the understanding that one-shot workshops are not necessarily productive and uses the terms "sustained" and "intensive" to describe effective professional development practices (Office of Elementary and Secondary Education, 2003, p. 32), the duration of time spent in professional development is only one

criterion for determining its effectiveness. This paradigm for evaluation does not assess the professional development experience and its impact on either teachers' practice or students' learning.

There is a growing body of research that outlines characteristics of effective professional development programs. Whereas these characteristics are described by a number of researchers **(**Joyce & Showers, 1988; Lieberman, 1995; Sparks & Loucks-Horsley, 1989), the data supporting their impact on students' learning in the content areas are limited. Guskey and Sparks (1991) reported that studies that analyzed the effectiveness of staff development models have typically reviewed the influence of the model on teachers' attitudes and practices. They pointed out that relatively few studies have determined if changes in teachers' practices did, in fact, lead to improvements in students' outcomes. Richardson (2001) also recommended further study regarding the effects of teachers' professional growth on their students while recognizing that what happens to students' learning when teachers change their practices is the whole point of professional development. Further study of professional development models is important in determining if the intended effect—improved students' achievement—is realized.

Guskey and Sparks (2002) stated, "While those responsible for professional development have generally assumed a strong and direct relationship between professional development for educators and improvements in students' learning, few have been able to describe the precise nature of that relationship" (p. 3). Many studies focus on learning experiences for teachers and offer data to suggest they impact teachers' attitudes or practices. However, there are often conflicting data about the impact of different types of programs upon students' achievement. Although observing teachers' practices and cataloging changes in teachers' attitudes are ways to document the effectiveness of professional development experiences, students' performance on standardized tests is used increasingly to assess the benefits of programs put into place within the public school setting.

Professional development is expensive in terms of time and human and fiscal resources. Financial resources have been increased at the federal level through competitive grants and through restructuring of federal project grants such as Title II (Office of Elementary and Secondary Education, 2003). However, the need to look closely at reallocating funds in order to ensure that they are spent for clearly articulated and purposeful growth is evident (Consortium for Policy Research, 1995). Administrators in public school systems must create the organizational supports that foster the implementation of best practices into teaching and learning processes while taking care to avoid the misuse of valuable resources. This can be done by seeking out models of professional development that positively impact students' achievement.

This study provides information about the design of effective professional development and its relationship to students' achievement in reading. Data were collected to compare the achievement of students whose teachers participated in a content-based, job-embedded professional development program designed around the research of Joyce and Showers (1988) with those whose teachers were not involved in this particular model of staff development. The information gathered in this study should be of use to any organization wishing to gain insight into structures of professional development that impact students' achievement. It could also be helpful for those school systems that are interested in designing professional development that makes the most efficient use of the resources of the school system.

Definitions

1. *Achievement test*: An assessment that measures a student's currently acquired knowledge and skills in one or more of the content areas common to most school curricula (for example, reading, language arts, mathematics, science, and social studies) (CTB/McGraw-Hill, 1997, p. 42).

2. *Professional development:* This term is used to describe specific activities planned for teachers to improve their competency levels after they have received state licensure and begun professional practice (Howey, 1985).
3. *Staff development*: Professional development and staff development are often used in the literature interchangeably. In this study, the term staff development is used to denote the training provided to groups of educators by school systems and is designed to improve students' learning by enhancing teachers' performance (Sparks & Loucks-Horsley, 1989). The term is used interchangeably in this study with the term professional development.
4. *Coaching*: Teachers receive inclass follow up by a supportive advisor who helps them to correctly apply skills learned in training (Servatius & Young, 1985).
5. *Teacher leader*: Teachers who receive support from The Learning Network® to improve the quality of their instruction. These teachers work first with a coordinator from The Learning Network® and then work with their colleagues under the guidance of the coordinator. Teacher-leader training involves the development of skills both in classroom practice and in the facilitation of learning for adults (Owen, 2002).
6. *Job-embedded professional development*: These learning activities take place within the context of the workday. The structure of the model is such that teachers gain new insights as they reflect upon their experiences, practice new strategies with their students, generate new insights, and share their understandings with others (Wood & McQuarrie, 1999).

Limitations and Delimitations

This study was delimited to a population that consisted of students in the third and fifth grades in one school system in Tennessee during the 2003–2004 school year. The sample was drawn from students who attended five different elementary schools in the school system that

year. Six different teachers, four of whom taught fifth grade and two who taught third grade, were responsible for teaching the 122 students of the study. All students were assigned to self-contained elementary classes prior to the initiation of this study. The students in the experimental groups received their reading instruction from a teacher who was involved with The Learning Network® (2004). The control group was composed of students at the same grade level whose teacher did not work with The Learning Network® consultant. Students who were enrolled in any of the classrooms of the study after November 15, 2003, were excluded from the data set.

The teachers in the study participated in a minimum of 100 hours of professional development in a period of eight months. Approximately 60 of those hours were classified as job-embedded professional development in literacy instruction. This part of the training was conducted under the direction of one literacy consultant selected by and provided to the schools through The Learning Network® (2004). Achievement data for the students whose teachers were trained in literacy instruction using this specific model were compared to the data of the students whose teachers may have attended workshops in reading but who did not have access to the components of support associated with the job-embedded model.

The research points to the importance of district and school administrators' support for the successful implementation of any model of professional development (Caldwell & Wood, 1988). The administrators from each of the schools in the study were involved in the training along with the teacher leaders in their buildings. Funding for the professional development initiative was provided through grants, school allocations, and district allocations. Additionally, two district-wide administrators participated in the district-wide training sessions. The data used in the study were gathered from reports of the 2004 Tennessee Comprehensive Assessment Program's elementary level *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997).

Overview of the Study

The study is organized into five chapters. Within Chapter 1 is an introduction to the study, a statement of the problem, a list of research questions, a list of hypotheses, the theoretical perspective, and an outline of the significance of the study. Chapter 1 also includes salient definitions, limitations, and delimitations of the study. Chapter 2 includes a review of the literature that is organized into the following components: historical perspectives on professional development, characteristics of effective professional development, an overview of models of professional development, a discussion of training, a description of evaluation of professional development and research regarding its impact on student achievement, methodological problems of evaluations of professional development using student achievement measures, and a summary. The methodology of the research project is detailed in Chapter 3. The section provides information on the research design, population, a description of the professional development model of the study, instrumentation, data collection procedures, data analysis, and a summary. Chapter 4 details the results of the study and is organized according to the research questions outlined in Chapter 1. Finally, a summary of the study is provided in Chapter 5 that includes a summary of the findings and gives conclusions as well as recommendations for further study and practice.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The review of related literature focuses on a variety of designs of professional development for teachers and upon their relationship to students' achievement. The first section provides a historical perspective of professional development in the public schools sector and includes information related to current practices in teachers' professional development. The second section reviews different models of professional development with a special emphasis on training models. The next section highlights processes for evaluating professional development and is followed by a review of studies that evaluates the impact of professional development on students' achievement.

The chapter includes discussions of both individual studies and meta-analyses of studies that investigate the relationship between professional development and students' achievement. A review of studies that correlate students' achievement and professional development is included accompanied by a discussion of the methodological problems associated with defining the success of professional development in terms of students' performance.

Historical Perspective

In 1850, educator Henry Barnard discussed the importance of teacher preparation in his *Report on the Normal School* (as cited in Hillway, 1964). In that report, he stated that the Normal School "could best promote the permanent improvement of the common schools of the state by truly educating, and thoroughly training a few efficient teachers . . ." (p. 45). He was concerned that teacher preparation was not effective and, as a result, the achievement of the students would be negatively impacted. Indeed, the greatest emphasis for teacher education was

on the development of teachers in “training schools” or in “normal schools” for the next 100 years (Hillway).

The primacy of teachers' development related to preservice education; nevertheless, some efforts were made to establish continuing professional development for existing teachers. Early in the creation of continuing education models for teachers in public education, debate surfaced over the purpose of professional development, the focus and strategies for designing professional development, and the roles of the participants in the process. During this period, the most influential writings associated inservice education with instructional supervision (Harris, 1989).

Rogalin (1931), principal of the Jamaica Training School for Teachers in New York City, recognized the role that principals and supervisors of education took in guiding the development of teachers. He acknowledged their credentials for providing guidance to the teachers in their buildings and applauded their ability to do so based on their training in both the higher education and experiential arenas. He was, in fact, hesitant for the training school to become an advocate for continuing education of teachers in the public school setting. However, he saw a need for first-year teachers to be mentored and therefore embarked upon a carefully designed experimental plan in which the staff of the Jamaica Training School for Teachers served as consultants to the teachers in New York City schools who held probationary licensure. These probationary teachers were provided with an “inservice friend” who observed them, gave demonstration lessons, coordinated materials, and gave direction “in the use of the hectograph and other duplicating machines” (p. 287). The principals of the New York City's school system found these services helpful in freeing them to attend to other duties and beginning teachers reported that they felt supported throughout the project. The experiment was determined to be successful by both the public sector and the schools that provided preservice training for teachers (Rogalin).

While the literature is sparse regarding public schools' efforts to provide professional development for teachers in any systematic way between 1930 and 1950, some continuing

education was offered at the school level through mentoring relationships and through assemblies presented at district levels. Nevertheless, teachers primarily received ongoing professional development through enrollment in courses at the normal school. This continuing education was disengaged from the public school domain. During the 1940s, inservice education continued to be incorporated under the sphere of instructional supervision. Myers (1930) was more forward thinking in his approach to the supervisory construct of inservice and called on public schools to encourage all teachers to participate in reflective practice and engage in growth activities. He suggested that the measurement of students' achievement could be used as an avenue to motivate teachers to increase their skills and knowledge. He posited that when teachers discovered that their students' performance was lacking, they would look to furthering their own education in order to improve students' performance. He considered that administrators should support teachers' growth in more ways than through the evaluation process. His concept of linking students' achievement to teachers' growth has come of age only in recent times.

During the 1950s, the developing social sciences exerted increasing influence on the design of professional development for educators (Harris, 1989). In these years, the concept of professional development as a distinct operation in the field of education began to be supported by the National Society for the Study of Education and the National Education Association (Harris). With the engagement of these organizations, a new demand arose for workshops, action research, and consultation services associated with processes of learning and the techniques for teaching. Early professional development practices consisted of new teachers' induction programs, district-wide workshops with consultants, speakers who supported a new focus of the system, and conferences. The design of these opportunities was based on the belief that periodic lectures or workshops delivered by experts would remediate deficits in teachers' practices and were, therefore, effective for impacting professional growth (Fine, 1994). Henry (1957), however, suggested that teachers' development could be designed differently. He

proposed that teachers should be collaborators and insisted that while lectures and workshops were not, in themselves, inappropriate, the lack of implementation of theory into the classroom created a chasm between teachers' development and students' learning.

Early researchers had some difficulty articulating the framework, methods, and the areas of focus for staff-development opportunities. Inservice education was expanding in its basis as a theoretical construct as well as a practical mission of the schools; however, the articles and books that addressed professional development were primarily descriptive or conceptual (Showers, Joyce, & Bennett, 1987). It was not until the 1970s that the effectiveness of inservice education began to be researched and delineated.

Hopkins (1972) described professional development as being so fledgling a science that the research could not be scaffolded to create an operational framework. In effect, he reported that the early research being conducted stood to conflict upon itself. The primary focus of the research base at that time was related to teachers' traits, instructional design, and descriptions of the appropriate design of professional development. Hopkins posited that the cursory and limited training provided to teachers based on these traits and models would provide only an illusory concept of improvement. In effect, Hopkins noted that in concentrating on the content of professional development, the process and context might be ignored, which could cause the results of the research to be limited in their applicability.

This consideration was borne out by the work of Costa and Garmston (1994) who reflected upon the staff development designs used in the 1970s and 1980s. In this era, the researchers found that the act of teaching was reduced to a series of specific tasks and behaviors believed to be connected to increasing students' achievement. Staff development consisted primarily of imparting information about these skills and behaviors to teachers with the expectation that they would be implemented into instructional design. This approach was successful in some ways; however, Costa and Garmston noted that divorcing the delivery of instruction from the content of teaching was decidedly short-sighted. In response to their

findings, the researchers created Cognitive Coaching, a model of professional growth that connected the needs of the adult learner with instructional design. This approach focused on the teacher as a decision-maker or someone who processed complex sets of information prior to, during, and after instruction of students.

Hord, Rutherford, Huling-Austin, and Hall (1987) also outlined the historical context for teachers' development. They reviewed the process in the context of the math and science curriculum movements of the 1960s and early 1970s. In the wake of Russia's launching of Sputnik in 1957, teachers were provided with a cadre of new science and math materials accompanied by cursory training in their use. These innovations were implemented in continuous annual cycles composed of introducing new curriculum, training teachers in workshops, and evaluating effectiveness of the curriculum changes based on students' performance. This model did not adequately provide for teacher training or for assimilation of new concepts and strategies associated with the curricular changes (Hord et al.). During this time, teachers were inundated with programs and had little opportunity to develop ownership for them. They became disenfranchised with the new programs and resistant toward implementing additional models.

Following this disastrous disconnect between teachers and the design of training in the 1960s, some researchers began to articulate the importance of the design of professional development models in impacting long-term change in teachers' practices. Berman and McLaughlin (1978) determined that teachers should be involved in the implementation of any professional development. Jwaideh and Marker (1972) discovered additional reasons for limited success as they recognized the incongruity between the research on best practices and teachers' implementation of the research. They found, for example, that although social studies teachers had the benefit of publications from the US Office of Education, ERIC, Title II Educational Laboratories, the National Education Association, and professional journals about best practices

in curricular and pedagogical technique, they were not using the strategies or information relayed in those publications to inform their practices (Jwaideh & Marker).

Jwaideh and Marker (1972) designed a training program that used field agents who were highly trained in content, in adult learning theory, in selection of strategy for diffusion of knowledge, and in techniques for recognizing appropriate timing of delivery of new knowledge. These field agents had continuous and intensive contact with social studies teachers for over a year. Their model reflected a growing awareness of the importance of connecting learning theory to professional development for teachers.

Sprinthall and Theis-Sprinthall (1983) also conducted studies that correlated conditions for adults' learning with teachers' growth. They suggested through their cognitive studies that teachers' growth could occur if teachers took a significant role in experiential learning as long as that learning was balanced with guided reflection of their experiences. They further outlined the importance of developing evaluations of teachers' growth opportunities as well as the challenges associated with assessing teachers' learning resulting from their engagement in professional development opportunities.

The concept of defining professional growth in terms of outcomes was expanded in the late 1980s. At that point, the focus of professional development models began shifting from the factors that impacted effective professional development to surveying students' outcomes and to analyzing strategies that teachers should use to impact students' learning (Choy & Chen, 1998). Meanwhile, Sprinthall and Theis-Sprinthall (1983) suggested that the construct of professional development models was still so new that the "primary and most pressing need facing the profession was to build a base in theory and in research" (p. 31).

Over time, the literature reflected a growing understanding that effective professional development was the key to teachers' effectiveness and to school improvement (Elam, Cramer, & Brodinsky, 1986; Fullan, 1982; Lieberman, 1995). Scanlon (1978) sounded the call for investment in teachers' development as the key for successful innovation, stating, “It is

unrealistic to assume that teachers will, without some special provision, automatically acquire the new teaching skills related to educational change" (p. 104). Elmore (1992) echoed that sentiment, stating, "It is patently foolish to expect individual teachers to be able to learn and apply the ideas of current research on teaching by themselves" (p. 46).

Several models for school improvement based on teachers' development were created from the late 1960s to the 1990s. Four of these models were listed in an issue of *The Catalog of School Reform Models* (Northwest Regional Educational Laboratory, 1999). These were: James Comer's *School Development Program* in 1968, *Success for All* in 1987, *Accelerated Schools* in 1987, and The Learning Network® in 1992. Each model reflected the philosophy that the entire school should be a practicing learning community and included a component that addresses a foundational belief that school reform occurs through and as a result of professional growth of its teachers and students.

According to Moats (1999), the National Education Association and the American Federation of Teachers both issued statements in 1986 calling for high-quality professional development delivered over extended periods in order to support school improvement. Likewise, The National Commission on Teaching and America's Future (1996) recognized the importance of improving teaching and learning in America and in stark contrast to reform initiatives of the past, set forth a series of goals that focused on teachers' preparation and competence in the classroom. Dilworth and Imig (1995) synthesized the most recent paradigm for teachers' development in terms of the underlying philosophy associated with design. This report pointed out that the framework for professional development had begun to change from the deficit-based approaches of the 1970s and 1980s to competency-based approaches and had begun to move from dwelling on educational theory to focusing on content.

Professional development models are being developed to embody the research of the past two decades that is underlying the consensus view of effective design. They are more often linked to school-wide performance goals with an emphasis on content knowledge and skills.

Additionally, they focus on the principles of adult-learning theory in their format and offer more effective opportunities for teachers to learn and grow (Elmore, 2002). The next sections address current effective professional development and give several characteristics associated with these practices.

Characteristics of Effective Professional Development

The characteristics associated with effective professional development have been identified by a number of sources using multiple approaches. Butler (n.d.) conducted a review of the literature on characteristics of effective professional development and identified three areas of consideration for the design of professional development experiences: (a) the needs of the participants; (b) the purposes, processes, structure, content and follow-up of the program; and (c) the organizational design characteristics that impact participants' success. Each model of teachers' development operates in the context of and in relation to these three issues.

Sparks (1983) also created a listing of characteristics associated with effective professional development. These characteristics included: (a) content that increases students' achievement; (b) training sessions conducted two or three weeks apart; and (c) presentation, demonstration, practice, and feedback in small-group and collaborative activities. Her meta-analysis of the research showed that "Collaborative staff development models show promise for creating a positive context for inservice activities" (p. 66).

The implication of the context of professional development activity has also received attention from the National Foundation for the Improvement of Education (1996). This organization recognized the importance of the context of the delivery model in its report, *Teachers Take Charge of Their Learning.* The report made a series of recommendations one of which was to include time within the school day for teachers to learn. Renyi (1998) indicated that professional development should incorporate the needs of the individual teacher within the

context of the school, recognize the value of contextual learning, and address the needs of the teacher in the cultural context of the workplace.

Professional development opportunities that reflect these practices are not widely practiced. This is evidenced by the most frequent designs for teachers' development. According to Little (2002), these designs continue to consist of training sessions that are delivered by an expert at after-school sessions and at conferences. Little (1993) also stated that this design reflected the continuing belief that teachers should function as intellectuals rather than as practitioners. As a result, schools suffer from what Pfeffer and Sutton (1999) referred to as the "knowing-doing gap." Teachers are provided with knowledge but it fails to impact or improve either their organizations or students' achievement, because, independently, they are unable to turn that knowledge into action.

One suggestion for overcoming the knowing-doing gap is to provide professional development primarily at the worksite rather than at district-wide meetings so typical of professional development opportunities of most school systems (National Foundation for the Improvement of Education, 1996; National Staff Development Council, 2001). Professional development can be designed so that the teacher has growth opportunities provided at the workplace within the working day and by using real-life problems central to the teaching and learning process. It must also address content knowledge and be designed to increase a teacher's understanding not only of the subject matter being taught but also of the process of students' learning (Elmore, 2002).

The National Foundation for the Improvement of Education (1996) stressed that high-quality professional development should have as its goal the improvement of students' learning and should be sustained over time to support long-term changes in teachers' practices. The typical workshop cannot accomplish this task. Lawrence (1974) conducted a meta-analysis of 97 studies and determined that inservice programs that were short in duration such as the typical

one-day event were largely ineffective in impacting teachers' practices and that only those of longer duration resulted in greater transferability of learning into practice.

According to Elam et al. (1986), the American Association of School Administrators issued a critical report on staff development that highlighted five components of an effective program. It: (a) is founded in a philosophy that recognizes that change is a process based on the needs of the organization and includes leadership development, (b) is based on research, (c) includes all educators, (d) focuses on the individual needs of teachers, and (e) is long range and intensive.

According to Fine (1994), this report was followed by recommendations from the North Central Regional Educational Laboratory. Recommendations were forthcoming by the Consortium for Policy Research in Education (1995), the U.S. Department of Education (Choy & Chen, 1998), the National Foundation for the Improvement of Education (1996), and the American Federation of Teachers (Moats, 1999). These organizations based their recommendations on new models of school reform that focused on increasing teachers' capacity.

The U.S. Department of Education (1996) provided a synthesis of these findings and defined high-qualify professional development as: (a) focusing on teachers as central to student learning; (b) focusing on individual, collegial, and organizational improvement; (c) respecting the leadership capacity of the participants; (d) reflecting best practices in teaching; (e) enabling teachers to further their expertise in subject content or teaching strategies; (f) promoting continuous inquiry and improvement that is embedded into the working day; (g) involving the stakeholders in the design and implementation of the development; (h) requiring substantial resources; (i) connecting practices to school improvement planning; and (j) impacting teachers' effectiveness and students' achievement in a positive way.

These concepts are foundational to three issues that Sparks and Hirsh (1997) stated were “altering the shape of schools in the United States and the staff development that occurs within them. These ideas are: results-driven education, systems thinking, and constructivism” (p. 4).

The philosophies and practices associated with these three issues underlay the design of professional development models in place today, the processes for implementing them, and the techniques used to assess their effectiveness. Educators at all levels are analyzing staff development in terms of how it reflects these best practices as identified by Sparks and Hirsh. Specifically, the question becomes: How are these best practices incorporated into models of professional development in order to meet the goal of improving students' learning?

Models of Professional Development

During the past two decades, a series of different professional development models have been designed to impact teaching practice and students' learning. These models were based on a number of assumptions about adults' learning and the process of change (Butler, n.d.). They have been variously grouped and labeled as: (a) training (Joyce & Showers, 1988; Zemke, 2002); (b) study groups (Wineburg & Grossman, 1998); (c) scoring students' work samples (Lambert, 2003; Little, Gearhart, Curry, & Kafka, 2003); (d) networks (Little, 2002; Pennell & Firestone, 1998); (e) discussion groups (Ladson-Billings & Gomez, 2001; Sparks, 1983); (f) critical friends (Bambino, 2002; Costa & Kallick, 1993; Dunn, Nave & Lewis, 2002); (g) associational membership (Little); (h) coteaching (Roth & Tobin, 2002); and (i) university level course work (Ferguson, 1991; Glatthorn, 1997).

Sparks and Loucks-Horsley (1989) conducted a meta-analysis of existing research and outlined five basic structures of staff development: (a) individually-guided staff development that is defined and determined by teachers to enhance their own learning and support them in meeting their own goals; (b) observation/assessment that is guided by classroom observation, evaluation, and feedback to the teacher; (c) involvement in a school improvement process such as curriculum development; (d) training characterized by workshops and conferences that are outcome-based and revolve around knowledge and skill development; and (e) inquiry that is based on action research techniques. Within their analysis, Sparks and Loucks-Horsley provided

a series of assumptions and structures that underlie each model. Although teachers' development can be designed using any of these models independently or in conjunction with one another, the design of most professional development continues to lie within the context of training.

The traditional training model is predominantly characterized by half-day or full-day workshops that are lecture-based and mandatory. These are the inservice activities that Wood and Thompson (1980) described as "disadvantaged, poverty-stricken, and neglected . . . the slum of American education" (p. 274). Their analysis of the effectiveness of professional development was based on the notion that learning is not a passive activity and that both teachers and students benefit from active engagement in the learning process. Further criticism focused on the lack of connection between these activities and the goal of a school for improvement.

On the other end of the spectrum is the broad based concept of professional development that Lambert (2003) referred to as "opportunities to learn" (p. 22). She defined professional development to include:

> Learning opportunities that can be found in collegial conversations, coaching episodes, shared decision-making groups, reflective journals, parent forums, or other such occasions. Indeed, because the focus of such conversations may well be on a given discipline or skill--literacy for instance or problem solving--the learning of both teachers and students can be addressed concurrently. (p. 22)

This broad-spectrum definition of professional development in concert with the conjoining of learning for both teachers and students is a true paradigm shift from the traditional framework for professional development.

While some movement is being made in educational sectors to embrace more inclusive approaches to teachers' development, many educators still look to models that are better defined. Some authors (Darling-Hammond & McLaughlin, 1995; Joyce & Showers, 1988) have argued that although brief and episodic training is inappropriate, training in itself is not a poor model of professional development. The problem lies in the simplistic design of most professional development sessions, the ubiquitous "sit and get" model of training. Sparks and Hirsh (1997) described job-embedded learning as training that "links learning to the immediate and real-life

problems faced by teachers and administrators" (p. 52). This type of learning provides teachers with the opportunity for immediate application and experimentation with strategies and concepts to which they are being introduced and allows for contextual learning. Sparks and Hirsh contended that providing teachers with support creates a transfer of knowledge to classroom practices and increases the productivity of this design of professional development.

A Closer Look at Training

The National Center for Educational Statistics (1999) found that 99% of all teachers participated in professional development activities that would be categorized as training. Most of those experiences lasted one day or less. The limited scope of such training opportunities has been shown to have little effect either on teachers' practices or on students' outcomes. They lacked the duration, intensity, and follow-up that are the keys to success (Little, 1993).

There are additional characteristics that have been associated with effective training models. Sparks (1983) and Wood and Thompson (1980) found that models of training that (a) were of sufficient intensity to create and sustain change, (b) focused on job related tasks and teaching methods, (c) offered opportunities to practice in the real work setting, and (d) included collaborative learning opportunities did make a difference.

Researchers have analyzed the complexity and purpose of the different models categorized as training. Zemke (2002) distinguished between know-how and expertise by pointing to the key role that training played in creating expertise. He reported that training should offer teachers both the knowledge and skills they needed to positively impact their performance. Zemke argued that experiences that offered knowledge without the associated skills for implementation, or, conversely, skills without the knowledge and the theory that underlay their use, did not typically create the understandings that supported lasting change in teachers' performance.

These attributes of training, both knowledge and skill-based, are embodied in the levels of training identified by Joyce and Showers (1980). Their work associated differing levels of complexity based on the purpose of the training. They distinguished between training that fine-tuned the craft of the teacher and training that required teachers to learn new strategies. Teachers required much less sophisticated models of training if they were merely fine tuning the skills they already possessed. However, if training were to redefine the techniques the teachers were already using, it must be designed in such a way that teachers became both knowledgeable about the change and competent at transferring the concepts, principles, and skills into their classrooms (Joyce & Showers, 1981).

Joyce and Showers (1988) suggested that training should not only be designed to improve individual skills and academic knowledge but it should also include supports that encourage the transferability of skills into the classroom. In order to accomplish this goal, they envisioned a system of professional development that would not only include from 15 to 20 days of study each year but would also contain a collaborative component allowing teachers to work with one another to hone and expand their skills (Joyce & Showers).

Joyce and Showers (1980) indicated that skill development was basic to improving teachers' efficacy and students' improvement and reported that complex training did create better teaching and learning. In a meta-analysis of more than 200 studies that investigated the effectiveness of different training methods, Joyce and Showers found that most researchers based their conclusions on the responses of the participants in the workshop setting. They set forth the idea, however, that effective models of training should be evaluated in terms of their impact upon teachers' practices and, ultimately, upon students' performance.

A series of studies have reported the effects of training on teachers' performance. In her meta-analysis, Butler (n.d.) found that the structures and processes of staff development programs are indicators of the impact of those programs. Guskey (1985) found, however, that just providing training or follow-up activities did not, in itself, cause teachers to change their

practices. The process was important to the success of any opportunity as illustrated by his finding that teachers were not motivated to change their practices until they saw evidence of success in their own classrooms. Students' success was determined to be the catalyst for teachers to implement and sustain new strategies into their practices. Therefore, Guskey suggested that any model of training should include students' outcomes as a part of the process of determining the effect of training on teachers' performance.

Joyce and Showers (1980) outlined five components of effective models of professional development that created specific structures and processes of support for teacher and students' success: (a) providing a description or theory behind the new skill, (b) modeling the skill for the teachers, (c) practicing the skill in simulated settings, (d) providing feedback to the teachers about their practice of the skills, and (e) providing coaching or mentoring to the teachers in the classroom setting. They found that the inclusion of all five components not only significantly increased transfer of knowledge and application to the classroom but also increased students' success.

A long-term study by researchers Berman and McLaughlin (1978) included 852 administrators and 689 teachers. These researchers also found that for training to be effective, it should be long term and specific to teachers' needs. Programs that included demonstrations, trials, and teachers' participation were more effective than traditional staff development sessions.

Sparks (1983) conducted a meta-analysis of available research that connected professional development and effective teaching. She recommended that the content of the staff development program be grounded in research and focused on the improvement of students' achievement. She found that to be effective, training sessions needed to be sustained over time, should occur two or three weeks apart, and should include presentation, demonstration, practice, and feedback. Sparks also recommended peer observations.

Joyce, McNair, Diaz, and McKibbin (1976) interviewed 1,016 educators and discovered that teachers wanted job-specific training, training that was available to them in a timely manner

and provided support to their craft instead of theory-based training associated with brief inservices. Joyce and Showers (1983) looked at 41 different studies from 1963 to 1982 to determine if there were correlations between a more complex model of professional development, one that included follow-up coaching, and teachers' mastery of the target skills in the training. They found that there was greater transfer of skills into the classroom if the model included coaching as a component of the model. Joyce and Weil (1992) found in a later study that a key structural element to the success of a professional development model was the inclusion of a coach or mentor who provided the teacher with companionship and support for reflection about skills, attitudes, and processes associated with teaching and learning.

Additional research highlighted follow-up as a critical component of staff development. Joyce and Showers (1981) found that teachers who were involved in follow-up activities with peer or expert coaches retained more information about the skills of the training and were more likely to describe the theoretical implications of the teaching and learning process. This is an especially important finding considering that Showers et al. (1987) found that teachers required 25 follow up sessions to effectively transfer new skills into their classroom practices.

Some researchers, however, have found that the design of professional development is immaterial. Wade (1984) conducted a meta-analysis of studies on professional development and postulated that there were “few accounts [of] concrete evidence of its effects on teachers and students” (p. 48). She reviewed 91 quantitative studies and analyzed the process elements of their associated professional development models. She grouped results into effect levels, analyzing the impact of the inservice on classroom performance. Her analysis determined that staff development treatment of any kind resulted in .52 of a standard deviation greater change for the experimental group of teachers. The implication was that teachers benefited from different types of training model.

Recognizing that there are many models of professional development and that these models vary in terms of their complexity and purpose, evaluation of a specific model becomes challenging. How, then, does one determine the effectiveness of the model?

Evaluation of Professional Development

In the past, evaluation of professional development has primarily consisted of examining teachers' attitudes as outcomes. This process has typically relied upon checklists, tests, and surveys designed to assess either teachers' attitudes or knowledge-base or to evaluate the presenter of the professional development opportunity. There is a paucity of research that addresses alternate methods of evaluation especially that which assesses professional development in terms of students' outcomes. A case in point is a 1994 publication by Dean that devoted two entire chapters to evaluation of professional development activities but omitted any discussion regarding the use of students' achievement to evaluate those experiences. Guskey (2002) proposed that professional development should not only be intentionally designed but should also be intentionally evaluated in order to determine if the activities achieved their purpose.

Guskey's (2002) position was supported by the National Staff Development Council (2001) that established national standards for professional development that give some direction for assessing the quality of teachers' learning experiences in terms of impact upon students' achievement. Broadly, these experiences can be viewed through a lens of process design in which the design of the event reflects best practices or through a lens of outcome design in which the experience results in a change of teachers' and students' behaviors. School systems should choose the paradigm that best fits their goals for professional development and should evaluate the experience in terms of the new accountability standards to which educators must answer (Elmore, 2002). Sparks and Hirsh (1997) related:

> The days when educators [usually teachers] sit relatively passively while an "expert" exposes them to new ideas or "trains" them in new practices, and the success of the effort

> is judged by a "happiness quotient" that measures participants' satisfaction with the experience and their off-the-cuff assessment regarding its usefulness are gone. (p. 1)

Guskey (2002) suggested five levels of evaluation of professional development whereby each looks at different data sets. Level one analyzes staff development by looking at the participants' reactions to the professional development experience. Historically, most professional development experiences have been evaluated using this design. Level-two evaluations measure the knowledge and skills gained by the participants. The data sets for both level one and level two are most commonly derived from checklists and surveys. Level-three evaluations focus on characteristics of the organization and the supports to the organization that promote the changes indicated by professional development. These evaluations frequently accompany initiatives surrounding school reform or programs designed to affect school improvement. Level-three evaluations rely heavily upon qualitative data in the form of questionnaires, portfolios, and structured interviews. Level-four evaluations ascertain the degree to which participants in a professional development session implement the new knowledge and skills into their practice. Questionnaires and interviews, direct observations, or videotapes provide the data for level-four evaluations. Finally, level-five assessments evaluate the impact of the professional development opportunity in terms of its impact upon students' learning outcomes (Guskey). Students' records are the basis for these assessments. While research centering around the effectiveness of professional development can be viewed through these five evaluation designs, Guskey pointed to the value of level-five evaluations for providing evidence of the overall impact of professional development on school reform.

A review of studies that reported results of professional development in light of these five levels revealed that most early data collection relied heavily upon level-one analysis. Gage (1984), for example, reported that in eight of nine experimental studies, participants reported that "inservice education was effective enough to change teachers' behaviors and improve students' achievement, behaviors, or attitudes" (p. 92). These studies were level-one evaluations that relied upon data solicited from the participants. Gage concluded that they showed limited impact

upon the participants or the students. Furthermore, he related that the results of the experiments might have been skewed to some degree because of the Hawthorne effect.

Guskey (1985) expanded upon these findings. He reported that teachers typically did not have a change in their attitudes or beliefs about a program or new teaching strategy until after they had implemented it into their classrooms and had seen a change in students' learning outcomes. He postulated, therefore, that reliance on teachers' perceptions about the effectiveness of staff development based on their reactions to the professional development experience itself was premature. He suggested that any evaluation should consider the long-term effects of the growth activity on teachers' practices.

Dupuis and Askov (1982) conducted a level-one evaluation on the *Content Area Reading Program*, a validated reading program used in Pennsylvania. Teachers attended training that consisted of 15 three-hour workshops and implemented strategies of those workshops over a two-year period. These researchers reported positive increases in teachers' knowledge and attitudes that remained consistent for one year following the training. The researchers noted, however, the intensity (45 hours) of the training was a significant factor in the design of the experiences and the impact it made on teachers' practices.

In the 1980s, several studies (Joyce & Showers, 1981, 1982, 1983, 1988) focused on the transferability of concepts into the teaching practices of the participants, assessing professional development experiences at level four. Joyce and Showers (1995) and Huberman (1992) found that teachers did not implement new strategies that were demonstrated in training sessions into their classrooms. They postulated that typical inservice presentations were too compact in intensity and duration for teachers to transfer knowledge to their practices. The data for these studies were collected through observations of teachers in their daily instructional environments.

Joyce and Showers (1988) subsequently observed teachers' behaviors to evaluate the effectiveness of more complex professional development models. In their level-four assessments, they found that effective implementation of best practices into the classroom

required training that included theory, demonstration, practice, feedback, and coaching. When feedback and coaching occurred in the workplace, an effect size of 2.71 occurred for knowledge-level objectives, 1.25 for skill-level objectives, and 1.68 for transfer of training to the classroom. They associated these effect sizes with the increased complexity of a model that offered all five components.

Servatius and Young (1985) also conducted a study to analyze the impact on teachers' practices of training models that were supported by follow-up coaching. Their study reported a count of practices observed in the classroom, reflecting a level-four evaluation. They found that teachers who received training and support-coaching implemented the targeted skills correctly and consistently. In a similar study, Fullan, Bennett, and Rolheiser-Bennett (1990) reported that teachers who participated in a professional development model that incorporated follow-up support demonstrated transfer of the concepts presented in the workshops into their classroom practice. Conclusions from these researchers were that the professional development experience was effective because there was transfer of skills and knowledge into the classroom. The evaluation technique used to assess the effectiveness of the professional development opportunities was level four and focused on teachers' practices.

In a recent level-four evaluation of professional development, Shroyer (2003) conducted a study in which teachers at grades kindergarten through three were observed teaching reading to their students prior to and after receiving approximately 100 hours of professional development. She found that teachers did not incorporate new reading strategies into their practices at a significant level even though their self-reported responses showed they believed there was transference of knowledge into classroom practices. Shroyer concluded that this discrepancy between the level-four and level-one evaluations of the teachers' growth indicated the complexities of the interaction between training events offered to the teachers, their learning, and the outcomes of those experiences.

Joyce, Murphy, Showers, and Murphy (1989) implemented a training model and evaluated it using level-five assessment measures. The model they assessed provided staff development using demonstration, feedback, coaching, and discussion that was designed to enhance and connect theory to skill. In order to determine the effectiveness of the model, achievement data were collected from students in Richmond County, Georgia. These researchers analyzed the data to determine if differences in teachers' skills in using new strategies were associated with students' learning as measured by the *Iowa Tests of Basic Skills*. Students of proficient teachers who participated in professional development models for two years out-performed those of the control group.

The most frequent quantitative measures of professional development continued to be assessed at levels one and two and were based on teachers' satisfaction or increases in their knowledge base. Guskey (1995), the National Staff Development Council (2001), Elmore (2002), Guskey (2002), and others emphasized moving to an environment in which staff development is assessed by looking at its impact on students' achievement. Historically, the effectiveness of staff development has not been based on students' performance. Actual analysis of the effectiveness of professional development using students' growth is sparse. However, in recent years, several initiatives supported by the Office of Educational Research, by regional laboratories, and by institutions of higher education have created a growing research base for analyzing the impact of professional development on students' achievement (Northwest Regional Educational Laboratory, 1999). A review of level-five evaluations is important to provide insight into the complexities of this assessment process.

The Impact of Training on Students' Achievement: Level-Five Evaluations

Elmore (2002) highlighted the importance of reshaping the perspective on school reform to reflect an understanding that increasing students' achievement "requires a strategy for investing in the knowledge and skills of educators . . . [who] have to learn to do their work

differently" (p. 5). He charged school systems and administrators of individual schools to invest in the knowledge and skills of teachers so that they can impact students' performance.

Willis (2002**)** referenced James Stigler's position that improving methods of teaching must be a priority for staff development programs if teachers are to impact students' achievement. If mediocre teachers continue to implement average methods, then students will continue to achieve at the substandard levels of the past. While it is hypothesized that students' achievement might be improved with teachers' professional development, there were few reliable studies that examined the direct connection between the two (Butler, n.d.). Sparks and Hirsch (2004) referenced a growing body of research that connected growth in teachers' knowledge and skills with increased students' achievement; however, Reitzug (2002) stated earlier that actually testing the relationship between professional development and students' achievement was problematic. The intervening variables created studies that were not as reliably designed as should be desirable for scientific research.

Several studies provided data that indicated the impact of variables associated with teachers' training upon students' achievement. Ferguson's (1991) correlational study showed that every additional dollar spent on creating more highly qualified teachers resulted in greater increases in students' achievement than did investment in other areas. Greenwald, Hedges, and Laine (1996) also found that moderate increases in spending on staff development resulted in significant increases in students' achievement. They reported that investment in professional development had more impact than money spent either to raise teachers' salaries or to reduce class size. Good and Grouws (1977) conducted an early level-five study and reported that a 10-session professional development program in mathematics content, instructional, and management techniques resulted in improved classroom practice and students' performance.

According to the U.S. Department of Education (1995), the Program Effectiveness Panel, a division of the National Diffusion Network, validated exemplary programs of reading. Its 1995 analysis of the Exemplary Center for Reading Instruction (ECRI) found that regular education

ECRI students demonstrated significantly greater gains ($p < .01$) on the reading subscales of standardized achievement tests than control groups and had greater than expected scores derived from nationally normed data (U.S. Department of Education). This program depended upon training teachers through lectures and practice, teaching students in a simulated setting, and follow-up coaching in trainees' classrooms.

According to Land and Olsen (2001), the National Writing Project is a professional development model that extensively trains teachers in annual four- to five-week sessions. Follow-up coaching takes place in classrooms and includes the components of demonstration lessons, coteaching, planning, and feedback. Networking opportunities are also available to support teachers' development. Land and Olson compared achievement data from students in grades 6 through 12 who were English Language Learners (ELL) to achievement scores of a control group over a period of five years. The students whose teachers participated in the National Writing Project achieved statistically higher scores than those whose teachers did not participate.

Cohen and Hill (1998) found that students' higher standardized test scores were associated with teachers who received greater amounts of staff development. They analyzed the achievement scores from students of teachers who participated in sustained professional development activities linked to California’s mathematics curriculum. These teachers demonstrated improved levels of knowledge of mathematics and transferability of practice into the classroom.

Joyce, Hrycauk, and Calhoun (2003) conducted a training program designed to help kindergarten teachers implement a new reading curriculum. The staff development included demonstrations, analysis of practice, feedback, and peer coaching embedded into the workplace of the teachers. Students achieved above the normally expected performance level in reading with 40% of the 94 students reading extended text and only 2% reading at the picture level. The authors reported that special education referrals went from 20 to 2 for the population involved in

the study. They concluded that the training received by teachers enabled them to provide quality instruction for their less able students, thereby avoiding the need to refer them for special education services.

The Literacy Collaborative, designed around a framework of five years of professional development, was created to increase literacy skills of students in grades kindergarten through two (Scharer, Desai, Williams, & Pinnell, 2003). Teachers received intensive training, seven weeks of which were distributed throughout the first year of implementation of this content-based professional development model. Scharer et al. found that the NCE scores for total reading on the Gates-MacGinitie Reading Test increased from a mean of 39.85 to a mean of 48 over six years. In addition, fewer students whose teachers participated in *The Literacy Collaborative* scored in the lowest quartile. The researchers associated this increase in performance with the teachers' training in literacy instruction.

Elser (1999) conducted a quasi-experimental comparative case study of a professional development model based on the components of Joyce and Showers' (1982, 1983, 1988) training model, The Learning Network® (2004). She found that achievement of fourth graders in reading and language arts was higher than that of the students whose teachers were not trained using this model. Although her results indicated a need for further study using a larger population, the study pointed to the positive correlation between students' achievement and professional development that included components of modeling, coaching, feedback, and reflective dialogue.

A series of level-five studies have been conducted surrounding the Comprehensive School Reform model, known as Accelerated Schools (Northwest Regional Educational Laboratory, 1999). This model employs a coach who works with teachers in developing a process of collaborative inquiry to make pedagogical decisions across the content areas. Teachers participate in 11 days of professional development prior to the beginning of the school year and ongoing coaching throughout the year. The training surrounds contextual issues of the school and designs of instruction to support student growth across the content areas. The

Northwest Regional Educational Laboratory found that students' achievement in reading and mathematics was not significantly impacted during the first three years of implementation of the professional development model. However, a gradual increase in scores was evidenced during the fourth and fifth years when the model of growth had been more fully implemented.

Some level-five studies do not demonstrate improvements in achievement following professional development. Moburg (1963) reviewed the literature on students' progress in reading and found that although teachers demonstrated significant growth, it was not reflected in corresponding improvement in reading achievement among their students. However, he posited that students' achievement gains were not realized due to relatively short periods of professional development in the studies he reviewed.

Stout (1996) also conducted a review of the literature. He found that there was little evidence that teachers' skills improved because of professional development and indicated that there was limited correlation between teachers' professional development and students' performance.

Three additional researchers, Shymansky, Yore, and Anderson, (1999) studied teachers who had received approximately 100 hours of inservice training. Analysis of the data they collected indicated that the training did not significantly affect students' achievement.

Methodological Problems Associated With Level-Five Evaluations

The link between professional development and achievement in the content areas is an area of study that has had limited scrutiny (Dilworth & Imig, 1995). There were a variety of reasons for this lack of inquiry into the connection between students' performance and models of teacher development. Guskey (2002) stated, "The relationship between professional development and improvements in student learning in these real world settings is far too complex and includes too many intervening variables to permit simple causal inferences" (p. 50) and admitted that "isolating the effects of a single program or activity under such conditions is

usually impossible" (p. 50). McLean (2001) highlighted some of the issues associated with the design of level-five research projects including the attrition and mobility rates of teachers and students as well as the selection of the schools, the students, and the teachers who participated in any designated model of study. Factors related to the consistency of implementation of any staff development model were other crucial components for consideration in a level-five evaluation.

The length of time that teachers participate in any one professional development model is a variable to address when correlating students' achievement to teachers' training. Short-term studies did not always provide teachers with enough time to implement the skills and knowledge they acquired through staff development; therefore, the effect on students' achievement could be minimized. On the other hand, while longitudinal studies explored the impact of professional development on students' achievement after multiple years, the risk of the impact of contextual factors that affect the validity of the studies increased.

Researchers have highlighted the importance of the context of a program of professional development in the past 20 years (Berman & McLaughlin, 1978; Fullan, 1982; Joyce & Showers, 1988; Lieberman, 1995). The uniformity with which any model is implemented is a consideration for making comparisons and drawing conclusions. The number of hours of training, the quality of the training, the involvement of the leadership, the engagement of the participants, and the design of the training all impact its effectiveness and its potential for being translated into increased achievement by students. These researchers further pointed out that replication of studies was difficult because of extraneous variables and the chain of events that were determined by the context, content, and design of professional development experiences.

Evaluations of staff development using questionnaires of teachers' impressions of the model or those based on observations of teachers' practices were limited in that they did not provide information regarding the impact on students' achievement. Showers et al. (1987) described those evaluations in which the researcher determined the effectiveness of professional development by simply counting the occurrence of selected behaviors demonstrated by teachers

following their participation in staff development as being over-simplistic. While they, too, reasoned that any model of staff development is impacted by the context in which it is delivered, they noted that the importance of exploring the effect that it has on students' achievement cannot be overestimated.

Looking at staff development in terms of teachers' perceptions does not address the role of staff development for increasing teachers' expertise and affecting students' achievement. Students' achievement is at the heart of the issue. To avoid analysis of the relationship between professional development and students' achievement is to ignore the importance of professional development for genuine school reform. Guskey (2002) stated that professional development must be evaluated in terms of the desired result--improved students' outcomes. While recognizing the complexities of evaluating professional development, this study analyzed one model of professional development in terms of its impact on students' achievement in reading, a level-five evaluation.

Summary

The school reform movement is changing from its focus on organizational design and programmatic innovations to one that recognizes the connection between teachers' effectiveness and students' achievement. As noted by Scanlon (1978), “The task for ensuring effective inservice training for teachers rests with the administrator “ (p. 104). Elam et al. (1986) also championed the importance of rethinking staff development with a call to action while describing teachers' development as “an obligation—for the district to provide and for the staff to participate. It is a debt teachers owe to their profession. It is an obligation administrators must carry out for the benefit of the students and the community” (p. 4). Recognizing this imperative, administrators are wrestling with designing quality professional development that not only increases teachers' capacity by expanding their repertoires of skills but also provides a structure for transferability of knowledge into practice. DuFour (1999) encouraged principals to

understand the connections between school improvement and the continuous learning of the organizational unit. He urged administrators to commit to the professional development and renewal of each member of the staff in order to increase students' achievement.

This study evaluated a professional development model using a level-five assessment. The professional development model of the study included the following components: (a) practice trials; (b) teachers' participation; (c) coaching, intensity, and duration of training; (d) reflective processing; and (e) administrative involvement. The Learning Network® (2004) is the model assessed in this study. Chapter 3 sets forth the design of the study and provides a description of the population, an overview of the data collection, and analysis processes.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of the study was to determine if there existed a difference in the achievement of students whose teachers participated in a job-embedded model of professional development based on the research of Joyce and Showers (1981, 1982, 1983, 1988) and achievement of students whose teachers did not participate in this model of professional development. Chapter 3 describes the methodology and procedures that were used to correlate students' achievement in reading and teachers' participation in professional development. It is organized into the following sections: research design, population, student achievement, description of professional development model, data collection, and data analysis.

Research Design

Borg and Gall (1989) stated that the primary reason for educational research was to develop new knowledge about teaching and learning. This study proposed to contribute information about the potential design of educational practice by correlating teachers' participation in a model of professional development based on Joyce and Showers' training model (1981) to students' achievement in reading.

This quasi-experimental, correlational study addressed differences between the scores of students whose teachers participated in a prescribed job-embedded model of professional development and those whose teachers did not. The reading achievement scores of students enrolled in pre-existing groups were analyzed. The data used in the study were gathered from reports of the 2004 Tennessee Comprehensive Assessment Program elementary level *TerraNov*a *Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997). While no cause and effect conclusion can be made based on this design, findings might suggest a link between job-embedded professional development and students' achievement.

With regard to objectivity of the researcher, it is desirable that the researcher not be integrally related to the project being evaluated. Nevertheless, it is appropriate that the researcher be involved in such a way as to have responsible knowledge of the program. While not being trained in this professional development model, nor being responsible for the overall fiscal management of the program, this researcher did participate in and observe training sessions for teacher leaders. Participation in monthly meetings throughout the training afforded the researcher with the opportunity to converse with teachers and administrators working in the schools of the study. The meetings were designed as informational sessions, allowing the teachers involved in the training to network and increase their understandings of theory and practice. Therefore, information about the staff development model, the service providers of the model, the degree to which the service providers adhered to the particular training model, and the degree to which the teachers of the study participated in the training process was readily available. This involvement was useful in assessing consistency of expectations for adherence to the training processes as well as consistency of implementation of the program across the population.

Additionally, the researcher was trained by representatives of CTB-McGraw Hill (1997) to generate reports using *TestMate Clarity,* the statistical package that accompanies the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill), a mandated test of student achievement that is annually administered to students in grades three through eight in the state of Tennessee. The *TestMate Clarity* package provided disaggregated data, gain scores, and achievement scores of the students of the study.

Population

This study explored the association of reading achievement of upper elementary school students whose teachers participated in job-embedded training during the 2003-2004 school year with students whose teachers did not participate. Students in grades three and five were targeted

for the study because (a) these students took the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997) in the year of the study and (b) students at these grade levels were in classes whose teachers had been trained using the particular model of the study.

The study group consisted of six different teachers representing five different schools. The comparison group for the study consisted of students in 10 third- and fifth-grade classrooms in the target schools whose teachers did not participate in the specified training model. The classes of the study were created by the principals of each school during the student-placement process; therefore, as in many studies within the discipline of education, the results are based on the scores of intact groups. The assumption that the cases represent a random sample from the population is violated.

In order to control for extraneous variables, one classroom of third-grade students whose teacher did not participate in the professional development model was excluded from the study. This classroom was a multiage classroom. The variables associated with this classroom design made the inclusion of these students untenable.

The population design is shown in Table 1. The study encompassed 336 students in grades three and five. Data were separated for students in the two grade levels of the study. Students who enrolled at the participating school after November 15, 2003, were excluded from the study. This procedure eliminated 6 students from the third-grade population and 10 students from the fifth-grade population.

Table 1

Demographics of the Population

School	Grade	Study Group	Control Group	School N	% Poverty Rate
1J	3	21	53	515	31
2R	3	15	10	214	85
3J	5	52	52	540	44
4K	5	17	36	57	61
5L	5	17	63	455	62
Totals		122	214		

The population of the five schools is representative of diverse socioeconomic levels. The targeted participants of the study consisted of 36 third-grade students and 86 fifth-grade students whose teachers participated in the specified professional development model.

Sixteen classrooms were involved in the study; of those involved, 6 participated in the study and 10 were in the control group. The classroom designs for the classrooms were primarily self-contained. In each case, the teacher who participated in the professional development model was responsible for students' achievement in reading. All classes of the study were single-grade classrooms. All students received a minimum of 1.5 hours of instruction in reading and writing daily for eight months.

Description of the Professional Development Model of the Study

In July 2003, five elementary schools in one school system in Tennessee that had identified the improvement of reading achievement as their school improvement goal banded together to participate in a model of professional development that would support their efforts to

increase students' achievement. These schools' leaders recognized the value of linking teachers and administrators across the school district to support the initiative (Joyce & Showers, 1988). With the help of a consultant, the schools implemented a structure of professional development designed to increase an individual teacher's competence in teaching reading while coordinating the effort through involvement at the district level.

The teachers involved in the study were selected by their principals for participation in the staff development opportunity. They were chosen for their willingness to engage in the activities of the model as well as for their skills in interacting with their colleagues. The teacher leaders, in essence, were not randomly selected.

These teachers received individual technical and coaching support from a consultant provided by The Learning Network (2004). Joyce and Showers (1988) stated that consultants who provide this type of training to teachers must be highly trained. They referred to such a consultant as a "staff development specialist" (p. 13). The consultant assigned to work with the schools of this study was an experienced teacher having taught school for 27 years. She had served as a public school administrator, had authored children's books, and had presented at regional and national staff development conferences. The consultant was also trained in pedagogical techniques, subject matter, and content knowledge foundational to expertise in the content area of reading. Additionally, the consultant was trained in techniques of adults' learning associated with effective professional development models (Renyi, 1998).

The consultant worked monthly with the two teacher leaders at each of the participating schools. The training concentrated on the use of formative assessment to initiate a teaching-learning cycle focused on students' growth in literacy skills. There was a special emphasis upon developing students' reading fluency, comprehension, and vocabulary in contextual learning experiences. The consultant demonstrated teaching techniques, observed teachers practicing the strategies, and offered feedback to help in closer approximations. The consultant worked with teachers in reflective processing through "instructional dialog" to help them connect their new

knowledge and theory to their skills in literacy instruction. These sessions were videotaped for the teachers to review. The consultant also provided coaching that was continued between visits through collaborative interactions with the participating teachers.

Each of the five schools created a critical triangle of the two teacher leaders and the administrator of the building. These teams met weekly without the consultant to discuss the strategies of focus and to create a framework of support for the teacher leaders. The district level component of the model lay in focus meetings. The members of the critical triangle from each of the five schools met together twice monthly to explore research and theory underlying the practices that they were implementing and to share ideas related to instructional design.

The principal of the participating schools selected each teacher leader. Teachers who indicated an interest in the model were more likely to participate as teacher leaders. They were, therefore, more likely to demonstrate a higher commitment to the process. This factor is important to consider when analyzing the results of the study.

Instrumentation

Students' achievement was measured using the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997). This nationally-normed achievement test is the accountability measure for the state of Tennessee. The test generates a total reading score for a student that reflects basic skills, vocabulary, and reading comprehension levels of students in the third grade and fifth grade. The reading subtests are purported to use authentic literature, both narrative and informational text, and to measure higher-order thinking skills. *The TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997) provided both criterion- referenced and norm-referenced data as well as scale scores that could be used to determine students' growth over time. The primary purpose of this test is to provide an accurate measure of achievement of academic skills. CTB-McGraw-Hill reported that its measure of achievement has a high degree of content, criterion, and construct validity (Tennessee Department of Education, 2002).

Data Collection

Permission was sought and obtained from the superintendent of the school system of the study to collect and analyze the data (see Appendix A). The data were made available by the school system through *Clarity TestMate*, a statistical package published by CTB-McGraw Hill (1997) that uses *Terra Nova* data to generate reports. These reports provided data related to individual students, schools, and the school system's achievement scores.

The data set consisted of total reading and total math achievement scores from the March, 2004 administration of the *TerraNova Test of Comprehensive Skills* (CTB/McGraw-Hill, 1997). Total reading scores from the 2003 administration of the *TerraNova Test of Comprehensive Skills* were also provided by the data banks of *Clarity TestMate.* Using *Clarity TestMate* software, data were collected on students in the target schools who were in grade three and students who were in grade five during the 2003–2004 school year. Data were initially disaggregated into two groups: students whose teachers participated in the professional development model and those whose teachers did not.

Additionally, two socioeconomic subgroups were identified for the purposes of the study, students of poverty and students of nonpoverty. School systems are charged with ensuring that all students make adequate yearly progress. A key issue to administrators is the incorporation of structures and strategies that support the growth of students of poverty. For purposes of this study, students were classified as students of poverty and students of nonpoverty based on their participation in the National Lunch Program. The federal government issues guidelines for assistance based on the income and size of families. Those who were identified as students of poverty received free or reduced lunch under the National Lunch Program during the 2003 – 2004 school year. All other students were classified as students of nonpoverty. Anonymity of the participants was ensured through coding procedures.

Teachers and principals in all participating schools were surveyed to determine consistency of implementation of the model (see Appendix B). All teacher leaders reported

receiving more than 100 hours of training through The Learning Network® (2004) during the eight months of the study. All participated in a three-day workshop sponsored by The Learning Network® prior to the beginning of the school year. Questions concerning the number of hours of reading instruction students received each day as well as those regarding the number of hours of professional development for the individual teachers were included on the survey.

Data Analysis

Using the *Statistical Package for the Social Sciences* (2002), the Explore procedure was used to generate descriptive statistics for each of the research questions. The assumptions of normality, homogeneity of variance, and random sampling were also considered for each question.

An independent *t* test for means was designed to address the null hypotheses that there was no difference between the mean reading achievement of the students whose teachers participated in the professional development model and that of those whose teachers did not participate. The mean Normal Curve Equivalent scores in reading of students in grade three and students in grade five whose teachers participated in the professional development model of the study were compared with those of students at grade three and grade five whose teachers did not participate in the professional development model of the study. A research model was designed to address the question: Do students whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement than their peers whose teachers do not participate in the same model.

The *No Child Left Behind* Act (2001) requires that designated subgroups make adequate yearly progress. One of the designated subgroups is students who are economically disadvantaged. In order to determine if there was a relationship between the teachers' engagement in the model of professional development and the achievement levels of this

subgroup, the data were disaggregated based upon socioeconomic status. Students of poverty were defined as those who received free or reduced lunch during the 2003–2004 school year.

Research Question #2 addressed the achievement of students of poverty. In order to determine if there were differences between the reading achievement of students of poverty whose teachers participated in the professional development model and the reading achievement of students of poverty whose teachers did not participate, students of poverty were grouped in three ways. First, the students of poverty whose teachers participated in the professional development model at each grade level were compared to students of poverty whose teachers did not participate in the professional development model. Then, the reading achievement of all students of poverty whose teachers participated in the professional development model was compared to the reading achievement of students of poverty whose teachers did not participate in the professional development model. A univariate Analysis of Variance (ANOVA) was calculated to compare the mean NCE total reading scores of students of poverty whose teachers participated in the professional development model to the mean NCE total reading scores of students of poverty whose teachers did not participate in the model.

Research Question #3 related to gain scores in reading achievement attained by students in fifth grade. Gain scores were generated using scale scores. Gain scores are important in the state of Tennessee because they are used as a basis for generating "value-added" grades for elementary schools. This particular accountability measure is publicly posted for each school in Tennessee. In order to determine gain scores for the students of the study, a report was generated using the database in *ClarityTestMate* that calculated reading gains for students who took the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997) in both the fourth and fifth grades. Twenty-five students were eliminated from both the experimental and the control groups because they had not been assessed on the *TerraNova Comprehensive Test of Basic Skills* on both Form N (2003) and Form O (2004). In order to determine gain scores, total reading scaled scores from Form N (2003) were subtracted from the total reading scaled scores

that the same students obtained on Form O (2004). The model for comparing the mean gain scores was created and an independent samples *t* test was conducted to determine if the gain scores of the groups were different.

The math scores of third- and fifth-grade students were analyzed in order to respond to research question #4. It was important to determine if participation in the professional development model impacted students' performance in an academic area that is not closely linked to literacy. The assumption underlying this question was the possibility that teachers who were involved in the professional development experience might neglect mathematics instruction. A fourth model was designed to assess if a relationship was evident between teachers' participation in the professional development experience and students' achievement in math. After reviewing the descriptives, an independent samples *t* test was conducted to address the null hypothesis that there is no difference between the mean math achievement scores of the two groups. All statistical tests were conducted using an alpha level of .05 to determine if statistically significant differences occurred.

Summary

Chapter 3 presented the methodology and the procedures used in the study. The chapter provided information about the population and a description of the instrumentation. An outline of statistical procedures and models for analyses of the data were also presented. Results of the data analysis are provided in Chapter 4.

CHAPTER 4

ANALYSIS OF THE DATA

The participants in the schools involved in this study viewed professional development as the catalyst for improving students' achievement in reading as measured by the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997). The five schools of the study implemented a model that provided each participating teacher with a professional development experience of approximately 100 hours of training over an eight-month period. The purpose of the study was to determine if the reading achievement means of students whose teachers participated in the training differed from the reading achievement means of students whose teachers did not participate. The research questions guiding the study included:

1. Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized tests scores in reading achievement from third-grade and fifth-grade students whose teachers do not participate in the same model?
2. Do third-grade students of poverty and fifth-grade students of poverty whose teachers participate in a job-embedded professional development model attain different standardized tests scores in reading achievement from third-grade students of poverty and fifth-grade students of poverty whose teachers do not participate in the same model?
3. Do fifth-grade students whose teachers participate in a job-embedded model of professional development attain different gain scores in reading achievement from fifth-grade students whose teachers do not participate in the same model?
4. Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in

math from third-grade students and fifth-grade students whose teachers do not participate in the same model?

This chapter is organized into four sections. Each section addresses one of the research questions using the model presented in Chapter 3. The reading achievement of students in grades three and five is discussed in research questions #1 and #2. Data regarding fifth-grade students' growth in reading achievement as measured by gain scores are presented next. Finally, data that address math achievement of students in third grade and students in fifth grade are provided.

Results for Research Question #1

Do third-grade and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement than third-grade and fifth-grade students whose teachers do not participate in the same model?

For the purposes of this study, an alpha level of .05 was set for all statistical tests. Before comparing the groups, the assumptions were considered. The first assumption that the test variable is normally distributed in each of the two grouping variables is, in some ways, dependent upon the sample size and upon the power of the statistical test (Hinkle, Wiersma, & Jurs, 2003). Using a two tailed *t* test with a power of .80 and a small effect size, Hinkle et al. suggested a sample size of 62 subjects. Both the number of third-grade students and the number of fifth-grade students in this study exceeded the number 62. All subgroups with the exception of the third-grade experimental group exceeded 62 students. This is an important factor to consider when evaluating the research questions that relate to the third-grade data.

The assumption that the variances of the normally distributed test variable for the populations are equal was assessed using the Levene test for equality of variances. There was no reason to believe that either the third grade ($p = .983$) or the fifth grade ($p = .984$) groups had unequal variances. The cases represent students placed in intact classroom units, those whose

teachers participated in training through The Learning Network® (2004) and those whose teachers did not. As such, the cases do not represent a random sample from the population. However, the scores on the test variables are independent of each other.

Descriptive statistics for students in the third-grade and fifth-grade groups were generated using Explore procedures with the *Statistical Package for the Social Sciences* (2002). The dependent variable was students' achievement in reading as measured by Form O of the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997). The median reading NCE score *Mdn* = 60.00 of the third-grade students whose teachers received training through The Learning Network® (2004) was similar to the median score *Mdn* = 61.50 of those whose teachers did not participate. The median reading NCE score *Mdn* = 61.00 of the fifth- grade students whose teachers received the training was higher than the median NCE reading score *Mdn* = 52.00 of those whose teachers did not participate.

The reading scores of students in each group of third and fifth graders (participant versus nonparticipant) were analyzed using an independent samples *t* test. The mean NCE scores were used to determine if a significant difference was found between the means of the two groups at either third or fifth grade. Table 2 provides a statistical summary of the means and standard deviations of each group of the study.

Table 2

Reading Scores of Students of the Study

Grade Level	Participating			Nonparticipating		
	N	*MNCE*	*SD*	*N*	*MNCE*	*SD*
Third Grade	36	61.86	16.36	63	59.97	16.05
Fifth Grade	86	59.49	19.26	151	54.17	18.19

The Mean National Curve Equivalent (MNCE) scores in reading of students whose teachers participated in the professional development model were higher than those of students whose teachers did not participate. Although the MNCE scores of third-grade students in the study were higher than those in the control group, the difference was not significant at the .05 level, t (98) = .562, p = .575. Therefore, the null hypothesis that there are no statistically significant differences in the mean total reading achievement scores of third-grade students whose teachers participated in a job-embedded model of professional development and third-grade students whose teachers did not participate in the same model was retained.

A significant difference at alpha .05 was found when scores of fifth-grade students were analyzed, t (235) = 2.118, p = .035. The mean reading NCE of fifth-grade students whose teachers participated was significantly higher than the mean NCE of fifth-grade students whose teachers did not participate in the job-embedded model. Thus, the null hypothesis that there are no statistically significant differences in the mean total reading achievement scores of fifth-grade students whose teachers participated in a job-embedded model of professional development and fifth-grade students whose teachers did not participate in the same model was rejected. The strength of relationship between the professional development and the variable of achievement, as assessed by partial eta squared index of .02, was small.

Results for Research Question #2

Do third-grade students of poverty and fifth-grade students of poverty whose teachers participate in a job-embedded model of professional development attain different standardized test scores in reading achievement from third-grade students of nonpoverty and fifth-grade students of nonpoverty whose teachers do not participate in the same model?

There were 150 third- and fifth-grade students of poverty whose teachers were involved in this study. Of these, 98 students had teachers who did not participate in the professional development model whereas 52 students had teachers who did participate. A review of the

descriptive statistics shows the mean score of the students whose teachers did not participate was 48.65 whereas the mean score of the experimental group was 52.60. The Levene's test for equality of variances was not significant, F (.180), p = .672; therefore, there was no reason to assume that the assumption for normality was violated. An independent samples t test was conducted to determine if there was a significant difference between the mean scores of students of poverty whose teachers participated in the professional development model and students of poverty whose teachers did not participate in the model. The t test was not significant, t (148) = -1.41, p = .158.

The students were then regrouped for analysis according to their grade level and according to their poverty category, poverty or nonpoverty. A review of descriptive statistics shows the difference in the means of students of poverty at third grade whose teachers did not participate in the professional development model and students of nonpoverty whose teachers did participate in the model was 17.24 points. At the fifth-grade level, there was a difference of 16.4 points in the means of students of poverty whose teachers did not participate in the professional development model and the nonpoverty students whose teachers did participate in the model.

A univariate analysis of variance was conducted on the groups to determine the effects of socioeconomic status and/or professional development. The assumptions were considered. The first assumption that the dependent variable of reading achievement is normally distributed in the population for each level of the within-subjects factor considers the population size. Because of the small sample size of the third-grade subgroups, the assumption should be considered violated. However, N sizes at the fifth grade are larger with each group containing more than 30 subjects.

Levene's test of equality of error variances was also conducted to test the null hypothesis that the variance of the two comparison groups is equal. Because p = .577 for the third-grade students and p = .402 for the fifth-grade students, the null hypothesis was rejected; there was no reason to doubt the homogeneity of variances among the groups.

Again, the assumption that the cases represent a random sample from the population is violated because convenience sampling was used in this study. However, there is no dependency in the scores between the participants. Partial results of the univariate analysis of variance of the reading achievement of third- and fifth-grade students are shown in Table 3.

Table 3

Comparison of Students' Performance Based Upon SES

Grade Level	Participating			Nonparticipating		
	N	*MNCE*	*SD*	*N*	*MNCE*	*SD*
Nonpoverty—3rd	22	69.59	12.29	44	63.43	14.94
Nonpoverty—5th	48	64.10	18.90	73	61.08	18.50
Poverty—3rd	14	49.71	14.73	20	52.35	16.11
Poverty—5th	38	53.66	18.32	78	47.71	15.38

A review of descriptive statistics reveals that at the fifth grade, the rank order of scores was as follows: students of poverty whose teachers did not participate in the model, students of poverty whose teachers participated in the model, students of nonpoverty whose teachers did not participate in the model, and students of nonpoverty whose teachers participated in the model. In other words, at the fifth grade, students of each category (poverty and nonpoverty) whose teachers participated in the professional development model out-scored the control group. The pattern was somewhat different at third grade with students of poverty whose teachers did not participate in the model achieving a higher mean NCE than those whose teachers were engaged.

Statistical tests were applied to the factor of poverty alone. Of special note is the achievement pattern of students of poverty when compared to their peers of higher socioeconomic status. Nonparametric procedures were used with the third-grade data because of the small number of students identified as students of poverty in both the control and experimental groups. A Kruskal Wallis test for differences among groups was conducted. The test was significant X^2 (1, N = 100) = .15.74, $p < .01$, showing a significant influence of poverty on the reading scores of third-grade students. An ANOVA was conducted on the fifth-grade data. Significance was also indicated for the effects of poverty at that grade level, F (1, 236) = 24.907, $p < .01$. These incidental findings of this study reflected the pattern reported by many schools that indicated that students of higher socioeconomic status outperform students of poverty on standardized achievement tests. The mean scores of students of poverty and nonpoverty are provided in graphical form in Figures 1 and 2.

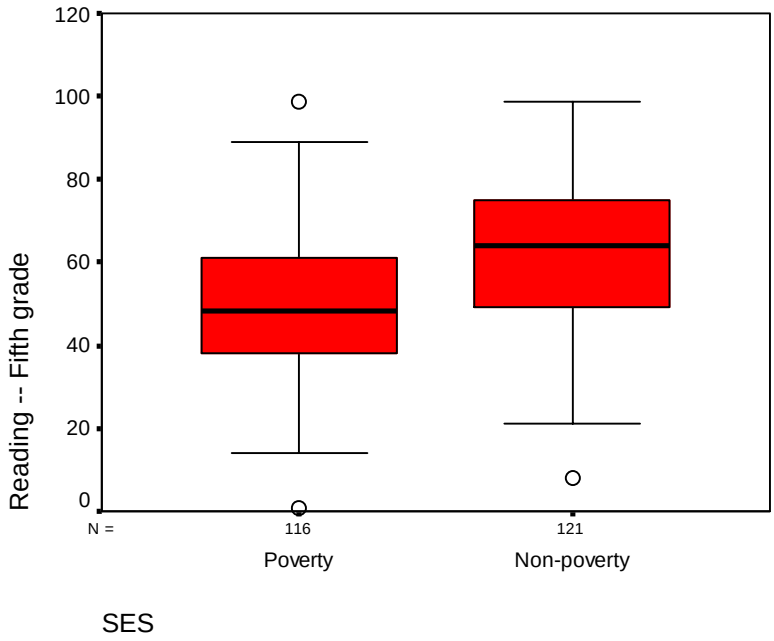

Figure 1. Reading Scores of Fifth-Grade Students of Poverty and Nonpoverty

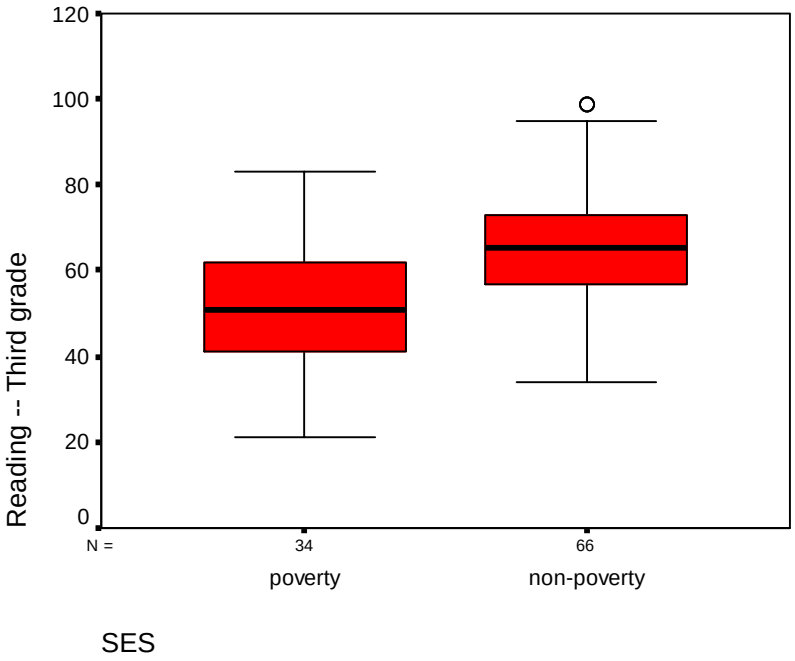

Figure 2. Reading Scores of Third-Grade Students of Poverty and Nonpoverty

The statistical tests of between subject effects appeared to support the idea that although there was a difference between the performance of students of poverty and students of higher socioeconomic status, this difference was not correlated to the variable of teachers' participation in the professional development model. There was no significant interaction between teachers' participation in the professional development model and students' socioeconomic status at the fifth grade, F (1, 236) = .377, p = .54, or at the third grade F (1, 99)= 1.91, p = .170. The null hypothesis was retained; therefore, that there are no statistically significant differences in the mean total reading achievement scores of students of poverty whose teachers participated in a job-embedded model of professional development and the reading achievement scores of students of poverty whose teachers did not participate in the same model. The null hypotheses, therefore, were retained for both the third grade and the fifth grade. Table 4 presents the main effects of the analysis.

Table 4

Tests of Between-Subject Effects

Grade	*df*	*F*	*Sig*	*Partial Eta Squared*
Third SES*TLN	1	1.908	.170	.003
Fifth SES*TLN	1	.377	.540	.002

Results for Research Question #3

Do fifth-grade students whose teachers participate in a job-embedded model of professional development attain different gain scores in reading achievement than fifth-grade students whose teachers do not participate in the same model?

In the state of Tennessee, students' gain scores are computed by subtracting scale scores on an achievement test of one year from those of the previous year. The expected gain score is published with each edition of the *TerraNova* and is based on a national-norming process. For the 2004 *TerraNova*, Form O, the expected gain in reading for fifth-grade students was 14 points. Gain scores can be calculated by subtracting the 2003 reading scores from the 2004 scores. The gain scores for fifth-grade students were generated using *Clarity TestMate*. Gain scores in reading achievement were calculated for 212 fifth-grade students in this study. The 2003 TerraNova scores were unavailable for 25 students; therefore, gain scores could not be determined for those students. Gain scores for the remaining 212 students were entered into *SPSS*. The mean gain score of fifth-grade students whose teachers participated in the professional development model exceeded the expected gain of 14 points whereas the mean gain score of the nonparticipating group was lower than the expected gain.

In order to determine if the difference in gain scores between the experimental and control groups was significant, the assumptions were first considered. The tests of normality were conducted. The Kolmogorov-Smirnov showed a violation of the assumption of normality for the students whose teachers were not involved with the professional development model,

$p <$ .01. This lack of normality was the result of many outlier scores within the group. When the data were altered to eliminate the 12 outlier scores, the assumption of normality was met, p =.20 for both the control and the experimental groups. Using the modified data set, homogeneity of variance was satisfied by a Levene test statistic of p = .668. An independent t test was then conducted to determine if a significant difference existed in the means of the two groups on the original data set and upon the modified data set. The test was not significant on either data set. The original data set revealed t (210) = .77, p = .44 whereas the independent t test on the modified data set resulted in t (198) = .732, p = .47. Therefore, the null hypothesis that there is no significant difference in the reading achievement gain scores of fifth-grade students whose teachers participated in a job-embedded model of professional development and fifth-grade students whose teachers did not participate in the same model was retained. Table 5 presents the results of statistical tests calculated on both the original set and the modified data set.

Table 5

Comparison of Gain Scores: Original and Modified Data Sets

Grade Level	Participating			Nonparticipating		
	N	*Mean Gain*	*SD*	*N*	*Mean Gain*	*SD*
Original Data Set Fifth Grade	75	16.28	31.48	137	12.34	37.17
Modified Data Set Fifth Grade	70	16.04	22.19	130	13.46	24.69

Results for Research Question #4

Do third grade students and fifth-grade students whose teachers participate in a job-embedded model of professional development attain different standardized test scores in math

than third-grade students and fifth-grade students whose teachers do not participate in the same model?

It was important to consider if teachers who participated in the professional development model impacted their students' performance in reading simply by allocating more time to literacy instruction thereby neglecting the content area of mathematics. In order to assess this variable, students' achievement in math, a subject that is not highly dependent upon reading skills, was analyzed. Math scores of students at the third and fifth grade were reviewed using the Explore procedure of *SPSS* in order to determine if the scores of students of participating teachers were different from the scores of students of the nonparticipating teachers.

The median math achievement score, *Mdn* = 71, of third-grade students whose teachers participated in the professional development model was higher than that of students whose teachers did not participate, *Mdn* = 61.50 . The same pattern was found for fifth-grade students whose teachers participated when compared with the math scores of those whose teachers did not participate *Mdn* = 53.00 and *Mdn* = 51.00, respectively. Additional analysis as presented in Table 6 shows the mean scores of students whose teachers participated in the model to be higher than those of the control group.

Table 6

Math Scores of Students of the Study

Grade Level	Participating			Nonparticipating		
	N	*MNCE*	*SD*	*N*	*MNCE*	*SD*
Third Grade	36	65.92	20.82	64	64.19	14.54
Fifth Grade	86	53.08	19.49	151	49.78	1.48

An independent samples *t* test was conducted to determine if there existed a significant difference between the two groups to test the null hypotheses that there are no significant differences in the mean total math achievement scores of third- or fifth-grade students whose teachers participated in a job-embedded model of professional development and third grade or fifth-grade students whose teachers did not participate in the same model. The two-tailed test was not significant at fifth grade t (235) = 1.31, p = .192, or at the third grade t (98) = .487, p = .628. Therefore, p values for one-tailed tests were not significant. The null hypotheses for both grade levels were retained. Students whose teachers participated in the professional development model in the content area of reading did not demonstrate weaker or stronger math skills as measured by the mean NCE on the math subtest of the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997).

Summary

The data were presented in Chapter 4 with accompanying analyses. The assumptions accompanying the statistical procedures applied to the data were considered for each question and adjustments in the procedures were made as appropriate.

The students whose teachers participated in approximately 100 hours of training in the job-embedded professional model achieved higher mean scores in reading than those whose teachers did not. An independent *t* test was applied to determine if the differences were significant. The results were mixed. At the fifth grade, there was a statistically significant difference at the .05 level of confidence. At the third grade, there was not a statistically significant difference in the means of the two groups.

Students were disaggregated into groups of poverty and nonpoverty. A univariate analysis of variance (ANOVA) was conducted to determine if there were differences in the reading achievement of the two groups. There were no statistical differences between the mean

reading achievement scores of students of poverty in either the experimental or the control groups.

Gain scores in reading were also analyzed for fifth-grade students. The mean and median of the experimental group was higher than that of the control group. The data were analyzed both with and without the presence of outlier scores. An independent samples *t* test did not show differences between the gain scores of the two groups to be significant in either case.

Finally, math scores were analyzed at both the third and the fifth grade to determine if there were significant differences between the math achievement of students whose teachers participated in the professional development model and those whose teachers did not participate. The independent samples *t* test found no significant differences in the mean total math scores of the two groups at either the third grade or the fifth grade.

Chapter 5 presents an analysis of the results of the study highlighted in this chapter. It provides a summary of the study and presents the specific findings associated with each research question. Additionally, the final chapter presents a summary of conclusions that might be drawn from the study as well as recommendations for further study and practice.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was conducted to explore the relationship between teachers' participation in a job-embedded model of professional development and students' achievement in reading. Chapter 5 provides a summary of the findings of the study and provides conclusions and recommendations for further study and practice.

Summary of the Study

Professional development is recognized as a key component of the current initiative to improve teachers' efficacy and students' achievement. School systems need to develop a clear understanding of the role of professional development as they refine their strategies for increasing students' achievement. Professional development is expensive in terms of both time and money. Therefore, determining which model of professional development is most effective is a valuable step in allocating precious resources. School systems must continually evaluate the professional development they provide in terms of its impact on students' achievement, the ultimate purpose of any professional development experience.

Evaluations of professional development in the past have been inadequate as they have not focused on meaningful indicators of success (Guskey, 2000). The goal of evaluation has primarily centered on either documentation of activities or documentation of teachers' attitudes toward their professional development experiences. With the political, social, and economic pressures of *No Child Left Behind* (2001), school systems are beginning to re-evaluate the usefulness of these evaluations. As a result, evaluations are being redirected to ascertain the actual impact that professional development has upon students' achievement. This researcher

attempted to evaluate one professional development model in terms of students' achievement in reading.

A review of the literature assessed the types of professional development models available to educators and outlined the research associated with the effectiveness of these models. The literature highlighted a variety of characteristics that are associated with students' increased performance. Many of these characteristics were related to the content and context in which the professional development occurred. Joyce and Showers (1988) outlined a five-step model that has been associated with improvement of teachers' performance and positive impact upon students' achievement. This training model has been incorporated into the design of The Learning Network® (2004), a professional development model that is focused on the development of teachers' efficacy in literacy instruction. The model includes five components: (a) providing a description or theory behind the new skill, (b) modeling the skill, (c) practicing the skill in simulated settings, (d) providing feedback about the practice of the skill, and (e) providing coaching or mentoring for the teacher in the classroom setting. The model is based upon instruction that is embedded into the teacher's school day and incorporates a design that encourages transfer of best practices in literacy instruction into teachers' pedagogical repertoire.

In the fall of 2003, five schools in a school system in Tennessee engaged in professional development through collaboration with The Learning Network (2004). This two-year professional development experience was connected to the School Improvement Plans of the individual schools and was intentionally designed to bring about improvement in students' achievement in reading. The content of the professional development was focused on the processes of reading and writing and upon the development of vocabulary, fluency, and comprehension skills of students. Teachers were trained to use formative assessments to make decisions about students' levels of success and to design instruction for whole group and guided reading groups based on those assessments. Teachers also explored techniques that encouraged

reading development during individual training sessions with the consultant and during focus meetings attended by all the teacher leaders of the school system.

At the time of this study, the teachers had participated in the job-embedded training model of professional development for approximately eight months. The school system recognized that the professional development experience for the participating schools was incomplete after the first year. However, future data would be laden with more contextual interference in successive years of implementation when the model would be expanded within the schools of the study. For that reason, the school system posed its essential question at the conclusion of the first year. That question was: Do students whose teachers undergo training exhibit higher scores than students whose teachers have not participated in the training?

Guskey (2000) pointed out, "The appropriateness of any particular model varies depending on the goals, the content, and the context for implementation" (p. 29). The content characteristics, process variables, and context characteristics all impact the quality of professional development. The degree to which these characteristics positively impact the school culture as a whole and the individual teacher's knowledge and practice in specific areas is difficult to assess and link to students' achievement. This study served as an initial evaluation component of one school system's beginning steps toward implementing a comprehensive professional development model that was embedded into five individual schools.

Summary of the Findings

The descriptive data associated with the research questions of the study reflected differences between the achievement scores of students whose teachers participated in a job-embedded training model of professional development. However, in not all cases were the differences in achievement statistically significant. The data implied that the reading achievement of third-grade students whose teachers participated in the professional development model designed to improve reading instruction did not significantly exceed that of students in the

control group. In the fifth grade, students of teachers who participated in the professional development model did perform significantly better than those of the control group. Each research question and its associated findings are summarized below.

Research Question #1

Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement from third-grade students and fifth-grade students whose teachers do not participate in the same model?

The findings were mixed. Students in both the third grade and fifth grade did score higher on the reading subtest of the *TerraNova Comprehensive Test of Basic Skills* (CTB/McGraw-Hill, 1997) as measured by mean NCE scores. However, the differences were not significant for students in the third grade and although the fifth-grade students scored significantly higher as indicated by the independent samples *t* test, the eta square index portrayed a "small" effect size at that grade level.

There are a number of factors that must be considered when analyzing these findings. First, the sample size for the third-grade control and experimental groups might have impacted the findings. Although all students whose teachers participated in the professional development experience were included in this study, the sample size of each of the third-grade groups was smaller than that of the fifth-grade groups. Therefore, the results must be viewed with caution.

An additional consideration lies within the timeframe for the study. The professional development experience designed around a coaching model did not allow teacher leaders at either the fifth grade or the third grade to implement all of their new understandings for the entire eight-month period. Because their knowledge base continued to grow throughout the eight-month period, the teachers of the study were not implementing many of the skills they gained until after the data were collected.

Nevertheless, the achievement scores of students at both the third grade and the fifth grade were higher than those of the control groups. This difference contributed to a higher mean in reading achievement scores of the schools involved in the study. In Tennessee, each school receives a grade based on the MNCE achievement of its students. This accountability measure is published annually by the state of Tennessee in the form of a Report Card. The schools of the study benefited from the higher MNCE scores of the participating students because those scores impacted their average reading scores in a positive direction even though that difference was not statistically significant at the .05 level.

Research Question #2

Do third-grade students of poverty and fifth-grade students of poverty whose teachers participate in a job-embedded professional development model attain different standardized test scores in reading achievement from third-grade students of poverty and fifth-grade students of poverty whose teachers do not participate in the same model?

At the fifth grade, the descriptive statistics showed that the students of poverty whose teachers participated in over 100 hours of job-embedded professional development achieved a mean NCE reading score that was 5.95 points above that of the control group. Disaggregating the data at the third grade into subgroups of poverty and nonpoverty left a very small sample of students of poverty in the third grade. All results at this grade level, therefore, should be viewed with extreme caution. Nevertheless, at the third grade, the data showed that the students of poverty whose teachers participated in over 100 hours of job-embedded professional development achieved a mean NCE reading score that was 2.64 points lower than those students whose teachers did not participate. Statistical analyses indicated that neither the differences at the third grade nor the differences at the fifth grade were statistically significant. It appears that teachers' participation in the professional development model does not correlate to improved students' achievement based on socioeconomic level as defined by this study.

This study also reflected that fifth-grade students of higher SES outperformed students of poverty at a statistically significant level. While the correlation of poverty to students' achievement in reading was not the purpose of this study, the finding that students of poverty performed statistically lower than their peers of nonpoverty was significant. The partial eta square coefficient for the main effect of SES for fifth graders was .097. The partial eta square coefficient for the main effect of SES at the third grade was .198.

Research Question #3

Do fifth-grade students whose teachers participate in a job-embedded model of professional development attain different gain scores in reading achievement than fifth-grade students whose teachers do not participate in the same model?

The students whose teachers participated in the professional development model achieved higher mean gain scores than the students whose teachers did not participate in the study. Additionally, the mean scores of students whose teachers received more than 100 hours of professional development exceeded the expected gain score. Students whose teachers did not participate in the model achieved a lower mean score than those of the experimental group and their mean score was below the expected reading gain score for fifth-grade students. Nevertheless, this study did not find statistically significant differences in the gain scores of students whose teachers participated in reading content professional development when compared to those of teachers who did not participate.

Two additional observations of note surrounding the descriptive statistics include: (a) there is less variation in the extreme values of the students whose teachers participated in the professional development model and (b) more students whose teachers participated in the model met expected gains than those whose teachers did not participate with 49.6% of the students of nonparticipating teachers meeting or exceeding the 14 point expected gain and 54.6% of the students of participating teachers meeting or exceeding the target gain score of 14 points. This

difference in the percentage of students who met the standard is of particular interest to schools in Tennessee that are held accountable for value-added scores under the Tennessee Value-Added Assessment System (Bratton, Horn, & Wright, 1996).

Schools receive annual value-added grades based on their gain scores. The value-added grades in reading achieved by each school are reported to the public as an accountability measure on the State Report Card. Additional value-added information is computed for each teacher at the fifth grade. Because the formula for computing value-added scores is not released to the public, it is impossible to determine the correlation between the value-added scores of the teachers and their participation in the professional development model. However, because the gain scores of teachers who participated in the professional development model are higher than those of their peers who did not participate in the model, their value added scores in reading may also be higher.

Research Question # 4

Do third-grade students and fifth-grade students whose teachers participate in a job-embedded professional development model attain different standardized test scores in math from third-grade and fifth-grade students whose teachers do not participate in the same model?

The math achievement scores served as a measure to determine the validity of the study. Conceivably, the students who were placed in the classrooms of the teachers who were receiving professional development could have been grouped to impact the validity of the study; i.e., more high-performing students could have been placed in the classrooms of the teachers who participated in the model. Additionally, it was conceivable that the teachers who participated in the professional development model spent more time in literacy activities, thereby neglecting their student's instruction in other areas. Higher reading achievement, therefore, could have been the result of more time spent in literacy instruction rather than from the professional development of the teacher.

The results of this study indicate that there was no statistical difference in the math scores of the two groups at either the third- or fifth-grade level. Students whose teachers participated in professional development in reading scored slightly higher on the math portion of the *TerraNova* than did the students whose teachers did not participate; however, the differences in the mean scores were not significant. This suggests that differences in reading achievement are not the result of increased time spent on reading instruction and are more reflective of teachers' development in the area of reading. It also reinforces the notion of normality and homogeneity of variance between the experimental and control groups.

Conclusions

Professional development's relationship to students' achievement is complex and difficult to assess. Contextual and procedural aspects of the professional development process impact the evaluation of any model. Furthermore, research studies are difficult to replicate because of the interaction of these and other factors that surround the social sciences. The context of this particular study, however, provided a unique opportunity for making connections between teachers' development and students' achievement. The following aspects of the contextual design of the professional development model of this project are important variables to consider when evaluating the results:

1. Consistency of implementation: The six teachers involved in this study were trained concurrently and by the same consultant. They received equivalent amounts of demonstration, follow-up consultations, and workshop-training sessions. Instead of focusing on the number of hours of professional development provided to the study group, a characteristic of lower level evaluation models, this level-five study focused on a model of training that was consistently implemented across five different schools.

2. Consistency of funding: The five schools in the study received equivalent funding for the implementation of the project. The financial allocations were administered by the central office personnel of the school system rather than by each school entity.
3. Consistency of support by administrators: Each school involved in the study developed a leadership team of two teacher leaders and the principal. The principal at each school was trained concurrently with the teacher leaders and attended the workshops required of the teacher leaders. In effect, then, the principals of each of the schools also received more than 100 hours of professional development in literacy instruction. These teams met once weekly at each of the schools to discuss issues surrounding the management and implementation of the model.
4. Consistency of content: The teacher leaders of each school received training in best practices associated with literacy instruction. The teaching points were essentially replicated in each of the schools. Teacher leaders were provided with written guidelines as well as demonstrations to support their understandings. Modeling, coaching, and instructional dialog sessions between the consultant and the teacher leaders were videotaped for review.
5. Consistency of resources: Teacher leaders were provided with informational text highlighting the research that supported the theory underlying their practice. Dialog between the teacher leaders was facilitated through monthly meetings that the leadership teams (the principal and two teacher leaders) from each school attended. During these meetings, the participants discussed the literature supporting best practices being implemented in their classrooms. Each school received a bibliography of printed materials to support teachers in the growth of pedagogical strategies and understanding of the theories underlying them.
6. During this year of implementation, mentoring by the coach and support from other teacher leaders made the data more pure; i.e., students whose teachers were not

participating in the professional development model did not have benefit of the understandings about teaching and learning that had been developed by the teachers who were being trained. In successive years of implementation, more teachers should have access to the information that was provided only to these teachers during the 2003–2004 school year. As the new understandings and pedagogical techniques are adopted by additional faculty members at the five schools, it will be more difficult to disaggregate the effects of the training.

The design of the study, therefore, appears appropriate for a level-five evaluation based on the controls that existed over the usual contextual factors that impact these studies. Overall, the results indicated that students whose teachers were trained in the job-embedded model of professional development did outperform those whose teachers were not, although, not in all cases at the statistically significant level. The data were collected prior to the conclusion of the two-year design of the training model. For that reason, a series of recommendations are provided for the researcher interested in following up on the findings of this study.

Recommendations for Further Study

Students' achievement is the hallmark of the efficacy of a school and the expertise of the educators within it. In the past, many school improvement efforts have centered upon concepts and issues related to organizational design. Current thought, however, leads teachers and administrators alike to focus on the principles associated with concepts and issues related to the design of effective professional development experiences. These growth opportunities for teachers have potential to impact the achievement of students in a positive and dramatic way; however, educators need more clearly articulated guidelines in order to create quality programs of teachers development.

Evaluation is the key to defining these experiences. Guskey (2000) stated that evaluation of professional development should be an integral part of any effort school systems make to

improve teachers' efficacy. To truly determine the effectiveness of the growth experiences of teachers, a variety of ongoing assessments should be included in any model of delivery. The evaluation of this study was a unidimensional, level-five evaluation. Several recommendations are included for the researcher to consider in order to analyze better the impact of the job-embedded training model based on the research of Joyce and Showers (1982, 1983, 1988) that was followed by the schools of this study.

1. Follow up study of the performance of the students of the teacher leaders should be conducted in order to assess the impact of continued growth during successive years of contact with The Learning Network® (2004). Teacher leaders of this study will continue to work with the same consultant for a second year thereby adding an additional layer of growth related to best practices in reading instruction and facilitating other teachers in their professional growth. There is an inherent assumption that not only will they continue to gain expertise but they will also be incorporating strategies learned during the first year of development into their practice from the beginning of the 2004–2005 school year. Students may demonstrate higher levels of benefit from their teachers' participation upon administration of *TerraNova* tests in Spring, 2005.
2. During successive years of association with The Learning Network® (2004), additional teachers will have access to the understandings associated with literacy instruction that were developed by the teacher leaders during the 2003–2004 school year. The increase in building capacity has potential to impact the school culture thereby influencing greater numbers of students. Although consistency of implementation will be difficult to monitor, students' performance in the schools associated with The Learning Network® (2004) should be studied over time.
3. Guskey (1985) found that teachers' attitudes follow their perceptions of the successfulness of any strategy they implement. He implied that teachers who engage

in practices associated with new models of instruction need time to personally assess their impact on the educational experience and achievement of their students. Delay of a level-one evaluation of teachers' attitudes until the pedagogical techniques associated with the professional development model have been implemented negates some of the disadvantages of using level-one evaluations.

4. Definitions of students' achievement in this study were limited to achievement test data measured by the *TerraNova*. The limited perspective such as that taken in this study does not account for the diversified strata of assessments that are available to assess students' learning. Further assessment of the model using alternate measures of students' performance could provide additional insight into the connections between professional development and students' achievement.

Recommendations for Practice

The linkages between professional development and improvement in teachers' practices are being assessed in increasingly more sophisticated ways. Evaluations of the past have focused primarily upon the participants' reactions to the professional development experience. This is understandable considering the complexities of evaluating the process, content, and context of any model. The current climate, however, does not afford school systems the luxury of expending professional development funds without a higher level of accountability.

With that in mind, the results of this study have implications for the practice of schools and school systems who are interested in developing quality professional development experiences for their teachers. First, professional development should be linked to goals for improving students' achievement and, as such, should be assessed in light of progress made toward those goals. This process requires that quality evaluations be included in the design of the professional development model. It also redirects the focus and makes the connection between professional development and students' learning.

Secondly, professional development should be designed in order to increase the capacity of the building. By learning together teachers create a community of learners. The dynamic associated with a community of learners is far superior to the disconnected professional development characterized by isolated workshops and conferences of the past.

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APPENDICES

APPENDIX A

Letter to Superintendent of Schools

March 29, 2004

xxxxxxxxxxxxx
Superintendent of Schools
xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx

Dear xxxxxxxxxxxxxx:

This letter is a follow up to our conversation in which we discussed my using TerraNova achievement scores to track the achievement of students whose teachers participated in the Learning Network during the 2003 – 2004 school year. My dissertation is entitled "An Investigation of the Impact of a Job-Embedded Model of Professional Development on Reading Achievement of Elementary School Students". I believe the results of this study will be helpful to those who are interested in correlating student achievement and professional development. In order to ensure anonymity, the school system, the participant schools, and the teachers of the system will not be referenced in the study. If you would like to preview the design of the study, a prospectus is available at your request.

Please notify me of your permission for access to the 2002, 2003 and/or 2004 TerraNova data as appropriate for selected students in elementary schools in xxxxxxxxx by returning this letter with your signature.

Sincerely,

Janet Faulk

I give approval of the study being conducted in xxxxxxxxxxxxxxxxxxxxxx using the data denoted above.

_____ _____

Signature Date

APPENDIX B

Survey for Teachers and Administrators

Name_____ School_____

Grade level_____

(1) Did you participate in the 2003 TLN Summer Conference?
Yes, all three days Yes, less than three days No

(2) Do you participate in Critical Triangle Meetings?

Yes, almost every week Yes, twice each month Rarely

(3) Do you participate in dependent/independent focus meetings?

Yes, I have attended all I have missed 1 – 2 I have missed 3 or more

(4) When the consultant visits your school, do you usually remain with her the full instructional day?

Yes No

(5) What is your closest estimate of the number of hours of professional development you have received through The Learning Network since July, 2003?

20 – 40 hours 40 – 60 hours 60 – 80 hours80 – 100 hours

(6) Using your best estimate, what is the length of time you spend in literacy instruction each day? (Only K – 5 classroom teachers should answer this question)

(7) Is your grade level departmentalized for reading instruction? (Only K - 5 classroom teachers should answer this question.)
Yes No

(8) Please identify the number of students you teach. _____

VITA

JANET FAULK

Personal Data:	Date of Birth: December 22, 1953 Place of Birth: Kingsport, Tennessee Marital Status: Married
Education:	Radford University, Virginia; B.S. Elementary Education, Special Education; 1974
	University of Memphis, Tennessee; M.Ed. Special Education and Rehabilitation Concentrations: Preschool Education of Exceptional Children; Educationally Handicapping Conditions; 1978
	East Tennessee State University, Johnson City, Tennessee; Educational Leadership and Policy Analysis, Ed.D.; 2004
Professional Experience:	Obion County Schools, Tennessee; Special Education Consultant; 1974-1975
	Memphis Diocese Schools, Tennessee; Teacher, Third Grade; 1975-1977
	Shelby County Schools, Tennessee; Teacher, Sixth Grade, Special Education Preschool; 1977-1980
	Hawkins County Schools, Tennessee; Teacher, Special Education, Consultant, Educational Diagnostician; 1983-1989
	Kingsport City Schools, Tennessee; Teacher, Middle School Gifted; Administrative Assistant; Special Education Director; Principal; 1989-Present

East Tennessee State University;
Adjunct Faculty;
Human Development and Learning;
2004-2005

Selected Presentations:

State Conferences:

1994 Tennessee Exceptional Children's Conference:
Including Special Education Students in the General Education Program: It's the Right Thing to Do.

2003 Title I Conference:
Effectiveness of FastForWord on Student Achievement in Reading

Local/Regional Presentations:

1994:
Lion's Quest: Social Skills Development of Middle School Students

1998:
Gifted Education and Its Impact on Student Progress

2004:
Impact of Community Volunteers on Student Reading Achievement