11-1-2004

Instructional methods and efficacy of teachers trained in differentiated instruction

Patricia A. Crum
University of Nebraska at Omaha

INSTRUCTIONAL METHODS AND EFFICACY OF TEACHERS TRAINED IN DIFFERENTIATED INSTRUCTION

by

Patricia A. Crum

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

Major: Educational Administration

Under the Supervision of Dr. Laura E. Schulte

Omaha, Nebraska

November, 2004

DISSERTATION TITLE

Instructional Methods and Efficacy of Teachers Trained in Differentiated Instruction

BY

Patricia A. Crum

SUPERVISORY COMMITTEE:

APPROVED	DATE
Leon Dappen Signature	11/19/04
Dr. Leon Dappen Typed Name	
Larry Dlugosh Signature	11/19/04
Dr. Larry Dlugosh Typed Name	
John W. Hill Signature	11/19/04
Dr. John Hill Typed Name	
Laura Schulte Signature	11/19/04
Dr. Laura Schulte Typed Name	
Signature	
Typed Name	
Signature	
Typed Name	

University of Nebraska Omaha

INSTRUCTIONAL METHODS AND EFFICACY OF TEACHERS TRAINED IN DIFFERENTIATED INSTRUCTION

Patricia A. Crum, Ed.D.

University of Nebraska, 2004

Advisor: Laura E. Schulte, Ph D.

This study examined the instructional methods and efficacy of teachers involved in a two-part district staff development project in differentiated instruction. Responses from 194 kindergarten through twelfth grade teachers on a self-perception survey were collected after an initial district staff training and implementation and again after involvement in a second teacher centered district staff development plan in differentiated instruction with implementation time. The data collected were analyzed to determine what instructional methods and efficacy the staff displayed and to determine whether a change in teachers' perceptions occurred during the 9-month period following the second district plan.

Analysis of the means and standard deviations for the Instructional Methods scores and Efficacy scores calculated from both the first survey and the second survey indicated that throughout the survey time, including the time prior to the staff development plan specifically studied in this research, teachers were incorporating many of the prescribed instructional methods and had efficacy scores that demonstrated similar highs and lows. A closer look at the means of specific questions indicated that in general more traditional differentiated methods were being incorporated frequently with higher efficacy scores, whereas more recently introduced

differentiated methods were only being used some of the time with lower efficacy scores.

Completion of repeated measures two-way analyses of variance indicated that teachers' perceptions of their use of the instructional methods changed significantly in a negative direction for the subscales of content, process and product during the 9-month period between the first and second surveys. Teachers' perceptions also decreased in the area of learning environment, although this decrease was not statistically significant. This negative shift was attributed to failure in developing intrinsic and extrinsic motivation for change and lack of district level and building level leadership, coordination, and continuous support.

ACKNOWLEDGMENTS

My deepest appreciation is conveyed to my advisor and chairperson of my committee, Dr. Laura Schulte, for the patience, guidance, and encouragement that she has so generously offered. Dr. Schulte's support and encouragement have provided me with the inspiration that I have needed to complete my course of study. I would especially like to recognize the friendship and support of Dr. Donna Flood, who served as my mentor in the Department of Staff Development at Millard Public Schools and gave me unwavering support for this study. My deepest appreciation to my dissertation committee Dr. Leon Dappen, Dr. Larry Dlugosh, Dr. John Hill, and Dr. Jack McKay for providing me with their expertise and experience. I owe a special debt of gratitude to Dr. Martha Bruckner, for recommending me to the doctoral program and for her continued support.

DEDICATION

This dissertation is dedicated to my family. To my mother, Stella Fiedler, who taught me patience and perseverance without which completion of this doctoral program would have been impossible. To my husband, Terry, for his unwavering support and sacrifice of family time. Without your help I could not attain my goals in this program and in my career. This dissertation is also dedicated to our children, Michelle and Derek Christensen, Joe and Theresa Crum, Chris Crum and Dominique Schiller, and Michael Crum. Thank you for always taking the time to listen to my thoughts and helping me to process them with your own unique knowledge and skills.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

Introduction

In differentiated instruction, the role of the teacher becomes one of coordinator of learner opportunities with a major focus on varying the content, process, product, and the learning environment to meet the needs of individuals in an academically heterogeneous classroom (Renzulli, 1988; Tomlinson, 1995, 1999b; VanTassel-Baska, 1994). Assignments that take into consideration the students' varying interests, learning styles, and learning readiness can be created to meet the needs of individuals within diverse groups (O'Connor, 1999; Silver, Strong, & Perini, 2000; Tomlinson, 1995; Winnebrenner, 1999). "Even though students may learn in many ways, the essential skills and content they learn can remain steady. This is, students can take different roads to the same destination" (Tomlinson, 1999c, p. 12).

The challenge for teachers is not to understand the goals of differentiated instruction; it is, however, a serious challenge to develop classroom practices that are consistent with these goals (Tomlinson, 1999b; Walther-Thomas, 2001). Working effectively in a heterogeneous classroom involves a broad repertoire of instructional strategies that place the focus on the learner (Callahan, 1999; Tomlinson, 1999a; Winnebrenner, 1999).

Teacher efficacy is the extent to which the teacher believes he or she has the capacity to alter student performance (McLaughlin & Marsh, 1978). Understanding of an individual's efficacy is based on the research of Bandura. According to Bandura (1977b, 1989, 1990), self-efficacy is a belief in one's capability to execute

the actions necessary to achieve a certain level of performance. It is an important influence on behavior, which relates to individuals' goal setting, effort expenditure, and levels of persistence (Bandura, 1977b, 1989, 1990). The assumption that beliefs are the best indicators of the decisions individuals make throughout their lives can be traced to human beings' earliest philosophical contemplations (Bandura, 1986; Dewey 1933; Pajares, 1992).

A number of studies have shown relationships between teachers' strong feelings of efficacy, classroom behaviors that are associated with effective teaching (Ashton & Webb, 1986; Gibson & Dembro, 1984) and student achievement (Ashton, Webb, & Doda, 1983). Teacher efficacy has also been linked with teacher willingness and effectiveness in implementing instructional innovation (Guskey, 1987; Stein & Wang, 1988). What has been written relates teacher efficacy to effective teaching in general. There is no literature available relating efficacy to the instructional methodology referred to as differentiated instruction.

Purpose Statement

The purpose of this survey study was to examine the instructional methods and efficacy of teachers trained in differentiated instruction after initial district staff training and implementation and again after involvement in a second teacher centered district staff development initiative with implementation.

Research Questions

This study was based upon the following research questions:

1. What instructional methods and efficacy scores are displayed by teachers on two occasions: (a) after initial district staff development training in differentiated instruction with implementation time and (b) after a second teacher centered district staff development initiative in differentiated instruction including implementation time?

2. Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

3. Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

4. Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

5. Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

6. Is there a relationship between instructional methods and efficacy after initial staff development training in differentiated instruction?

7. Is there a relationship between instructional methods and efficacy after a second teacher centered district staff development initiative in differentiated instruction?

Theoretical Framework

Self-efficacy has its origins in Bandura's (1977b) publication, *Self-Efficacy: Toward a Unifying Theory of Behavioral Change.* Based upon Bandura's Social Learning Theory and the concept of reciprocal determinism, Bandura states that, "psychological functioning is a continuous reciprocal interaction between personal, behavioral, and environmental determinants" (Bandura, 1977a, pp. 11-12). Simply defined, environment causes behavior and behavior causes environment as well. In 1986 Bandura extended this theory to the concept of triadic reciprocity showing the reciprocal relationship among behavior, environment, and personal factors.

> Efficacy beliefs help determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will prove in the face of adverse situations. The higher the sense of efficacy, the greater the effort, persistence, and resilience....As a result of these influences, self-efficacy beliefs are strong determinants and predictors of the level of accomplishment that individuals finally attain. (p. 3)

Rand Corporation researchers who used only two Likert-type items to measure the construct of efficacy conducted the earliest studies of teacher efficacy. They defined teacher efficacy as "the extent to which the teacher believes he or she has the capacity to alter student performance" (McLaughlin & Marsh, 1978, p. 84).

Gibson and Dembro (1984) were the first to develop an expanded measure of the teacher efficacy construct. The majority of studies investigating teacher efficacy have used Gibson's and Dembro's (1984) conceptualization and scale of teacher efficacy (Deemer & Minke, 1999).

This study will seek to determine if there is a relationship between teacher instructional methods according to the framework proposed by Tomlinson and efficacy scores of teachers. If there is a strong relationship between these constructs, then educational institutions might benefit from providing staff development in differentiated instruction for their in-service teachers, and institutions of higher education might better assist their pre-service teachers by providing similar training.

Assumptions

It was assumed that respondents were accurate and honest in their reporting of instructional methods, their perceptions of student behaviors, and perceptions of their own effectiveness.

Delimitations of the Study

This study was delimited to one suburban school district's pre-kindergarten through 12th grade teachers who received initial staff development training in differentiated instruction during one of the years including 1999, 2000, 2001, 2002 and were registered to be involved in a second staff development program in differentiated instruction during the summer of 2003.

Limitations of the Study

Three limitations affected this study. One limitation of the study was the fact that teachers had a choice of several years to enroll in this study. Those who were most interested in differentiated instruction may have registered for the first summer of extended staff development offered during the summer of 2003. Teachers registered in teams and all content area teachers of the middle and high school were not represented. The results may not be truly representative of the entire staff.

A second limitation of the study was the connection of this study with the district's staff development program and the tendency of teachers to want to portray themselves as model teachers. Every attempt was made to guarantee anonymity of the respondents to encourage honest, open responses. However, responses may still have been affected by this desire to provide what were perceived to be desired answers.

A third limitation of the study was the reliability of the instrument itself. An attempt to control this problem was made through instrument development procedures.

Definition of Terms

Differentiated instruction recognizes diversity in students' educational needs by adapting curriculum and using multiple teaching strategies to ensure students meet or exceed set competencies. It is a student-centered process that equally challenges and engages students through flexible grouping based on student readiness, interest, and learning styles (Millard West Differentiation Committee, 2001).

Content is what a teacher wants students to learn and the materials or mechanisms through which that is to be accomplished (Tomlinson, 1999a).

Learning environment is the physical setting and psychological climate in which learning takes place (Renzulli, 1988; VanTassel-Baska et al., 1989).

Process describes activities designed to ensure that students use key skills to make sense out of essential ideas and information (Tomlinson, 1999a).

Products are vehicles through which students demonstrate and extend what they have learned (Tomlinson, 1999a).

Student interest refers to a child's affinity, curiosity, or passion for a particular topic or skill (Tomlinson, 1999a).

Student readiness is a student's entry point relative to a particular understanding or skill (Tomlinson, 1999a).

Student learning profile has to do with how a student learns. It may be shaped by intelligence preferences, gender, culture, and/or learning style (Tomlinson, 1999a).

Self-efficacy is one's perceived capability to produce a given level of attainment (Bandura, 1986).

Teacher efficacy is the extent to which the teacher believes he or she has the capacity to alter student performance (McLaughlin & Marsh, 1978).

Significance of the Study

One of the greatest challenges facing classroom teachers is meeting the needs of the various types of learners found there. This challenge has been compounded in recent years by the move away from tracking and pullout programs toward

heterogeneous classrooms and inclusion. As schools continue to try to deal with these challenges, serious consideration needs to be given as to how a teacher is to meet student needs. This study addressed differentiated instruction that has been proposed to meet those needs.

The contribution to research expected from this study is to provide new literature in the area of instructional methods used by teachers trained in differentiated instruction and currently teaching in pre-kindergarten through 12th grade settings as well as the relationship between those methods and efficacy of teachers. These areas have had very little related research available.

The contribution to practice is to provide insight into the effectiveness of differentiated instruction in pre-kindergarten through 12th grade classrooms. School districts seeking information concerning differentiation and its effect upon instructional methods, teacher efficacy, and probable impact in the classroom now have a source of information that did not formerly exist. Institutions aspiring to train pre-service teachers to handle the challenges of the heterogeneous classroom have evidence as to whether or not differentiated instruction should be part of the training of perspective teachers. Insights gained from this study may be useful in understanding how effective instructional methods affect the efficacy of teachers and provide groundwork for future studies in this area.

Chapter 2

Review of the Literature

This literature review presents the history of differentiated instruction to provide a background for understanding the development of differentiated instructional methods. Next, a review of the literature from the 1990s, when these methods became recognized by the name, "differentiated instruction", to the present provides a core of information for this study. Finally, the reviewer addresses literature on teacher efficacy focusing on teacher self-efficacy in relation to instructional methods, teacher effectiveness, and student achievement.

History of Differentiated Instruction

The origin of differentiated instruction is grounded in research completed to support the needs of gifted and talented students. Ward developed a systemic theory of differential educational experience for the gifted as described in his book, *Educating The Gifted: An Axiomatic Approach*, published in 1961. Ward was a key figure in early differentiation. Creativity has been a significant area of study for gifted in respect to differentiation. Gowan, Demos, and Torrance compiled numerous authors' works in their 1967 book, *Creativity: Its Educational Impact*. Kaplan wrote in response to the needs expressed by the 1972 Education of the Gifted and Talented, Volume I: Report to the Congress of the United States by the Commissioner of Education (Marland, 1972). In her 1974 publication, *Providing Programs for the Gifted and Talented*, she expressed the need for appropriate program methods as stated in the following excerpt:

> Curriculum for the gifted and talented students can only be marked as such if it encompasses elements which distinguishes from being suitable for the education of all children. Curriculum for the gifted students must be congruent with the characteristics that identify them as a population. (p. 123)

Programs for the gifted and talented. During these early years the groundwork for differentiated instruction was being developed to provide a basis for pullout programs that would attend to the special needs of the gifted and talented population. This practice was within the framework of tracking which was the way schools had been structured since early days of American Education.

In summary, differentiated instruction grew from the need for gifted and talented and special education students to be removed from the mainstream of students as a means to attend to their specific needs. It was not believed, during this time, that the philosophy of differentiated instruction was targeted toward the average student.

From tracking to heterogeneous classrooms. Tracking is the educational practice of categorizing students by curriculum. Usually there are three basic categories: (1) fast or academic, (2) average or general, and (3) slow or vocational (Oakes, 1985). Tracking was based on the ideology of biological determinism, which indicated that the ultimate level of learning that a student could attain was biologically determined. Intelligence tests, standardized tests, and Bell curves all have been misused to reflect these beliefs. In fact, these techniques gave the

impression that tracking, also known as ability grouping, was a democratic and an educationally sound way of providing students with an education that best matched their abilities (Lockwood & Cleveland, 1998; Oakes, 1995). This ideology supported the practice of pull-out programs for students who were identified as, "gifted and talented".

In the 1980s, psychologists such as Gardner (1983) and Sternberg (1982) stressed that intelligence is acquired as a product of experiences and social interactions over time. Thus a new construct, the Developmental Theory of Intelligence, emerged. This ideology affected educators' thoughts about ability grouping (Oakes & Wells, 1997). Advocates for heterogeneous classrooms made their case based on equity of learning (Gamoran & Berends, 1987; Oakes, 1992, 1995; Page, 2000; Slavin, 1990).

Simultaneously, a philosophy of inclusion became prevalent in the field of special education (Snell & Janney, 1993). Although the Education for All Handicapped Children Act (1975) guaranteed equal education for disabled students and for students who were not disabled, it was not until the Americans with Disabilities Act (1990) that schools began to make a serious effort to provide programs for students with disabilities within the general education classroom. In reference to inclusion, Malloy and Malloy (1997) state, " It includes students in general education according to the similarity of their educational needs rather than excluding them based upon dissimilarity in intellectual, physical, and social needs" (p. 460).

From the 1990s and continuing still today, educational institutions have been moving from homogeneous to heterogeneous instructional groupings. In a 3-year longitudinal study of 10 racially and socioeconomically mixed secondary schools that had undertaken reforms to rid themselves of tracking, it was determined that moving from tracked to heterogeneous classrooms includes much more than rearranging instructional groups (Oakes & Wells, 1997). It crosses over political and cultural beliefs, ideologies, and local control. Its success hinges on the assurance that low ability students will learn more and high ability students will learn just as much as in a tracked system (Oakes & Wells, 1997).

In summary, passing of the Americans with Disabilities Act (1990) and the change of ideology from biological determinism to the Developmental Theory of Intelligence have altered the look of American schools. Tracking, a long accepted practice, was in the process of being phased out of schools. In its place came the heterogeneous classroom, which produced its own set of concerns.

Differentiated instruction as a response to heterogeneous classrooms. During the 1990s, teachers in the heterogeneous classroom tried to teach with the ingrained practice of aiming for the students in the middle. As a result educators struggled with students on both ends of the spectrum, and the needs of many students were not met. Gardner (as cited in Siegel & Shaughnessy, 1994) pointed out that one of the greatest mistakes in teaching was treating all students in the same way. Differentiated instruction received increasing attention as an alternative for dealing effectively with these concerns (Tomlinson, 1999c). As schools attempted to teach students with

learning disabilities, they needed to understand that these children were not necessarily less intelligent or less capable than the student in the middle; however, they did lack the learning strategies they needed to be successful (Winnebrenner, 1996). On the other hand, gifted students are able to function on many levels of concentration at the same time and need opportunities to make use of their abilities in the classroom (Winnebrenner, 2000).

Differentiation has received acclaim as a commonsense approach to the issues of heterogeneous classrooms, but success does not come easily. Effective differentiation, where educators are asked to accommodate student diversity with a high level of academic achievement for all students, is a very complex task (Silver et al., 2000; Tomlinson, 1999c).

Differentiation requires a broad range of strategies, as it is not a one-size-fits all educational plan (Tomlinson, 1995, 1999a). "There is not one miracle thing that works for every child," says Woodin-Weaver (as cited in Willis & Mann, 2000). It necessitates focusing on best practices and promotes varying the level of teacher support, task complexity, pacing, and avenues to learning based on student readiness, interest, and learning profile (Tomlinson, 1999b). Attention to learning profile, where one considers both multiple intelligences based on the work of Gardner (1983) and learning styles beginning with Jung (1927), allows teachers to take into consideration the diverse population found in the classroom (Silver, Strong, & Perini, 1997).

In summary, differentiated instruction continues to derive its greatest advocates from the areas of gifted education and special education. With the current situation of heterogeneous classrooms, the methods proposed for pull-out programs in earlier years are now combined with management techniques to recognize and meet the needs of all students with respect to individual differences in learning readiness, interest, and learning style.

Instructional Methods for Differentiated Instruction

Teachers are currently successfully using many models for differentiated instruction. Models such as the Planning Pyramid by Vaughn, Bos, and Schum, (1997) or the Triad Model for secondary students (Reis & Renzulli, 1985) are being used across the country. Page (2000) explains the model developed by her school district in which the educators made their plan for differentiation by focusing on what would be expected from the gifted child. Teachers used these expectations to determine the criteria that would identify exemplary work. This practice helped in developing guidelines for levels of work above and below this level with greater consistency. Every model attunes to a plethora of instructional methods. Most models for differentiation have commonalities in respect to three or four of the following aspects that a teacher might differentiate:

1. content (what it is that we want the students to learn)
2. process (how that content is learned)
3. products (the results of student interaction with the content)

4. learning environment (the physical and psychological climate in which learning takes place).

These aspects affect teaching and learning in effective differentiated classrooms (Renzulli, 1988; Tomlinson, 1995,1999a; VanTassel-Baska, 1994). In addition, teachers who differentiate instruction rely on any number of strategies to meet the needs of the variety of learners found in one classroom (Campbell, 1997; Tomlinson, 1999a; Winnebrenner, 1992, 1999; Woodin-Weaver as cited in Willis & Mann, 2000).

Differentiation and content. Instruction is planned around the essential concepts, principles, and skills of the subject. When differentiating the content, the teacher varies that content with respect to the level of understanding that different students are expected to reach, but not with respect to what is considered to be essential about that concept in relation to the subject taught (Tomlinson, 1999a). Processing backwards from what the teacher wants the students to learn after careful reflection on the content helps in the planning process (McLesky & Waldron, 2000; Tomlinson, 1999a).

Student readiness is a consideration in planning appropriate strategies for differentiation of content. In certain situations where students may have already mastered some of the content, compacting encourages teachers to assess students before beginning work on a specific content area. With compacting, students who do well on a preassessment move on to something else, usually associated with student interest (Reis & Renzulli, 1992; Tomlinson, 1999a; Winnebrenner, 1992, 1999).

Specific instructional strategies that assist in differentiating content include learning stations, tiered assignments, and learning boards (Tomlinson, 1999a; Winebrenner, 1992, 1999).

Differentiation and process. The process of learning involves all of the learning activities by which a student gains the essential concepts, principles, and skills of the subject. This process will take on many forms as student interest, readiness, and learning profile are taken into consideration.

Specific instructional methods for differentiating according to interest, readiness, and student learning profile include providing choices. Allowing students to make choices significantly increases student motivation (Nunley, 2001). Role and task cards are one such useful strategy (Campbell, 1997). Use of tiered assignments provides structure within the choices (Tomlinson, 1999a). Layered curriculum is another approach by which students make choices and learn to be responsible for their own learning (Nunley, 2001). Rubrics help guide the student in understanding the teacher expectations resulting in higher quality work.

Development of students' learning profiles can assist in differentiation by incorporating a variety of methods including multiple intelligences and learning styles. Gardner (1983) and Campbell (1997) studied the work of cognitive and educational psychologists and developed their theories of multiple intelligences. Jung (1927) noted the way students perceived, made decisions, and interacted, which provided the basis for the work of psychologists in the area of learning styles (Briggs & Myers, 1977; Dunn & Dunn, 1978). Integration of multiple intelligences, learning

styles, and personality types by McCarthy (1982) has provided useful information for determining a student's learning profile (Tomlinson, 1999a). Multiple intelligences and personality styles as used by Silver et al. (2000) guide students with their menu driven grids.

Differentiation and product. Products are used to assess student learning. They are often products created in the process of learning. In other situations they are created after the learning to demonstrate that the learning did occur. Differentiation of product to attend to student differences can coordinate with any of the methods used to differentiate the process (Tomlinson, 1999a).

Differentiation and learning environment. The physical environment includes grouping to allow for individual, small group and large group activity. Learning centers are often used for grouping especially in respect to areas of interest or readiness level (Tomlinson, 1999a). The environment may include activities outside the regular classroom, independent work with a self-directed project, or collaboration with other students (Winnebrenner, 2000). Independent work may involve use of learning contracts (Tomlinson, 1999a; Winnebrenner, 1992, 1999). Use of cooperative learning groups may include literary circles (Page, 2000). Flexible grouping is key to successful differentiation (Winnebrenner, 1992, 1999, 2000; Woodin-Weaver as cited in Willis & Mann, 2000).

Silver et al. (2000) encourage building comfort into learning to get students to respond positively and constructively to their learning. Nunley (2001) encourages the use of layered curriculum to allow students to make appropriate choices in the

process of learning. These methods increase student motivation and place the responsibility for learning in the hands of the learner.

In summary, differentiation of content, process, product, and the learning environment are areas upon which teachers need to focus their efforts to differentiate instruction. These areas will involve a wide range of instructional strategies. There is not one way to differentiate instruction. Rather, there are as many ways to differentiate, as there are teachers to do it. Differentiated instruction is not a strategy. It is a total way of thinking about learners, teaching, and learning (Tomlinson, 2000).

Teacher Efficacy

An individual's level of efficacy is a reflection of that person's belief in his or her ability to perform a function. Teacher efficacy relates to the ways that teachers react to educational situations. Successful teachers display high degrees of efficacy because of their responsibility for problems that occur in the classroom and their capabilities in the area of coping with the situations that they face each and every day (Brophy & Evertson, 1976).

In the field of education, studies have been completed that have made connections among teacher efficacy, instructional methods, teacher effectiveness, and student achievement (Bandura, 1997; Campbell, 1997; Gerges, 2001; Gorrell & Capron, 1990). Much of this work has been based on Bandura's theory of triadic reciprocity showing the reciprocal relationship among behavior, environment, and personal factors (Bandura, 1986). Multifaceted teacher efficacy scales have been

produced, evaluated, and revised to enable the researcher to match the domain of his or her research to the instrument being used (Bandura, 1990).

Teacher efficacy and instructional methods. Gorrell and Capron (1990) found significant main effects favoring cognitive modeling and teacher efficacy in their study of 93 pre-service teachers. In similar research of pre-service teachers, which studied whether a sense of efficacy was related to their implementation of instructional variation techniques, a significant relationship was not found (Gerges, 2001). It was noted in Gerges' study that external factors, such as contradictory expectations of supervising teachers, were a probable cause for the inconsistency in efficacy and implementation of instructional variations.

In a review of current research in this area, Fang (1996) noted recurring instances of consistency and inconsistency between teacher beliefs and practices. He noted that many of the inconsistencies related to other factors including experience and classroom realities such as mutual teacher-student respect, classroom management, differences in the way students learn, social and emotional characteristics, and textbooks. Campbell (1996) echoed these findings through his study of pre-service and in-service teachers. He concluded that age, degree status, and teaching experience all were factors that affected teacher efficacy.

In summary, it is important to pay attention to demographic information about the teachers who are being studied. It is more likely that in-service teachers will show consistent relationships between efficacy and instructional methods than pre-service teachers. Instructional methods can be related to teacher efficacy with

consideration of these factors. No research was found that relates teacher efficacy with instructional methodology training that has been provided on a district wide level involving only in-service teachers. Wertheim and Leyser (2002) completed a related study of pre-service teachers in Israel. In this study instructional practice with emphasis on what was referred to as differentiated instruction was compared to teacher efficacy. This was not a parallel study to what is proposed for this study, as Wertheim's and Leyser's definition of differentiation considered only the needs of low ability students, and their subjects were all pre-service teachers.

Teacher efficacy, teacher effectiveness, and student achievement. Effective schooling involves reciprocal causation. Teachers' sense of instructional efficacy partly determines how much their students learn. In turn, a number of factors in the school environment can alter teachers' beliefs in their efficacy to produce scholastic achievement (Bandura, 1997).

Gibson and Dembro (1984) completed a study of 90 elementary teachers in which teacher efficacy scores were analyzed and compared to classroom observation data. Results indicated that there were differences between high-efficacy and low-efficacy teachers in time spent in whole class versus small group instruction, teacher use of criticism versus encouragement, and teacher persistence in failure situations. These are criteria that Bandura (1997) associated with effective teacher behavior.

In a study of 48 high school basic skills communications and mathematics teachers, Ashton et al. (1983) found there was a significant positive relationship between a teacher's sense of efficacy and student achievement, as measured by the

Metropolitan Achievement Test (MAT). In this study, comparison of the current year's MAT scores with the previous year's MAT scores took account of student's entering ability. In addition, teachers' efficacy was related to student behaviors, indicating that teachers with high efficacy were more likely to be attentive to students in a positive, supportive style.

Ashton and Webb (1986) documented the impact of divergent levels of teachers' perceived efficacy. They studied seasoned teachers who taught students placed in classes for basic skills because of severe academic deficiencies. Teachers' beliefs about their instructional efficacy predicted their students' levels of mathematical and language achievement over the course of the academic year where variations in the students entering ability levels were controlled. Students learned much more from teachers who displayed a sense of efficacy than from those beset with self-doubts. Teachers with a high sense of efficacy tended to view difficult students as reachable and teachable and regarded their learning problems as surmountable by ingenuity and extra effort. Teachers of low perceived efficacy were inclined to use low student ability as an explanation for why their students could not be taught.

In summary, a study of the literature indicates that teacher efficacy is related to teacher effectiveness and student achievement. When teacher efficacy is high, and higher student achievement becomes evident to the teacher, the teacher's efficacy is raised. This can produce a spiraling effect upon teacher efficacy and student achievement.

Summary

In the transition that happened in American education during the second half of the 19th century, one can trace a change in ideology and practices. This change caused differentiated instruction to originate and then to evolve from methods developed to help gifted and talented students into methods intended to meet the needs of all students in the heterogeneous classroom. This time in educational history can also be associated with interest in the relationship between teacher efficacy, teacher effectiveness, and student achievement. The relationship of differentiated instructional methods and teacher efficacy has arisen within the past decade of educational research.

Chapter Three

Methodology

The purpose of this survey study was to examine the instructional methods and efficacy of teachers trained in differentiated instruction after initial district staff training and implementation and again after involvement in a second teacher centered district staff development initiative in differentiated instruction with implementation time. This chapter describes the research design, sample, instrumentation, variables, and methods of data analysis to be used to conduct this study.

Design

This repeated measures study was a quantitative examination of teacher implementation of instructional methods introduced in differentiation staff development, and efficacy of those teachers. The study examined whether continued staff development and classroom practice resulted in a significant change of those measures. In addition the researcher investigated the relationship between instructional methods and teacher efficacy.

Sample

The sample consisted of classroom teachers employed by a suburban public school district, located in the Midwestern United States. This school district has a student population of approximately 19,000. The 190 pre-kindergarten through high school teachers surveyed in this study represented approximately one-fifth of the teacher population of the district. The teachers in this sample elected to attend a

second required differentiation staff development program to be held in the summer of 2003.

This sample included job-alike teams of teachers in many, but not all curricular areas of the district's schools. Curricular areas available for training during three summers, 2003, 2004, and 2005 were selected by the District Office of Staff Development to accommodate job-alike teams of teachers who were not heavily involved in new curriculum implementation during the training year. The 3-year training program involved most certified teachers, but only data from classroom teachers trained in the summer of 2003 were used for this study.

Respondents were asked to complete a short demographic profile that provided relevant personal and professional information about themselves. They also were asked to respond to a two-part instrument designed to measure their own instructional methods and teacher efficacy.

Data Collection

IRB approval was completed on April 28, 2003. The IRB approval number for this research is 159-03-EX (see Appendix A).

In order to facilitate a favorable response the survey was distributed on-line through the District Staff Development Office. The first survey was made available on-line to the teacher sample in April of 2003. The repeated measure survey was made available on-line in January of 2004 to those teachers who completed the June 2003 training and continued their employment as teachers for this district during the fall term of 2003. Building principals and building differentiation facilitators were

notified in advance of both surveys informing them that the survey was being provided for classroom teachers to complete. An e-mail explaining the intent of the study and confidentiality of the data was sent to the teachers in advance of both of the surveys. Surveys were coded with staff ID numbers to ensure participant confidentiality. Participants were asked to complete their surveys on-line for the District Staff Development Office. The number of participants who completed the June 2003 training and taught in district classrooms in the fall of 2004 totaled 342. In the spring of 2003, 287 surveys were completed and matched to existing staff IDs. In January 2004, 227 surveys were completed. Of these surveys, 195 of them were matched for the repeated measures part of this study. Only data from those 195 participants were used. In the spring of 2003, 64% of the trained classroom teachers responded. In January of 2004, 66% of the teacher population studied responded. Matched responses from teachers that completed the survey both times represented 57% of the participating teacher population.

Personal and Professional Characteristics

There were 27 (13.8%) male respondents and 168 (86.2%) females. Ten (5.1%) had 1-3 years of experience, 27 (13.8%) had 4-6 of years experience, 28 (14.4%) had 7-10 of years experience, 29 (14.9%) had 11-15 of years experience, and 101 (51.8%) had 16 or more years of experience. One hundred fifteen (59.0%) taught at the elementary level, 52 (26.6%) taught at the middle school level, and 28 (14.4%) taught at the high school level.

Instrumentation

Researchers have developed teacher efficacy instruments ranging from simple to multi-dimensional (Rich, Lev, & Fischer, 1996). Initially a teacher's sense of efficacy was conceptualized as a global concept and was to be measured by two items. The first item would involve efficacy to educate the difficult and unmotivated student and the second item to overcome the negative effects of adverse environments on students' academic motivation. Since that time a variety of instruments have been developed, most of which are complex.

The scale developed by Gibson and Dembro (1984) is classified as multi-dimensional because it includes two subscales: teaching efficacy (TE) subscale, which describes the teachers' belief that teaching methods or behaviors will affect student performances and the personal teaching efficacy (PTE) subscale, which indicates the teachers' belief as to whether they can perform those necessary activities (Bandura, 1977b). The TE subscale has been used in many studies involving teacher efficacy. In recent years it has undergone some scrutiny and restructuring by individual researchers. Deemer and Minke (1999) noted that this scale does correspond to Bandura's (1977b) outcome and efficacy expectations, but that item orientation poses some concerns. According to Deemer and Minke (1999), item analysis of Gibson's and Dembro's scale indicated that items on the first factor are mostly positive and items on the second factor are mostly negative. Deemer's and Minke's study examined three different factor structures. In the process of their study, they proposed a revised Teacher Efficacy Scale. The results of their study

support the accuracy of the PTE subscale but leave the TE subscale in question. In spite of this concern, Gibson's and Dembo's Teacher Efficacy Scale continues to be the basis of many studies both in its original and modified forms. This instrument demonstrates the two subscales approach to investigating efficacy, but does not match the specific content desired for this study.

In the teacher efficacy scale created by Hillman (1986), the test for content validity involved item-by-item analysis to determine if the dimensions (positive/negative, internal/external, fixed/variable) were represented as intended. Level of agreement at the end of this process ranged from 97.92% to 100.00% for these dimensions. Reliability tests were completed and accepted with an overall alpha level of .88. This instrument appeared to be a good choice, but there was a concern with its length. It includes 16 four-part questions, which, when coupled with an instructional methods instrument, may have proven to be too long.

The Webb Efficacy Scale (Ashton et al., 1983) includes two parts. In the first part the teachers respond to seven pairs of statements by selecting which statement they agree with most. The second part is comprised of 15 vignettes describing classroom situations to which the teachers respond on a 7-point Likert scale with responses ranging from extremely ineffective to extremely effective in respect to the teachers' perceptions of their capability in handling the described situations. It has been used in various other studies, but again may have proven to be too long for participants to respond to with the dual nature of this study.

Instructional methods have been studied by a variety of instruments. One such common scale is the Classroom Instructional Practice Scale (CIPS), which was based on the Classroom Informational Sheet developed by Wiesz and Cowan in 1976 (as cited in Shim, Felner, Shim, & Noonan, 2001). In their 2001 study, Shim et al. developed an instrument to study school reform. One segment of the study focused on the frequency of instructional methods used. These instruments were rejected because the general instructional practice questions did not address specific methods associated with differentiated instruction.

The review of the literature identified several existing surveys for both instructional methods and teacher efficacy. Two were located that involved a combination of both variables. The first combination instrument involved mathematics teaching and efficacy beliefs. This instrument, created by Enochs, Smith, and Huinker (2000), met many qualifiers with a total of 21 questions, but was rejected because it only addressed the curricular area of mathematics. The second entitled "Efficacy Beliefs, Background Variables, and Differentiated Instruction of Israeli Prospective Teachers" by Wertheim and Leyser (2002) combined a modified Gibson and Dembro (1984) instrument with questions addressing instructional methods for heterogeneous classrooms. It modeled an instrument design in which instructional use and belief of effectiveness provided information for parallel questions. It was rejected because the use of differentiation was limited to addressing the needs of lower ability and special education students in the regular education

classroom. Needs of the above average and gifted student must also be addressed to meet the requirements of this study.

The instrument used in this study was designed and tested as part of this study (see Appendix B). Examples from previous studies were used to ensure that the essence of efficacy and instructional methods instruments were captured. The model of parallel questions from the study by Wertheim and Leyser (2002) was used in this instrument design.

Content validity. Review of the literature on the topics of instructional methods used for differentiated instruction and teacher efficacy and use of a panel of experts helped to insure the instrument's content validity. The panel of experts was selected from classroom teachers who serve as Differentiation Facilitators in the school district being studied. The role of these facilitators is as liaisons between the Department of Staff Development and the elementary school, middle school, and high school buildings of the school district being studied. Members of this 10-person panel represented all three instructional levels as well as both regular classroom teachers and special needs teachers. The panel was asked to read the questions and code them as: Not Appropriate, Marginally Appropriate, and Very Appropriate. They were also asked to suggest revised wording when they felt rewording the question would increase its appropriateness. As a result of this peer review, several questions were dropped and some others were restated.

Pilot study. The pilot study was conducted with a sample of 50 teachers selected from the school district being studied. The classroom teachers involved

represented the population of the school district and were not registered for the staff development initiative in the summer of 2003. These classroom teachers completed the survey, as it was revised through the peer review by a panel of experts.

Reliability. For this study, the reliability coefficients of the subscales were computed on the data from the study using Cronbach's alpha. Cronbach's alpha is a measure of the internal consistency and is used for measures where respondents complete a survey with a Likert-type scale. Alpha range can be between 0 and 1.0. A scale with an alpha above .70 is considered to be internally consistent (Nunley, 1978).

The subscales in this study are as follows: differentiation of content, differentiation of process, differentiation of product, and differentiation of the learning environment. Using Cronbach's alpha the reliability estimates of the instrument employed were as follows: differentiation of content (.83), differentiation of process (.79), differentiation of product (.77), and differentiation of the learning environment (.86).

Variables

Independent variables. The independent variables included in this study were defined as:

1. testing time (after initial training, after second staff development initiative)
2. instructional level (elementary school, middle school, high school)
3. years experience (1-3, 4-6, 7-10, 11-15, 16^{+})

Dependent variables. The mean scores from the subscales of the two scales, instructional methods scale and efficacy scale, were dependent variables for this

study. Each scale was broken down into the same four subscales: differentiation of content, differentiation of process, differentiation of product, and differentiation of the learning environment. Respondents' mean scores on the eight subscales were the dependent variables for the purpose of this study.

Mean Substitution Process

A mean substitution process was used to compute the mean scores on the subscales. Due to certain respondent characteristics, missing data may result in survey's using Likert scales (Raaijmakers, 1999; Roth, 1994). In this survey there were missing data for the teacher efficacy scores if the participant's response to an instructional methods question was never. If the participants responded that they never used a particular instructional practice they were directed to skip the corresponding efficacy question.

Research Questions

This study was based upon the following research questions:

1. What instructional methods and efficacy scores are displayed by teachers on two occasions: (a) after initial district staff development training in differentiated instruction with implementation time and (b) after a second teacher centered district staff development initiative in differentiated instruction including implementation time?

2. Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

3. Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

4. Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

5. Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

6. Is there a relationship between instructional methods and efficacy after initial staff development training in differentiated instruction?

7. Is there a relationship between instructional methods and efficacy after a second teacher centered district staff development initiative in differentiated instruction?

Data Analysis

Research question 1 was analyzed using descriptive statistics, such as means and standard deviations. Research questions 2, 3, 4, and 5 were analyzed using two-way analyses of variance (ANOVAs). Research questions 6 and 7 were analyzed using the Pearson product-moment correlation coefficient. Because multiple statistical tests were conducted, the significance level was reduced to .01 for each test to control for Type I errors.

Chapter 4

Results

The purpose of this survey study was to examine the instructional methods and efficacy of teachers trained in differentiated instruction after initial district staff training and implementation and again after involvement in a second teacher centered district staff development initiative in differentiated instruction with implementation time. A survey was administered to classroom teachers at two times. The first survey was administered to teachers who had received an initial training in differentiated instruction, which included implementation time. This first survey was completed about a month before those same teachers attended a second staff development experience in differentiated instruction. The second survey was administered 8 months later, after the teachers had had an opportunity to implement the lessons that they designed during the staff development experience. Both surveys were collected via an on-line survey.

Only the data from those teachers completing both surveys were used. Of the 342 eligible participants, 195 (57.0%) completed both surveys. Demographic data (years of experience and teaching level) were taken from the first survey and used for research questions that required those demographic variables. Because of low numbers of respondents in the category, preschool, the planned four teaching levels (preschool, elementary school, middle school, and high school) were compressed into three categories: (a) elementary school, (b) middle school, and (c) high school.

Aspects of instruction that result in effective differentiated instruction were determined through an analysis of past research and related literature. These four aspects: differentiation of content, differentiation of process, differentiation of product and differentiation of the learning environment were developed into separate subscales of the survey. For each of these instructional aspects, a subscale with survey items that represent differentiation in that area, was designed using a 5-point Likert scale with the following choices: 1 = never, 2 = infrequently, 3 = some of the time, 4 = frequently, and 5 = always. Each question related to instructional methods was paired with a question concerning teacher efficacy. Survey items related to each of these efficacy questions were designed using a 5-point Likert scale with the following choices: 1 = strongly disagree, 2 = moderately disagree, 3 = uncertain, 4 = moderately agree, and 5 = strongly agree.

For the purposes of statistical analysis means were computed for each of the four aspects of instruction on both the instructional methods and efficacy components of the survey. Means were computed from usable responses, and the mean substitution process was employed for the purpose of being able to use a respondent's score if he/she did not have a response for all of the items.

Research Question 1

What instructional methods and efficacy scores are displayed by teachers on two occasions: (a) after initial district staff development training in differentiated instruction with implementation time and (b) after a second teacher centered district

staff development initiative in differentiated instruction including implementation time?

Survey one - Instructional Methods. The overall mean score on the Instructional Methods segment of the first survey for the Differentiation of Content subscale was 3.76 (*SD* = 0.80). The overall mean score for the Differentiation of Process subscale was 3.78 (*SD* = 0.79). The overall mean score for the Differentiation of Product subscale was 3.41 (*SD* = 0.91). The overall mean score for the Differentiation of Learning Environment subscale was 3.36 (*SD* = 0.96). Table 1 presents the means and standard deviations of each individual item for the four subscales in the Instructional Methods segment of the first survey. During the first survey, the means for individual items ranged from a low of 2.87 (*SD* = 0.85) on an item in the area of differentiation of product (I allow students to select, from a list or menu, how they will demonstrate their learning of a concept.) to a high of 4.26 (*SD* = 0.62) on a item in the area of differentiation of content (I check whether students have prerequisite understanding during instruction, before proceeding to the next level of learning/understanding.).

Survey one - Efficacy. The overall mean score on the Efficacy Segment of the first survey for the Differentiation of Content subscale was 4.21 (*SD* = 0.77). The overall mean score for the Differentiation of Process subscale was 4.13 (*SD* = 0.73). The overall mean score for the Differentiation of Product subscale was 3.96 (*SD* = 0.75). The overall mean score for the Differentiation of Learning Environment subscale was 4.02 (*SD* = 0.76). Table 2 presents the means and standard deviations

Table 1

Teacher Instructional Methods Reported at Survey One

Subscale 1 – Differentiation of Content Items	Mean	*SD*
1a. I plan learning activities based on individual student's ability levels.	4.03	0.73
2a. I include varying levels of questioning, from knowledge to analysis and evaluation, as I direct student learning.	4.05	0.71
3a. I use compacting to allow students to demonstrate that they already have met an objective and allow them to move on to a different learning opportunity.	3.13	0.84
4a. I direct students to reflect upon what they are learning with questions requiring a range of thinking from concrete to abstract.	3.88	0.71
5a. I check whether students have prerequisite understanding during instruction, before proceeding to the next level of learning/understanding.	4.26	0.62
6a. I use tiered activities to encourage student study at a level that promotes continued growth.	3.25	0.98
Subscale 2 – Differentiation of Process Items	Mean	*SD*
7a. I make use of rubrics to guide student learning.	3.49	1.03
8a. I provide open-ended activities to keep all students actively involved in the learning process.	3.81	0.76
9a. I provide opportunities for students to meet the same objective in a variety of ways (with choices of different activities).	3.66	0.79
10a. I use varied instructional approaches, addressing different learning styles, when teaching ideas, concepts, facts, and skills.	4.23	0.65
11a. I assess student interests and integrate those interests into instructional planning and delivery.	3.59	0.80
12a. I assess a student's prior level of understanding of a concept and adjust instruction to his/her readiness.	3.92	0.72

Table 1 (continued)

Subscale 3 – Differentiation of Product Items	Mean	*SD*
13a. I allow students to select (from a list or menu) how they will demonstrate their learning of a concept.	2.87	0.85
14a. I assess student learning in a variety of ways.	4.21	0.70
15a. I make use of rubrics to guide scoring of student assessments.	3.37	1.10
16a. I provide for enrichment activities during a unit of study.	3.62	0.91
17a. I encourage students to create their own extensions to activities that are assigned to them.	2.99	0.99
Subscale 4 – Differentiation of Learning Environment Items	Mean	*SD*
18a. I vary grouping arrangements (group size, physical space) during an instructional period.	3.87	0.86
19a. I employ the use of learning centers to allow students to explore topics and practice skills independently.	2.99	1.32
20a. I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity within a unit of study.	3.89	1.00
21a. I provide the opportunity for students to make choices concerning the process of their own learning.	3.45	0.83
22a. I provide students with the opportunity to be involved with self-directed projects (with teacher guidelines) as part of their learning experience.	3.11	0.95
23a. I arrange like-ability groups for learning experiences.	3.13	0.88
24a. I provide the opportunity for flexible grouping based on student interest.	3.07	0.86

Table 2

Teacher Efficacy Reported at Survey One

Subscale 1 – Differentiation of Content Items	Mean	*SD*
1b. When I plan learning activities based on individual student's ability levels, individual students demonstrate a higher level of new learning.	4.19	0.86
2b. When I include varying levels of questioning, students' depth of understanding is increased.	4.31	0.83
3b. When I use compacting and allow students to proceed on to other learning opportunities; the amount of new learning, for those students, is increased.	3.94	0.87
4b. When I direct students to reflect upon their learning, with questions ranging from concrete to abstract, their understanding and retention of that learning is improved.	4.26	0.73
5b. When I check for prior understanding during instruction, students move to the next level of learning with a greater degree of success.	4.49	0.63
6b. When I use tiered activities, students demonstrate continuous growth.	4.07	0.68
Subscale 2 – Differentiation of Process Items	Mean	*SD*
7b. When I make use of rubrics to guide student learning, student learning is greater than when I do not use rubrics.	3.45	0.93
8b. When I provide open-ended activities, student learning extends beyond the required level of understanding.	4.07	0.79
9b. When I provide opportunities for students to learn the same objective, with different activities, students attain a higher level of understanding of that objective.	4.09	0.79
10b. When I vary instructional approaches to address different learning styles, students gain a better understanding of ideas, concepts, facts, and skills.	4.48	0.62
11b. When I integrate student interests into instructional planning and delivery, student learning is enhanced.	4.33	0.65
12b. When I assess a student's prior level of understanding of a concept and adjust instruction to his/her readiness, he/she attains a higher level of understanding of that concept.	4.31	0.62

Table 2 (continued)

Subscale 3 – Differentiation of Product Items	Mean	*SD*
13b. When I allow students to select (from a list or menu) how they will demonstrate their learning of a concept, they more clearly demonstrate what they have learned.	3.77	0.82
14b. When I assess student learning in a variety of ways, I find students demonstrate their understanding with a higher level of quality then when I use traditional assessments.	3.99	0.61
15b. When I make use of rubrics to guide scoring of student assessments, student learning is more equitably scored.	3.99	0.82
16b. When I provide enrichment activities, during a unit of study, students who choose to complete the enrichment activities display learning that extends beyond the required level of understanding.	4.16	0.73
17b. When I encourage students to create their own extensions to the work that is assigned to the whole class to complete, the students who complete those extensions attain a higher level of understanding of the objectives being studied.	3.91	0.78
Subscale 4 – Differentiation of Learning Environment Items	Mean	*SD*
18b. When I vary students' grouping arrangements (group size, physical space), it encourages their learning.	4.16	0.78
19b. When I provide learning center opportunities to allow students to explore topics, student learning is enhanced.	3.98	0.76
20b. When I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity; I find students are more motivated and involved in the learning process.	4.21	0.69
21b. When I provide the opportunity for students to make approved choices in the process of learning, my students are more motivated to learn.	4.04	0.78
22b. When I provide the opportunity for students to be involved with self-directed projects as part of their learning experience, the students are more involved in their own learning.	4.09	0.70
23b. When I arrange like-ability groups, students reach their own learning potential more quickly.	3.78	0.86
24b. When I provide the opportunity for flexible grouping based on student interest, student learning is enhanced.	3.87	0.78

of each individual item for the four subscales in the Efficacy Segment of the first survey. During the first survey, the means for individual items ranged from a low of 3.45 (*SD* = 0.93) on an item in the area of differentiation of process (When I make use of rubrics to guide student learning, student learning is greater than when I do not use rubrics.) to a high of 4.49 (*SD* = 0.63) on a item in the area of differentiation of content (When I check for prior understanding during instruction, students move to the next level of learning with a greater degree of success.).

Survey two - Instructional Methods. The overall mean score on the Instructional Methods segment of the second survey for the Differentiation of Content subscale was 3.67 (*SD* = 0.84). The overall mean score for the Differentiation of Process subscale was 3.68 (*SD* = 0.83). The overall mean score for the Differentiation of Product subscale, was 3.21 (*SD* = 0.98). The overall mean score for the Differentiation Learning Environment subscale was 3.28 (*SD* = 0.99). Table 3 presents the means and standard deviations of each individual item for the four subscales in the Instructional Methods segment of the second survey. During the second survey, the means for individual items ranged from a low of 2.73 (*SD* = 1.09) on an item in the area of differentiation of product (I encourage students to create their own extensions to activities that are assigned to them. Usually this is on an individual or small group basis with guidelines set by the teacher.) to a high of 4.15 (*SD* = 0.69) on a item in the area of differentiation of process (I use varied instructional approaches, addressing different learning styles, when teaching ideas, concepts, facts and skills.).

Table 3

Teacher Instructional Methods Reported at Survey Two

Subscale 1 – Differentiation of Content Items	Mean	*SD*
1a. I plan learning activities based on individual student's ability levels.	3.92	0.79
2a. I include varying levels of questioning, from knowledge to analysis and evaluation, as I direct student learning.	3.95	0.74
3a. I use compacting to allow students to demonstrate that they already have met an objective and allow them to move on to a different learning opportunity.	3.05	0.94
4a. I direct students to reflect upon what they are learning with questions requiring a range of thinking from concrete to abstract.	3.69	0.81
5a. I check whether students have prerequisite understanding during instruction, before proceeding to the next level of learning/understanding.	4.08	0.74
6a. I use tiered activities to encourage student study at a level that promotes continued growth.	3.34	0.99
Subscale 2 – Differentiation of Process Items	Mean	*SD*
7a. I make use of rubrics to guide student learning.	3.39	1.13
8a. I provide open-ended activities to keep all students actively involved in the learning process.	3.65	0.72
9a. I provide opportunities for students to meet the same objective in a variety of ways (with choices of different activities).	3.52	0.85
10a. I use varied instructional approaches, addressing different learning styles, when teaching ideas, concepts, facts, and skills.	4.15	0.69
11a. I assess student interests and integrate those interests into instructional planning and delivery.	3.49	0.80
12a. I assess a student's prior level of understanding of a concept and adjust instruction to his/her readiness.	3.86	0.80

Table 3 (continued)

Subscale 3 – Differentiation of Product Items	Mean	*SD*
13a. I allow students to select (from a list or menu) how they will demonstrate their learning of a concept.	2.81	0.93
14a. I assess student learning in a variety of ways.	3.93	0.80
15a. I make use of rubrics to guide scoring of student assessments.	3.30	1.13
16a. I provide for enrichment activities during a unit of study.	3.27	0.93
17a. I encourage students to create their own extensions to activities that are assigned to them.	2.73	1.09
Subscale 4 – Differentiation of Learning Environment Items	Mean	*SD*
18a. I vary grouping arrangements (group size, physical space) during an instructional period.	3.78	0.92
19a. I employ the use of learning centers to allow students to explore topics and practice skills independently.	2.87	1.34
20a. I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity within a unit of study.	3.85	1.01
21a. I provide the opportunity for students to make choices concerning the process of their own learning.	3.34	0.93
22a. I provide students with the opportunity to be involved with self-directed projects (with teacher guidelines) as part of their learning experience.	3.03	0.91
23a. I arrange like-ability groups for learning experiences.	3.11	0.91
24a. I provide the opportunity for flexible grouping based on student interest.	2.95	0.90

Survey two-Efficacy. The overall mean score on the Efficacy segment of the second survey for the Differentiation of Content subscale was 4.13 (SD = 0.86). The overall mean score for the Differentiation of Process subscale was 4.03 (SD = 0.81). The overall mean score for the Differentiation of Product subscale was 3.90 (SD = 0.79). The overall mean score for the Differentiation of Learning Environment subscale was 3.99 (SD = 0.77). Table 4 presents the means and standard deviations of each individual item for the four subscales in the Efficacy segment of the second survey.

During the second survey, the means for individual items ranged from a low of 3.09 (SD = 1.06) on an item in the area of differentiation of process (When I make use of rubrics to guide student learning, student learning is greater than when I do not use rubrics.) to a high of 4.42 (SD = 0.77) on a item in the area of differentiation of process (When I vary instructional approaches to address different learning styles, students gain a better understanding of ideas, concepts, facts, and skills.).

Research Question 2

Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

Subscale 1 – Differentiation of Content. There was not a significant (a) main effect for time, $F(1, 189) = 1.40$, $p = .238$; (b) main effect for years of experience, $F(4, 189) = 1.27$, $p = .285$; or (c) interaction between time and years of experience, $F(4, 189) = 1.62$, $p = .170$, in the efficacy scores for the Differentiation of Content

Table 4

Teacher Efficacy Reported at Survey Two

Subscale 1 – Differentiation of Content Items	Mean	*SD*
1b. When I plan learning activities based on individual student's ability levels, individual students demonstrate a higher level of new learning.	4.03	1.03
2b. When I include varying levels of questioning, students' depth of understanding is increased.	4.23	0.86
3b. When I use compacting and allow students proceed on to other learning opportunities; the amount of new learning, for those students, is increased.	3.93	0.89
4b. When I direct students to reflect upon their learning, with questions ranging from concrete to abstract, their understanding and retention of that learning is improved.	4.16	0.80
5b. When I check for prior understanding during instruction, students move to the next level of learning with a greater degree of success.	4.31	0.86
6b. When I use tiered activities, students demonstrate continuous growth.	4.12	0.74
Subscale 2 – Differentiation of Process Items	Mean	*SD*
7b. When I make use of rubrics to guide student learning, student learning is greater than when I do not use rubrics.	3.09	1.06
8b. When I provide open-ended activities, student learning extends beyond the required level of understanding.	4.03	0.79
9b. When I provide opportunities for students to learn the same objective, with different activities, students attain a higher level of understanding of that objective.	4.07	0.82
10b. When I vary instructional approaches to address different learning styles, students gain a better understanding of ideas, concepts, facts, and skills.	4.42	0.77
11b. When I integrate student interests into instructional planning and delivery, student learning is enhanced.	4.25	0.75
12b. When I assess a student's prior level of understanding of a concept and adjust instruction to their readiness, he/she attains a higher level of understanding of that concept.	4.29	0.68

Table 4 (continued)

Subscale 3 – Differentiation of Product Items	Mean	*SD*
13b. When I allow students to select (from a list or menu) how they will demonstrate their learning of a concept, they more clearly demonstrate what they have learned.	3.75	0.80
14b. When I assess student learning in a variety of ways, I find students demonstrate their understanding with a higher level of quality then when I use traditional assessments.	3.97	0.71
15b. When I make use of rubrics to guide scoring of student assessments, student learning is more equitably scored.	4.01	0.84
16b. When I provide enrichment activities, during a unit of study, students that choose to complete the enrichment activities display learning that extends beyond the required level of understanding.	3.96	0.79
17b. When I encourage students to create their own extensions to the work that is assigned to the whole class to complete, the students who complete those extensions attain a higher level of understanding of the objectives being studied.	3.82	0.82
Subscale 4 – Differentiation of Learning Environment Items	Mean	*SD*
18b. When I vary students' grouping arrangements (group size, physical space), it encourages their learning.	4.10	0.81
19b. When I provide learning center opportunities to allow students to explore topics, student learning is enhanced.	3.99	0.80
20b. When I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity, I find students are more motivated and involved in the learning process.	4.19	0.72
21b. When I provide the opportunity for students to make approved choices in the process of learning, my students are more motivated to learn.	4.03	0.75
22b. When I provide the opportunity for students to be involved with self-directed projects as part of their learning experience, the students are more involved in their own learning.	3.98	0.74
23b. When I arrange like-ability groups, students reach their own learning potential more quickly.	3.75	0.81
24b. When I provide the opportunity for flexible grouping based on student interest, student learning is enhanced.	3.87	0.75

subscale. Table 5 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and years of experience.

Subscale 2 – Differentiation of Process. There was not a significant (a) main effect for time, $F(1, 189) = 2.45, p = .119$; (b) main effect for years of experience, $F(4, 189) = 1.22, p = .305$; or (c) interaction between time and years of experience, $F(4, 189) = 2.36, p = .055$, in the efficacy scores for the Differentiation of Process subscale. Table 6 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and years of experience.

Subscale 3 – Differentiation of Product. There was not a significant (a) main effect for time, $F(1, 189) = 1.96, p = .164$; (b) main effect for years of experience, $F(4, 189) = 0.72, p = .580$; or (c) interaction between time and years of experience, $F(4, 189) = 3.15, p = .016$, for the Differentiation of Product subscale. Table 7 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and years of experience.

Subscale 4 – Differentiation of Learning Environment. There was not a significant (a) main effect for time, $F(1, 188) = 0.36, p = .551$; (b) main effect for years of experience, $F(4, 188) = 0.93, p = .450$; or (c) interaction between time and years of experience, $F(4, 188) = 0.95, p = .435$, for the Differentiation of Learning Environment subscale. Table 8 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and years of experience.

Table 5

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Years of Experience for the Differentiation of Content Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	4.48	0.44	9
	4-6 yrs	4.17	0.58	27
	7-10 yrs	4.00	0.65	28
	11-15 yrs	4.21	0.55	29
	16+ yrs	4.25	0.53	101
	Total	4.21	0.56	194
Second	1-3 yrs	4.39	0.37	9
	4-6 yrs	4.16	0.56	27
	7-10 yrs	4.13	0.65	28
	11-15 yrs	3.93	0.86	29
	16+ yrs	4.15	0.58	101
	Total	4.13	0.63	194

Table 6

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Years of Experience for the Differentiation of Process Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	4.33	0.51	9
	4-6 yrs	4.18	0.45	27
	7-10 yrs	4.00	0.48	28
	11-15 yrs	4.14	0.54	29
	16+ yrs	4.11	0.45	101
	Total	4.12	0.47	194
Second	1-3 yrs	4.30	0.51	9
	4-6 yrs	4.10	0.57	27
	7-10 yrs	4.11	0.54	28
	11-15 yrs	3.82	0.67	29
	16+ yrs	4.03	0.50	101
	Total	4.03	0.55	194

Table 7

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Years of Experience for the Differentiation of Product Subscale

Survey	Years Experience	Mean	*SD*	*n*
Initial	1-3 yrs	4.10	0.36	9
	4-6 yrs	3.95	0.38	27
	7-10 yrs	3.88	0.48	28
	11-15 yrs	3.97	0.52	29
	16+ yrs	3.96	0.54	101
	Total	3.96	0.50	194
Second	1-3 yrs	3.92	0.52	9
	4-6 yrs	4.06	0.45	27
	7-10 yrs	3.98	0.53	28
	11-15 yrs	3.66	0.64	29
	16+ yrs	3.89	0.53	101
	Total	3.89	0.54	194

Table 8

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Years of Experience for the Differentiation of Learning Environment Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	4.15	0.43	9
	4-6 yrs	4.07	0.48	27
	7-10 yrs	3.95	0.51	28
	11-15 yrs	3.94	0.54	29
	16+ yrs	3.99	0.56	100
	Total	4.00	0.53	193
Second	1-3 yrs	4.03	0.33	9
	4-6 yrs	4.14	0.50	27
	7-10 yrs	4.03	0.51	28
	11-15 yrs	3.82	0.71	29
	16+ yrs	3.94	0.54	100
	Total	3.97	0.55	193

Research Question 3

Is there a difference in the efficacy scores of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

Subscale 1 – Differentiation of Content. There was not a significant (a) main effect for time, $F(1, 191) = 0.50, p = .482$; (b) main effect for instructional level, $F(2, 191) = 2.51, p = .084$; or (c) interaction between time and instructional level, $F(2, 191) = 1.61, p = .202$, for the Differentiation of Content subscale. Table 9 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and instructional level.

Subscale 2 – Differentiation of Process. There was not a significant (a) main effect for time, $F(1, 191) = 3.47, p = .064$; (b) main effect for instructional level, $F(2, 191) = 3.64, p = .028$; or (c) interaction between time and instructional level, $F(2, 191) = 0.73, p = .482$, for the Differentiation of Process subscale. Table 10 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and instructional level.

Subscale 3 – Differentiation of Product. There was not a significant (a) main effect for time, $F(1, 191) = 0.42, p = .519$; (b) main effect for instructional level, $F(2, 191) = 2.67, p = .072$; or (c) interaction between time and instructional level, $F(2, 191) = 1.71, p = .184$, for the Differentiation of Product subscale. Table 11 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and instructional level.

Table 9

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Instructional Level for the Differentiation of Content Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	4.31	0.50	114
	Middle School	4.06	0.60	52
	High School	4.07	0.64	28
	Total	4.21	0.56	194
Second	Elementary	4.16	0.70	114
	Middle School	4.08	0.45	52
	High School	4.09	0.66	28
	Total	4.13	0.63	194

Table 10

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Instructional Level for the Differentiation of Process Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	4.17	0.46	114
	Middle School	4.04	0.49	52
	High School	4.02	0.48	28
	Total	4.12	0.47	194
Second	Elementary	4.11	0.56	114
	Middle School	3.88	0.46	52
	High School	3.99	0.61	28
	Total	4.03	0.55	194

Table 11

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Instructional Level for the Differentiation of Product Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	4.01	0.45	114
	Middle School	3.97	0.52	52
	High School	3.71	0.59	28
	Total	3.96	0.50	194
Second	Elementary	3.93	0.55	114
	Middle School	3.85	0.46	52
	High School	3.81	0.65	28
	Total	3.89	0.54	194

Subscale 4 – Differentiation of Learning Environment. There was a significant main effect for instructional level, in the Efficacy Scores among the elementary school, middle school, and high school levels, $F(2, 190) = 15.33$, $p < .0005$ for the Differentiation of Learning Environment subscale. Follow-up Tukey pairwise comparison tests indicated that elementary school teachers' efficacy scores ($M = 4.13$, $SD = 0.44$) were significantly higher than the middle school teachers' efficacy scores ($M = 3.83$, $SD = 0.42$) and also significantly higher than the high school teachers' efficacy scores ($M = 3.68$, $SD = 0.52$). There was not a significant main effect for time, $F(1, 190) = 0.01$, $p = .912$, in the efficacy scores between the initial survey and the second survey, or a significant interaction between time and instructional level, $F(2, 190) = 3.37$, $p = .036$. Table 12 summarizes the means and standard deviations of Efficacy Scores for this subscale as a function of survey time and instructional level.

Research Question 4

Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by years of experience?

Subscale 1 – Differentiation of Content. There was not a significant (a) main effect for time, $F(1, 187) = 5.23$, $p = .023$; (b) main effect for years of experience, $F(4, 187) = 0.19$, $p = .943$; or (c) interaction between time and years of experience, $F(4, 187) = 1.85$, $p = .120$. Table 13 summarizes the means and standard deviations

Table 12

Means and Standard Deviations of Teacher Efficacy as a Function of Survey Time and Instructional Level for the Differentiation of Learning Environment Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	4.15	0.49	113
	Middle School	3.90	0.46	52
	High School	3.59	0.56	28
	Total	4.00	0.53	193
Second	Elementary	4.11	0.54	113
	Middle School	3.77	0.47	52
	High School	3.76	0.58	28
	Total	3.97	0.55	193

Table 13

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Years of Experience for the Differentiation of Content Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	3.81	0.42	10
	4-6 yrs	3.78	0.38	27
	7-10 yrs	3.65	0.60	27
	11-15 yrs	3.76	0.40	29
	16+ yrs	3.79	0.49	99
	Total	3.76	0.48	192
Second	1-3 yrs	3.70	0.53	10
	4-6 yrs	3.55	0.45	27
	7-10 yrs	3.75	0.65	27
	11-15 yrs	3.62	0.56	29
	16+ yrs	3.70	0.56	99
	Total	3.67	0.56	192

of Instructional Methods Scores for this subscale as a function of survey time and years of experience.

Subscale 2 – Differentiation of Process. There was a significant main effect for time, $F(1, 188) = 12.79, p < .0005$ in the Instructional Practice Scores between the first survey and the second survey, for the Differentiation of Process subscale. Teacher perceptions of their use of differentiated instructional methods in the area of differentiation of process were significantly higher after the initial district staff training ($M = 3.78$, $SD = 0.48$) than after the second teacher centered staff development initiative in differentiated instruction ($M = 3.67$, $SD = 0.53$). There was not a significant main effect for years of experience, $F(4, 188) = 0.47$, $p = .758$, or a significant interaction between time and years of experience, $F(4, 188) = 1.23, p = .299$. Table 14 summarizes the means and standard deviations of the Instructional Practice Scores for this subscale as a function of survey time and years of experience.

Subscale 3 – Differentiation of Product. There was a significant main effect for time, $F(1, 187) = 15.08, p < .0005$, in the Instructional Practice Scores between the first survey and the second survey, for the Differentiation of Product subscale. Teacher perceptions of their use of differentiated instructional methods in the area of differentiation of product were significantly higher after the initial district staff training ($M = 3.41$, $SD = 0.61$) than after the second teacher centered staff development initiative ($M = 3.21$, $SD = 0.67$). There was not a significant main effect for years of experience, $F(4, 187) = 0.59, p = .669$, or a significant interaction

Table 14

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Years of Experience for the Differentiation of Process Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	3.95	0.47	10
	4-6 yrs	3.80	0.42	27
	7-10 yrs	3.81	0.51	28
	11-15 yrs	3.81	0.47	29
	16+ yrs	3.74	0.49	99
	Total	3.78	0.48	193
Second	1-3 yrs	3.57	0.53	10
	4-6 yrs	3.70	0.55	27
	7-10 yrs	3.76	0.49	28
	11-15 yrs	3.74	0.42	29
	16+ yrs	3.62	0.57	99
	Total	3.67	0.53	193

between time and years of experience, $F(4, 187) = 0.70, p = .590$. Table 15 summarizes the means and standard deviations of the Instructional Practice Scores for this subscale as a function of survey time and years of experience.

Subscale 4 – Differentiation of Learning Environment. There was not a significant (a) main effect for time, $F(1, 186) = 3.07, p = .081$; (b) main effect for years of experience, $F(4, 186) = 1.68, p = .157$; or (c) interaction between time and years of experience, $F(4, 186) = 0.93, p = .450$, for the Differentiation of Learning Environment subscale. Table 16 summarizes the means and standard deviations of Instructional Practice Scores for this subscale as a function of survey time and years of experience.

Research Question 5

Is there a difference in the instructional methods of teachers after an initial district staff training in differentiated instruction and a second teacher centered staff development initiative in differentiated instruction by instructional level?

Subscale 1 – Differentiation of Content. There was a significant main effect for time, $F(1, 189) = 7.21, p = .008$, in the Instructional Practice Scores between the first survey and the second survey for the Differentiation of Content subscale. Teachers' perceptions of their use of differentiated instructional methods in the area of differentiation of content were significantly higher after the initial district staff training ($M = 3.76, SD = 0.48$) than after the second teacher centered staff development initiative in differentiated instruction ($M = 3.67, SD = 0.56$). There was

Table 15

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Years of Experience for the Differentiation of Product Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	3.36	0.73	10
	4-6 yrs	3.48	0.53	27
	7-10 yrs	3.45	0.71	28
	11-15 yrs	3.32	0.66	29
	16+ yrs	3.41	0.59	98
	Total	3.41	0.61	192
Second	1-3 yrs	3.02	0.63	10
	4-6 yrs	3.31	0.63	27
	7-10 yrs	3.37	0.62	28
	11-15 yrs	3.17	0.72	29
	16+ yrs	3.17	0.68	98
	Total	3.21	0.67	192

Table 16

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Years of Experience for the Differentiation of Learning Environment Subscale

Survey	Years Experience	Mean	*SD*	*n*
First	1-3 yrs	3.61	0.59	10
	4-6 yrs	3.48	0.55	26
	7-10 yrs	3.43	0.62	27
	11-15 yrs	3.25	0.64	29
	16+ yrs	3.32	0.64	99
	Total	3.36	0.62	191
Second	1-3 yrs	3.47	0.47	10
	4-6 yrs	3.50	0.44	26
	7-10 yrs	3.43	0.63	27
	11-15 yrs	3.12	0.67	29
	16+ yrs	3.20	0.72	99
	Total	3.28	0.67	191

not a significant main effect for instructional level, $F(2, 189) = 3.78$, $p = .025$, or a significant interaction between time and instructional level, $F(2, 189) = 0.16$, $p = .849$. Table 17 summarizes the means and standard deviations of Instructional Practice Scores for this subscale as a function of survey time and instructional level.

Subscale 2 – Differentiation of Process. There was a significant main effect for time, $F(1, 190) = 8.37$, $p = .004$, in the Instructional Practice Scores between the first survey and the second survey for the Differentiation of Process subscale. Teachers' perceptions of their use of differentiated instructional methods in the area of differentiation of process were significantly higher after the initial district staff training in differentiated instruction ($M = 3.78$, $SD = 0.48$) than after the second teacher centered staff development initiative in differentiated instruction ($M = 3.67$, $SD = 0.53$). There was not a significant main effect for instructional level, $F(2, 190) = 0.66$, $p = .518$, or a significant interaction between time and instructional level, $F(2, 190) = 0.29$, $p = .751$. Table 18 summarizes the means and standard deviations of Instructional Practice Scores for this subscale as a function of survey time and instructional level.

Subscale 3 – Differentiation of Product. There was a significant main effect for time, $F(1, 189) = 14.17$, $p < .0005$, in the Instructional Practice Scores between the first survey and the second survey, for the Differentiation of Product subscale. Teachers' perceptions of their use of differentiated instructional methods in the area of differentiation of product were significantly higher after the initial district staff

Table 17

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Instructional Level for the Differentiation of Content Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	3.82	0.44	112
	Middle School	3.61	0.50	52
	High School	3.82	0.52	28
	Total	3.76	0.48	192
Second	Elementary	3.74	0.55	112
	Middle School	3.53	0.55	52
	High School	3.68	0.55	28
	Total	3.67	0.56	192

Table 18

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Instructional Level for the Differentiation of Process Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	3.78	0.48	114
	Middle School	3.74	0.49	51
	High School	3.87	0.47	28
	Total	3.78	0.48	193
Second	Elementary	3.65	0.57	114
	Middle School	3.66	0.49	51
	High School	3.76	0.47	28
	Total	3.67	0.53	193

training in differentiated instruction ($M = 3.41$, $SD = 0.61$) than after the second teacher centered staff development initiative in differentiated instruction ($M = 3.21$, $SD = 0.67$). There was not a significant main effect for instructional level, $F(2, 189) = 1.03$, $p = .359$, or a significant interaction between time and instructional level, $F(2, 189) = 0.59$, $p = .557$. Table 19 summarizes the means and standard deviations of the Instructional Practice Scores for this subscale as a function of survey time and instructional level.

Subscale 4 – Differentiation of Learning Environment. There was a significant main effect for instructional level, $F(2, 188) = 16.49$, $p < .0005$, in the Instructional Practice Scores between the elementary school, middle school, and high school levels, for the Differentiation of Learning Environment subscale. Follow-up Tukey pairwise comparison tests indicated that elementary school teachers' efficacy scores ($M = 3.52$, $SD = 0.56$) were significantly higher than the middle school teachers' efficacy scores ($M = 3.08$, $SD = 0.59$) and also significantly higher than the high school teachers' efficacy scores ($M = 2.98$, $SD = 0.56$). There was not a significant main effect for time, $F(1, 188) = 4.11$, $p = .044$, or a significant interaction between time and instructional level, $F(2, 188) = 0.72$, $p = .490$. Table 20 summarizes the means and standard deviations of Instructional Practice Scores for this subscale as a function of survey time and instructional level.

Research Question 6

Is there a relationship between instructional methods and efficacy after initial staff development training in differentiated instruction?

Table 19

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Instructional Level for the Differentiation of Product Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	3.46	0.57	113
	Middle School	3.29	0.69	51
	High School	3.38	0.65	28
	Total	3.41	0.61	192
Second	Elementary	3.23	0.65	113
	Middle School	3.12	0.68	51
	High School	3.27	0.72	28
	Total	3.21	0.67	192

Table 20

Means and Standard Deviations of Instructional Methods as a Function of Survey Time and Instructional Level for the Differentiation of Learning Environment Subscale

Survey	Level	Mean	*SD*	*n*
First	Elementary	3.56	0.60	112
	Middle School	3.15	0.56	51
	High School	2.98	0.52	28
	Total	3.36	0.62	191
Second	Elementary	3.47	0.66	112
	Middle School	3.01	0.61	51
	High School	2.97	0.51	28
	Total	3.28	0.67	191

There were significant positive relationships between teachers' perceptions of their own differentiation of instructional methods and efficacy concerning the effectiveness of differentiated instructional methods after initial staff training in differentiated instruction. Subscales showed significant positive relationships between the instructional methods and efficacy for Differentiation of Content, $r(193) = .519, p < .0005$, Differentiation of Process, $r(193) = .629, p < .0005$, Differentiation of Product, $r(193) = .621, p < .0005$ and Differentiation of the Learning Environment, $r(193) = .510, p < .0005$.

Research Question 7

Is there a relationship between instructional methods and efficacy after a second teacher centered district staff development initiative in differentiated instruction?

There were significant positive relationships between teachers' perceptions of their own differentiation of instructional methods and efficacy concerning the effectiveness of differentiated instructional methods after a second teacher centered district staff development initiative in differentiated instruction. Subscales showed significant positive relationships between instructional methods and efficacy for Differentiation of Content, $r(193) = .459, p < .0005$, Differentiation of Process, $r(193) = .436, p < .0005$, Differentiation of Product, $r(188) = .573, p < .0005$, and Differentiation of the Learning Environment, $r(189) = .556, p < .0005$.

Chapter 5

Discussion

The purpose of this survey study was to examine the instructional methods and efficacy of teachers trained in differentiated instruction after initial district staff training and implementation and again after involvement in a second teacher centered district staff development initiative in differentiated instruction with implementation time. This study used teacher perception data to examine teacher instructional methods and teacher efficacy for a 9-month period during the 6-year district staff development process in differentiated instruction and was implemented to gain insight into three specific areas. The first area was the overall teachers' perceptions of their differentiated instructional methods and efficacy in relationship to those methods. The second area was the change in teacher perceived instructional practice and efficacy during the 9-month period of this study. This change was analyzed by both years of experience and instructional level to determine if these variables had a significant effect on teacher responses. The third area was the relationship between instructional methods and teacher efficacy at both survey times. This relationship was investigated to determine whether the data collected would indicate a significant positive relationship between differentiated instructional methods and teacher efficacy.

Teachers' Perceptions of Instructional Methods

Analysis of the means and standard deviations for the Instructional Methods Scores calculated from both the initial survey and the second survey indicated that

throughout the survey time, including the time prior to the staff development initiative specifically studied in this research, teachers were incorporating many of the prescribed instructional methods. The average of teachers' perceptions of their differentiated instructional methods ranged from "some of the time" to "frequently." In addition, the responses to the survey questions showed a noticeable difference in teachers' perceptions of their use of new or more traditional instructional methods. Higher rankings were reported in response to survey questions that described instructional methods that may have been in teachers' repertoires for a longer period of time, such as addressing student learning styles. In contrast, lower rankings were reported for more recently introduced methods such as tiered assignments and compacting as described in differentiated instructional methods literature (Tomlinson, 1999a; Tomlinson & Eidson, 2003; Winnebrenner, 1992, 1996).

Differentiation of Process. Instructional methods in the area of differentiation of process were rated highest at both survey times. Responses for both survey one and survey two indicated that addressing different learning styles and considering student readiness were ranked, on the average, as "frequently" used. These frequently used methods are likely to have been in place in the classroom for some time. Assessing student interests and use of rubrics in guiding student learning were described as used "some of the time." Open-ended activities and activities that involve choices ranked between "some of the time" and "frequently." The lower ranked methods involving open-ended activities and activities of choice are

commonly associated with differentiated instruction and may be considered new methods by many teachers.

Differentiation of Content. Survey items describing instructional methods in the area of differentiation of content were rated in the same order at both survey times. Responses for both survey one and survey two indicated that checking for prior understanding, varying levels of questioning, and planning according to student ability levels were used in the "frequently" to "always" range. Many teachers would not consider these methods new instructional methods. In contrast, compacting and tiered assignments are typically introduced in differentiation trainings and would be new methods for most teachers. These methods were ranked between "some of the time" and "frequently."

Differentiation of Product. Instructional methods in the area of differentiation of product were rated in slightly different order at the two survey times. Responses for both survey one and survey two indicated that teachers, on the average, ranked the practice of assessing student learning in a variety of ways as between "frequently" and "always." The methods of using scoring rubrics, enrichment activities, and extension activities, were rated as between "some of the time" and "frequently" and the practice of allowing students to select how they will demonstrate their learning of a concept as between "infrequently" and "some of the time." The four methods that were ranked lower on the Likert scale are commonly described in differentiation literature to assist regular classroom teachers in shifting to a more differentiated classroom (Tomlinson, 1999a; Winnebrenner, 1992, 1999).

Differentiation of Learning Environment. Instructional methods in the area of differentiation of the learning environment were rated in the same order at both survey times and were the lowest ranked methods for the entire survey. Responses for both survey one and survey two indicated that varying grouping patterns in respect to group size, and physical space were rated in the range of "some of the time" to "frequently." The remainder of the methods were in the range of "infrequently" to "frequently" with lowest ratings for grouping based on student interest, using learning centers, and providing opportunities to complete self-directed projects. These lower rated methods have often been encouraged in descriptions of the differentiated classroom.

Teacher Efficacy

In response to most items, efficacy scores clearly paralleled instructional methods scores. Teacher efficacy in relationship to instructional methods was rated in the range from "moderately agree" to "strongly agree" in respect to the teachers' perception of the effectiveness of the methods described in this survey. As was the case with the instructional methods responses, the efficacy ratings were higher for items that referred to methods that would normally have been in the teachers' repertoires prior to the differentiation staff development experiences.

Differentiation of Content. Efficacy scores in the area of differentiation of content were rated highest for both the first survey and second survey. All of these items' ratings resulted in averages that were in the same order on both surveys. On

the average, all of the descriptions in this subscale were described as "moderately agree" to "strongly agree."

Differentiation of Process. Efficacy scores in the area of differentiation of process were fairly consistent between the first survey and the second survey. On the average use of rubrics to guide learning was ranked low, between "uncertain" to "moderately agree" on both surveys. The other items were ranked in the range of "moderately agree" to "strongly agree."

Differentiation of Product. Efficacy scores in the area of differentiation of product were fairly consistent between the first survey and the second survey. These scores indicated moderate agreement concerning the effectiveness of assessing students in a variety of ways, using scoring rubrics, and providing enrichment activities and were ranked very close to "moderately agree" on both surveys. Efficacy concerning allowing students to select how they will demonstrate their learning and complete extensions were ranked lowest with scores between "uncertain" and "moderately agree."

Differentiation of Learning Environment. Efficacy scores in the area of differentiation of the learning environment were fairly consistent between the first survey and the second survey. On the average most of the efficacy scores ranked in the "moderately agree" to the "strongly agree" range. However, arrangement of students in like-ability groups and grouping based on student interest received lower scores, on the average, between "uncertain" to "moderately agree."

Findings Relevant to Changes Over Time

Analyses using repeated-measures two-way ANOVAs indicated that teachers' perceptions of their use of the instructional methods changed significantly in a negative direction for the subscales of content, process, and product during the 9-month period between the first and second surveys. Teachers' perceptions also decreased in the area of the learning environment, although this decrease was not statistically significant. The average instructional practice scores decreased from the first survey to the second survey for all items with the exception of the item, "I use tiered activities to encourage student study at a level that promotes continued growth." in the Differentiation of Content subscale. The rating on this instructional practice increased, but not significantly.

Review of the means and standard deviations for Efficacy Scores calculated from survey one and survey two indicated that teacher efficacy was described, as moderately agreeing that the methods described were effective methods. These scores changed in a negative direction between the first survey and the second survey, but none of these changes were statistically significant when analyzed using repeated-measures two-way ANOVAs.

Average scores of all of the efficacy items with the exception of two decreased from the first survey to the second survey. One of the items in the Differentiation of Content subscale, use of tiered assignments, increased but not significantly. The instructional methods question that paralleled this statement displayed a small increase that was not statistically significant. The other item had

the same average score on both the first survey and the second survey. This item involved providing flexible grouping as found in the Differentiation of Learning Environment subscale. The parallel item on the instructional methods survey decreased slightly but not significantly.

Barriers to differentiated instruction implementation. Analysis of this data indicated that the second teacher centered district staff development initiative was not successful in increasing the frequency of use of differentiated instructional methods in the classroom during the 9-month period studied. Interpretation of these results required review of the staff development plan used in this district and research on staff development.

In an examination of recent lists of characteristics found in effective professional development programs, Guskey (2003) summarized the most common characteristics as (a) research based methods, (b) enhancement of teachers' content and pedagogical knowledge, (c) sufficient time and other resources, (d) well organized and structured time, (e) collegiality and collaborative exchange, (f) evaluation with purpose of improvement of the process , (g) school or site-based structure; and (h) collaboration between site-based educators and district level personnel. Although these characteristics do not guarantee successful staff development programming, they have been associated with successful staff development processes throughout the country.

This district initiative paralleled most of the tenets described by Guskey (2003). The district's initial and second staff development plans incorporated

research based methods, were focused on enhancement of teachers' pedagogical skills, provided time and resources including collaboration time, were well organized, included evaluation as part of the process, elicited site-based educators as facilitators and trainers, and involved district level personnel. However, the plans were not site-based and provided limited teacher time and support for implementation at the building level. Teachers were asked to differentiate one unit with hopes of success in that unit carrying over to other units and becoming part of the teachers' daily repertoires. Many teachers did not perceive differentiated instruction as a means to increase student achievement in their own classrooms and/or believed it to be too much work to accomplish. These teachers did not put in much time beyond that provided by the district as contract time or paid days.

Current research states that successful staff development needs to be linked to student achievement, and embedded in the classroom every day (Covey, 1989; Hirsh, 2004; Kelleher, 2003; Rasmussen, Hopkins, & Fitzpatrick, 2004). In many buildings teacher commitment and building level administrative leadership in differentiated instruction appeared to be lacking. Time for planning and implementation on a regular basis, which would be necessary to carry the staff development initiative in differentiated instruction into daily practice, was not the norm. Many teachers believed that they had already been differentiating instruction to meet the needs of their students. Evidence of this perception can be noted in the level of responses to questions within each of the individual subscales.

The consistency of the decrease in ratings for nearly all of the items over both surveys is not likely to be a result of teacher instructional methods moving away from differentiated methods. This interpretation rests on the fact that the lowered ratings occurred equally in response to almost all of the questions regardless of whether the methods described fell into the category of traditional differentiated methods or whether they represented newer approaches to differentiated instruction. The lowered responses are most likely explained by an overall negative teacher attitude. This negative attitude might be attributed to the fact that many teachers were not intrinsically or extrinsically motivated to change their methods toward more differentiated instruction and were annoyed that they were asked to repeat the survey and expected to share their implementation methods at a conference several weeks later. Another factor that may have contributed to a less positive attitude was the time of year of the surveys. The first survey took place in late April when the school year was starting to come to a close whereas the second survey was in mid-January when work responsibilities may be at a peak.

The findings of this study as well as concerns resulting from the short time frame between the initial survey and second survey were consistent with research that indicates that it is extremely difficult to bring about changes in classrooms (Goodlad, 1998; Senge, Combron-McCabe, Lucas, Dutton, & Kleiner, 2000). Changing teachers' instructional methods toward differentiated instruction is a lengthy process and a serious challenge for schools and school districts (Silver et al., 2000; Tomlinson, 1999b; Walther-Thomas, 2001).

Enablers of differentiated instruction implementation. The district's goal to develop differentiated classrooms was rooted in the district's evaluation process and the results of a voluntary district educational audit. Differentiation was one facet of the commitment to provide quality education for all students. The district staff development plans in differentiated instruction did have many positive effects upon education in the district. One of the enablers that resulted was the development of a common language. As the teachers of this district continue to go through change processes, they have the vocabulary and understanding of the instructional methods that are intended to meet the needs of all learners in the school district. In fact the differentiated practice of using tiered assignments increased on both instructional methods and efficacy surveys. This indicated that teachers did connect with one new differentiated practice and reported an increase of use in the classroom.

Another enabler involved the teachers who were willing to take on the role as building level facilitators and were committed to the process. They developed some model differentiated lessons and their enthusiasm influenced some of their peers to do the same. These teacher facilitators met monthly with the director of staff development and received ongoing support and training as well as additional resources. These meetings also provided an opportunity for collaboration relative to successes as well as concerns. Some of these teachers took on the role of trainers for the second differentiation training, which further entrenched the differentiated instruction into their teaching methods.

The third enabler resulted from the process of incorporating differentiated methods into the evaluation process for all classroom teachers. In this way there remains a constant reminder that differentiation is not a fad that will come and go and then be forgotten but rather that the district remains committed to the concept of learning for all. It also serves, as a clear statement that there is an expectation that teachers will develop methods that do meet the needs of all students even after differentiated instruction is no longer the focus of district staff development.

Findings Relevant to Demographic Variables

This study examined two demographic independent variables, years of experience and instructional level. These variables were analyzed to determine if factors other than time impacted the teachers' perceptions of instructional methods and efficacy. For the teachers included in this study, perceptions of instructional methods and efficacy did not differ significantly for years of experience. However, there were significant differences found for the independent variable, instructional level. These differences were found in both the Instructional Methods and Efficacy responses to the survey.

There was a significant main effect for instructional level in the Differentiation of Learning Environment subscale. Teachers in the elementary school level reported significantly higher perceptions of use of instructional methods and efficacy than middle school and high school teachers.

The Learning Environment subscale contains instructional methods including varying grouping arrangements by size and physical space, providing learning

centers, varying size of group, student choice in respect to activity, homogeneous ability groups, self-directed projects, and student interest grouping. These methods are more typically seen in elementary classrooms than in middle school classrooms and to still a lesser degree in the high school setting. This difference may be attributed to methods found in the one teacher classroom, as seen in the elementary school, in comparison with teaming in the middle school, and separate rooms and teachers for different courses in the high school.

Findings Relevant to the Relationship Between Instructional Methods and Efficacy

This study used the Pearson r correlation to determine the relationship between instructional methods and efficacy of teachers after initial staff development training in differentiated instruction and again after a second teacher centered staff development initiative in differentiated instruction. Significant positive relationships were found in both the first survey and second survey across all four subscales, Differentiation of Content, Differentiation of Process, Differentiation of Product, and Differentiation of Learning Environment. These results are supported by previous studies, which have shown relationships between teachers' efficacy and classroom behaviors that are associated with effective teaching (Ashton & Webb, 1986; Gibson & Dembro, 1984). According to the concept of triadic reciprocity, when efficacy is higher, effort, persistence and resilience are also higher and as a result self-efficacy may predict the level of accomplishment of individuals (Bandura, 1986). Therefore, one expects that perception of practice corresponds to efficacy and efficacy corresponds to practice and that they drive each other in a particular direction. In

this study efficacy statements that paralleled instructional methods that were rated highest were also given the highest efficacy scores. Likewise, those instructional methods rated lowest were given the lowest efficacy scores, which supports prior research on these relationships.

Implications

Changes in school structure across the United States have resulted in great challenges for classroom teachers in meeting the needs of various types of learners. The change from tracking to heterogeneous classrooms has led attention to differentiated instruction as a means for dealing with these concerns (Silver et al., 2000; Tomlinson, 1999c; Winnebrenner, 2000). Differentiation has had verbal accolades for accommodating student diversity with a high level of achievement (Silver et al., 2000; Tomlinson, 1999c), but there is not significant research to substantiate these claims. The fact is that there are many variables that influence student achievement. It is a difficult task to develop a research situation that would directly link the two.

Some studies have been completed showing connections between teacher efficacy, instructional methods, teacher effectiveness, and student achievement (Bandura, 1997; Campbell, 1997; Gerges, 2001; Gorrell & Capron, 1990). Other research in this area showed inconsistencies between teacher beliefs and methods (Campbell, 1996; Fang, 1996). Overall there is little current research showing a relationship between efficacy and instructional methods and none found that tie specifically to differentiated instructional methods.

This study makes a contribution to the research relating teacher instructional methods and teacher efficacy. It also supports the growing research in staff development that indicates that a significant amount of time is needed to produce a positive change in instructional methods.

Implications for research. Teacher efficacy does provide a means by which educational systems can gain insight into teachers' instructional methods and effectiveness of staff development. The positive relationships between these instructional methods and teacher efficacy were consistent with previous research by Brophy and Evertson (1976) and Bandura (1997). There is a need for more research in this area especially with links between teacher methods, teacher efficacy, and student achievement. In the attempt to reform educational methods to meet the needs of all learners, it would be valuable for research to consider the effect on achievement for various types of learners. Even as this study progressed, methods used to collect and analyze data have improved exponentially. Analyses of student data necessary to link methods to achievement in K-12 education are beginning to be implemented across the country. Impact of specific factors in a school system can be determined by gathering, intersecting and analyzing school data concerning the student, staff, school, and community (Bernhardt, 2003).

There is also a need for longitudinal research in the effectiveness of staff development plans affecting teacher instructional methods. This is especially important in respect to those instructional methods that most affect various types of learners. It may also be effective to incorporate qualitative and quantitative data in

this research to reduce concerns that self-reported teacher perceptions may not be accurate in all cases.

Finally, a study of factors that may affect the change process involving instructional methods and teacher efficacy is an important consideration for continued research. A research based change process with instructional methods and teacher efficacy tied to student achievement has the potential to produce effective educational changes in meeting the needs of all learners found in heterogeneous classrooms. Specific areas that need to be focused upon include the building level involvement, both in terms of administrative leadership and teacher attitude, as well as the time and resources provided at the building level to sustain teacher efforts toward change.

Implications for policy and practice. There are several implications for policy and practice. First of all, an on-going assessment program to develop a baseline of teacher methods and efficacy needs to be in place. In addition, this assessment program should be linked to student achievement and categorized by type of learner to ensure that all types of learners experience equitable academic achievement. A longitudinal focus is critical for monitoring and guiding needed support. This type of research based assessment program can improve teacher-learner processes and assist in overcoming inherent barriers.

Finally, it is important that staff development in differentiated instructional methods be ongoing and continually supported at both the district and building levels. This support needs to include training, teacher time, teacher resources, and collaborative exchange. Only with a consistent message and equally consistent

support will instructional methods, efficacy, and student achievement improve and provide excellence in education for all students.

References

Americans With Disabilities Act. (1990). (n.d.) Retrieved November 20, 2004, from http://www.nichcy.org/pubs/outprint/nd15txt.htm#edforall

Ashton, P., & Webb, R. (1986). *Making a difference: Teachers' sense of efficacy and student achievement.* New York: Longman.

Ashton, P. T., Webb, R. B., & Doda, N. (1983). *A study of teachers' sense of efficacy.* Gainesville, FL: Florida University. National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 231 833)

Bandura, A. (1977a). *Social learning theory.* Engelwood Cliffs, New Jersey: Prentice-Hall.

Bandura, A. (1977b). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44,* 1175-1184.

Bandura, A. (1990). *Multidimensional scales of perceived academic efficacy.* Stanford, CA: Stanford University.

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

Bernhardt, V. L. (2003). *No schools left behind. Educational Leadership, 60*(5), 26-30.

Briggs, K.C., & Myers, I.B. (1977). *Myers-Briggs type inventory*. Palo Alto, CA: Consulting Psychologists Press.

Brophy, J., & Evertson, C. (1976). *Learning from teaching: A developmental perspective*. Boston, MA: Allyn & Bacon.

Callahan, C. M. (1999). Classrooms for learners and losers. *The High School Magazine, 6,* 22-28.

Campbell, J. (1996). A comparison of teacher efficacy for pre and in-service teachers in Scotland and America. *Education, 117*, 2-11.

Campbell, L. (1997). How teachers interpret MI theory. *Educational Leadership, 55*(1), 14-19.

Covey, S. (1989). *The seven habits of highly effective people*. New York: Simon & Schuster.

Deemer, S. A., & Minke, K. M. (1999). An investigation of the factor structure of the teacher efficacy scale. *Journal of Educational Research, 93*(1), 3-10.

Dewey, J. (1933). *How we think.* Boston, MA: D. C. Heath.

Dunn, R. & Dunn, K. (1978). *Teaching students through their individual learning styles.* Englewood Cliffs, NJ: Prentice-Hall.

Education for All Handicapped Children Act. (1975). (n.d.) Retrieved November 20, 2004, from http://www.nichcy.org/pubs/outprint/nd15txt.htm#edforall

Enochs, L. G., Smith, P. L., & Huinker, D. M. (2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics, 100*(4), 194-202.

Fang, Z. (1996). A review of research on teacher beliefs and methods. *Educational Research, 38*(1), 47-65.

Gamoran, A., & Berends, M. (1987). *The effects of stratification in secondary schools: Synthesis of survey and ethnographic research.* National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 288 855)

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. United States of America: Harper Collins.

Gerges, G. (2001). Factors influencing preservice teachers' variation in use of instructional methods: Why is teacher efficacy not a significant contributor? *Teacher Education Quarterly, 28*(4). 71-88.

Gibson, S., & Dembro, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569-582.

Goodlad, J. (1998). *How teachers teach.* New York: McGraw Hill.

Gorrell, J., & Capron, E. (1990). Cognitive modeling and self-efficacy: Effects on pre-service teachers' learning of teaching strategies. *Journal of Teacher Education, 41(*4), 15-22.

Gowan, J.C., Demos, G.D., & Torrance, E.P. (1967). *Creativity: Its educational impact*. New York, NY: Wiley.

Guskey, T. R. (1987). Context variables that affect measures of teacher efficacy. *Journal of Educational Research, 81*, 41-47.

Guskey, T. R. (2003). What makes professional development effective? *Phi Delta Kappan, 84*(9), 748-750.

Hillman, S. J. (1986). *Measuring self-efficacy: Preliminary steps in the development of a multi-dimensional instrument*. National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 271 505)

Hirsh, S. (2004). Putting comprehensive staff development on target. *Journal of Staff Development, 25*(1), 12-15.

Jung, C. (1927). *The theory of psychological type.* Princeton NJ: Princeton University Press.

Kaplan, S. N. (1974). *Providing programs for the gifted and talented.* Mansfield Center, CT: Creative Learning Press.

Kelleher, J. (2003). A model for assessment-driven professional development. *Phi Delta Kappan, 84*(9), 751-756.

Lockwood, J. H., & Cleveland, E. F. (1998). *The challenge of detracking: Finding the balance between excellence and equity*. National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 422 436)

Malloy, W., & Malloy, C. (1997). Deconstructing the impediments to responsible inclusion through the essential schools option. *Journal for a Just & Caring Education, 3*(4), 459-480.

Marland, S. P., Jr. (1972). *Education of the gifted and talented, Volume I: Report to the Congress of the United States by the Commissioner of Education.* Washington, DC: United States Government Printing Office.

McCarthy, B. (1982). *The 4Mat system.* Arlington Heights, IL: Excel Publishing.

McLaughlin, M. W., & Marsh, D. D. (1978). Staff development and school change. *Teacher College Record, 80,* 70-94.

McLesky, J. & Waldron, N. (2000). *Inclusive schools in action: Making differences ordinary.* Alexandria, VA: Association for Supervision and Curriculum.

Millard West Differentiation Committee. (2001, December). *Differentiation definition.* Omaha, NE: Author.

Nunley, K. F. (2001). *Layered curriculum.* Kearney, NE: Morris Publishing.

Nunnaly, J. (1978). *Psychometric theory.* New York: McGraw-Hill.

Oakes, J. (1985). *Keeping track: How schools structure inequality.* Gainesville, FL: Florida University. National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 274 749)

Oakes, J. (1992). Can tracking research inform practice? Technical, normative, and political considerations. *Educational Researcher, 21*(40), 12-21.

Oakes, J. (1995). Two cities' tracking and within-school segregation. *Teachers College Record, 96*(4), 681-690.

Oakes, J., & Wells, A. S. (1997). Detracking: The social construction of ability, cultural politics, and resistance to reform. *Teachers College Record, 98*(3), 483-511.

O'Connor, C. (1999). *Teaching techniques of a differentiated classroom.* McVeyton, PA: Tuscarora Intermediate Unit 11.

Page, S. W. (2000). When changes for the gifted spur differentiation for all. *Educational Leadership, 58*(1), 66-69.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332.

Raaijmakers, Q.A. (1999). Effectiveness of different missing data treatments in surveys with Likert-type data: Introducing the relative mean substitution approach. *Educational & Psychological Measurement, 59*(5), 725-749).

Rasmussen, C., Hopkins, S., & Fitzpatrick, M. (2004). Our work done well is like the perfect pitch. *Journal of Staff Development, 25*(1), 16-22.

Reis, S., & Renzulli, J. (1985). *The secondary triad model: A practical plan for implementing gifted programs at the junior and senior high school levels.* Masfield Center, CT: Creative Learning Press.

Reis, S., & Renzulli, J. (1992). Using curriculum compacting to challenge the above average. *Educational Leadership, 50*(2), 51-57.

Renzulli, J. S. (1988). The multiple menu model for developing differentiated curriculum for the gifted and talented. *Gifted Child Quarterly, 32*(3), 298-309.

Rich, Y., Lev, S., & Fischer, S. (1996). Extending the concept and assessment of teacher efficacy. *Educational and Psychological Measurement, 56*, 1015-1025.

Roth, P. L. (1994) Missing data: A conceptual review for applied psychologists. *Personnel Psychology, 47*(3), 537-561.

Senge, P., Combron-McCabe, N., Lucas, T., Dutton, J., & Kleiner, A. (2000). *Schools that learn*. New York: Doubleday.

Shim, M. K., Felner, R. D., Shim, E., & Noonan, N. (2001). *Multi-dimensional assessment of classroom instructional practice: A validity study of the classroom instructional practice scale*. Paper presented at the Annual Meeting of the American Educational Research Association in Seattle, WA, 2001. National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 455 302)

Siegel, J., & Shaughnessy, M. F. (1994). Educating for understanding: An interview with Howard Gardner. *Phi Delta Kappan, 75*(7), 564.

Silver, H., Strong, R., & Perini, M. (1997). Integrating learning styles and multiple intelligences. *Educational Leadership, 55*(1), 22-27.

Silver, H., Strong, R., & Perini, M. (2000). *So each may learn: Integrating learning styles and multiple intelligences*. Alexandria, VA: ASCD.

Slavin, R. E. (1990). Achievement effects of ability grouping in secondary schools as a best-evidence synthesis. *Review of Educational Research, 60*, 471-499.

Snell, M. E., & Janney, R. (1993). Including and supporting students with disabilities within general education. In *Program leadership for serving students with disabilities*. Blacksburg, VA: Virginia Tech.

Stein, M., & Wang, M. (1988). Teacher development and school improvement: The process of teacher change. *Teaching and Teacher Education, 4*, 171-187.

Sternberg, R. J. (1982). *Handbook of human intelligence.* New York: Cambridge University Press.

Tomlinson, C. A. (1995). Deciding to differentiate instruction in middle school: One school's journey. *Gifted Child Quarterly, 39*(2), 77-87.

Tomlinson, C. A. (1999a). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. A. (1999b). Leadership for differentiated classrooms. *The School Administrator, 56*, 6-11.

Tomlinson, C. A. (1999c). Mapping a route toward differentiated instruction. *Educational Leadership, 57*(1), 12-16.

Tomlinson, C. A. (2000). Differentiated instruction: Can it work? *Educational Digest, 65*(5), 25-31.

Tomlinson, C. A., & Eidson, C. C. (2003). *Differentiation in practice*. Alexandria, VA: Association for Supervision and Curriculum Development.

VanTassel-Baska, J. (1994). *Comprehensive curriculum for gifted learners*. Needham Heights, MA: Allyn & Bacon.

VanTassel-Baska, J., Feldhusen, J., Seeley, K., Wheatley, G., Silverman, L., & Foster, W. (1989). *Comprehensive curriculum for gifted learners.* Needham heights, MA: Allyn & Bacon.

Vaughn, S., Bos, C., & Schum, J. (1997). *Teaching mainstreamed diverse and at-risk students in the general education classroom*. Boston, MA: Allyn & Bacon.

Walther-Thomas, C. (2001). Nancy Walron and James McLeaskey. *Intervention in School & Clinic, 36*, 175-181.

Ward, V.S. (1961). *Educating the gifted: An axiomatic approach.* Columbus, OH: Merrill Books, Inc.

Wertheim, C., & Leyser, Y. (2002). Efficacy beliefs, background variables, and differentiated instruction of Israeli prospective teachers. *The Journal of Educational Research, 96*(1), 54-63.

Willis, S., & Mann, L. (2000 winter). Differentiating instruction: Finding manageable ways to meet individual needs. *Curriculum Update: Association for Supervision and Curriculum Development*, 1-7.

Winnebrenner, S. (1992). *Teaching kids with learning disabilities in the regular classroom.* Minneapolis, MN: Free Spirit Publishing, Inc.

Winnebrenner, S. (1996). *Teaching gifted kids in the regular classroom.* Minneapolis, MN: Free Spirit Publishing, Inc.

Winnebrenner, S. (1999). Shortchanging the gifted. *The School Administrator, 56*, 12-16.

Winnebrenner, S. (2000). Gifted students need an education, too. *Educational Leadership, 58*(1), 52-56.

APPENDIX A

IRB Approval

University of Nebraska Medical Center

NEBRASKA'S HEALTH SCIENCE CENTER
A Partner with Nebraska Health System

Institutional Review Board (IRB)
Office of Regulatory Affairs (ORA)

April 28, 2003

Patricia Crum
16207 Arbor Street
Omaha NE 68130

IRB#: 159-03-EX

TITLE OF PROTOCOL: Instructional Methods and Efficacy of Teachers Trained in Differentiated Instruction

Dear Ms. Crum:

The IRB has reviewed your Exemption Form for the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46:101b, category 1 and 2. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable sections of the IRB Guidelines. It is also understood that the IRB will be immediately notified of any proposed changes that may affect the exempt status of your research project.

Please be advised that the IRB has a maximum protocol **approval period of three years** from the original date of approval and release. If this study continues beyond the three year approval period, the project must be resubmitted in order to maintain an active approval status.

Sincerely,

Ernest Prentice, PhD/GDK

Ernest D. Prentice, Ph.D.
Co-Chair, IRB

EDP/gdk

Academic and Research Services Building 3000 / 987830 Nebraska Medical Center / Omaha, NE 68198-7830
402-559-6463 / FAX: 402-559-3300 / Email: irbora@unmc.edu / http://www.unmc.edu/irb

APPENDIX B

Survey Instrument

Instructional Methods and Efficacy of Teachers Trained in Differentiated Instruction Instrument

Instructional Methods and Efficacy
of Teachers Trained in Differentiated Instruction
Instrument

Gender: (circle one)

male female

Instructional Level: (circle all that apply)

pre-kindergarten elementary middle school high school

Total Years Experience in Education: (circle one)

1-3 4-6 7-10 11-15 16+

*Which of the following best describes how you have implemented the differentiation planning that you did during the Home Base Team Process last June.

revised and implemented implemented as planned did not implement

***Included as additional information in survey two only.**

Directions: Please circle the response for each question that best describes your use of instructional strategies and your perception of student learning related to that strategy.

Instructional Methods and Teacher Efficacy Scale
Differentiation of Content Subscale

1a. I plan learning activities based on individual student's ability levels.

never, infrequently, some of the time, frequently, always

If the response to question 1a was **never**, skip question 1b and proceed to question 2a.

1b. When I plan learning activities based on student's ability levels, individual students demonstrate a higher level of new learning.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

2a. I include varying levels of questioning, from knowledge to analysis and evaluation, as I direct student learning.

never, infrequently, some of the time, frequently, always

If the response to question 2a was **never**, skip question 2b and proceed to question 3a.

2b. When I include varying levels of questioning, students' depth of understanding is increased.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

3a. I use *compacting to allow students to demonstrate that they already have met an objective and allow them to move on to a different learning opportunity.

*compacting is the process of pre-assessing what students already know and allowing them to continue on to new learning rather than continuing to work on what they already know.

never, infrequently, some of the time, frequently, always

If the response to question 3a was **never**, skip question 3b and proceed to question 4a.

3b. When I use compacting and allow students proceed on to other learning opportunities; the amount of new learning, for those students, is increased.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

4a. I direct students to reflect upon what they are learning with questions requiring a range of thinking from concrete to abstract.

never, infrequently, some of the time, frequently, always

If the response to question 4a was **never**, skip question 4b and proceed to question 5a.

4b. When I direct students to reflect upon their learning, with questions ranging from concrete to abstract, their understanding and retention of that learning is improved.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

5a. I check whether students have prerequisite understanding during instruction, before proceeding to the next level of learning/understanding.

never, infrequently, some of the time, frequently, always

If the response to question 5a was **never**, skip question 5b and proceed to question 6a.

5b. When I check for prior understanding during instruction, students move to the next level of learning with a greater degree of success.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

6a. I use *tiered activities to encourage student study at a level that promotes continued growth.

***tiered activities are multiple activities that focus on the same essential understanding, but vary in level of complexity, allowing students to be appropriately challenged with a level of difficulty that matches their ability**

never, infrequently, some of the time, frequently, always

If the response to question 6a was **never**, skip question 6b and proceed to question 7a

6b. When I use tiered activities, students demonstrate continuous growth.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

Differentiation of Process Subscale

7a. I make use of rubrics to guide student learning.

never, infrequently, some of the time, frequently, always

If the response to question 7a was **never**, skip question 7b and proceed to question 8a.

7b. When I make use of rubrics to guide student learning, student learning is greater than when I do not use rubrics.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

8a. I provide open-ended activities to keep all students actively involved in the learning process.

never, infrequently, some of the time, frequently, always

If the response to question 8a was **never**, skip question 8b and proceed to question 9a.

8b. When I provide open-ended activities, student learning extends beyond the required level of understanding.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

9a. I provide opportunities for students to meet the same objective in a variety of ways (with choices of different activities).

never, infrequently, some of the time, frequently, always

If the response to question 9a was **never**, skip question 9b and proceed to question 10a.

9b. When I provide opportunities for students to learn the same objective, with different activities, students attain a higher level of understanding of that objective.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

10a. I use varied instructional approaches, addressing different learning styles, when teaching ideas, concepts, facts, and skills.

never, infrequently, some of the time, frequently, always

If the response to question 10a was **never**, skip question 10b and proceed to question 11a.

10b. When I vary instructional approaches to address different learning styles, students gain a better understanding of ideas, concepts, facts, and skills.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

11a. I assess student interests and integrate those interests into instructional planning and delivery.

never, infrequently, some of the time, frequently, always

If the response to question 11a was **never**, skip question 11b and proceed to question 12a.

11b. When I integrate student interests into instructional planning and delivery, student learning is enhanced.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

12a. I assess a student's prior level of understanding of a concept and adjust instruction to his/her readiness.

never, infrequently, some of the time, frequently, always

If the response to question 12a was **never**, skip question 12b and proceed to question 13a

12b. When I assess a student's prior level of understanding of a concept and adjust instruction to their readiness, he/she attains a higher level of understanding of that concept.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

Differentiation of Product Subscale

13a. I allow students to select (from a list or menu) how they will demonstrate their learning of a concept.

never, infrequently, some of the time, frequently, always

If the response to question 13a was **never**, skip question 13b and proceed to question 14a.

13b. When I allow students to select (from a list or menu) how they will demonstrate their learning of a concept, they more clearly demonstrate what they have learned.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

14a. I assess student learning in a variety of ways.

never, infrequently, some of the time, frequently, always

If the response to question 14a was **never**, skip question 14b and proceed to question 15a.

14b. When I assess student learning in a variety of ways, I find students demonstrate their understanding with a higher level of quality then when I use traditional assessments.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

15a. I make use of rubrics to guide scoring of student assessments.

never, infrequently, some of the time, frequently, always

If the response to question 15a was **never**, skip question 15b and proceed to question 16a.

15b. When I make use of rubrics to guide scoring of student assessments, student learning is more equitably scored.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

16a. I provide for *enrichment activities during a unit of study.

*enrichment activities are teacher designed activities that are beyond the normal range of activity for the class.

never, infrequently, some of the time, frequently, always

If the response to question 16a was **never**, skip question 16b and proceed to question 17a.

16b. When I provide enrichment activities, during a unit of study, students that choose to complete the enrichment activities display learning that extends beyond the required level of understanding.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

17a. I encourage students to create their own *extensions to activities that are assigned to them.

*Extensions are activities, that are related to the current objective, which students propose to do. Usually this is on an individual or small group basis with guidelines set by the teacher.

never, infrequently, some of the time, frequently, always

If the response to question 17a was **never**, skip question 17b and proceed to question 118a

17b. When I encourage students to create their own extensions to the work that is assigned to the whole class to complete, the students who complete those extensions attain a higher level of understanding of the objectives being studied.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

Differentiation of Learning Environment Subscale

18a. I vary grouping arrangements (group size, physical space) during an instructional period.

never, infrequently, some of the time, frequently, always

If the response to question 18a was **never**, skip question 18b and proceed to question 19a.

18b. When I vary students' grouping arrangements (group size, physical space), it encourages their learning.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

19a. I employ the use of learning centers to allow students to explore topics and practice skills independently.

never, infrequently, some of the time, frequently, always

If the response to question 19a was **never**, skip question 19b and proceed to question 20a.

19b. When I provide learning center opportunities to allow students to explore topics, student learning is enhanced.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

20a. I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity within a unit of study.

never, infrequently, some of the time, frequently, always

If the response to question 20a was **never**, skip question 20b and proceed to question 21a.

20b. When I incorporate a variety of flexible grouping patterns from independent work to small group work or large group activity, I find students are more motivated and involved in the learning process.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

21a. I provide the opportunity for students to make choices concerning the process of their own learning.

never, infrequently, some of the time, frequently, always

If the response to question 21a was **never**, skip question 21b and proceed to question 22a.

21b. When I provide the opportunity for students to make approved choices in the process of learning, my students are more motivated to learn.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

22a. I provide students with the opportunity to be involved with self-directed projects (with teacher guidelines) as part of their learning experience.

never, infrequently, some of the time, frequently, always

If the response to question 22a was **never**, skip question 22b and proceed to question 23a.

22b. When I provide the opportunity for students to be involved with self-directed projects as part of their learning experience, the students are more involved in their own learning.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

23a. I arrange like-ability groups for learning experiences.

never, infrequently, some of the time, frequently, always

If the response to question 23a was **never**, skip question 23b and proceed to 24a

23b. When I arrange like-ability groups, students reach their own learning potential more quickly.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

24a. I provide the opportunity for flexible grouping based on student interest.

never, infrequently, some of the time, frequently, always

If the response to question 23a was **never**, skip question 24b.

24b. When I provide the opportunity for flexible grouping based on student interest, student learning is enhanced.

strongly disagree, moderately disagree, uncertain, moderately agree, strongly agree

End of Survey

Thank you for your assistance.

APPENDIX C

Participant Contact

Millard
PUBLIC SCHOOLS

Millard West High School • 5710 So. 176th Ave. • Omaha, NE 68135-2268 • (402) 894-6000 • (Fax) 894-6060

IRB# 159-03-EX

Dear Teacher,

I am a doctoral student at the University of Nebraska at Omaha and would like to include your responses to a survey as data in my dissertation, Instructional Methods and Efficacy of Teachers Trained in Differentiated Instruction. I have designed this survey for the dual purpose of collecting data for my study and providing needed information for the Millard Public School Office of Staff Development.

In helping you make the decision of whether I may use your data, I would like you to know that individual data will not be reported in my dissertation. No building will be cited as a source of data. The name of the Millard School District will not appear in the dissertation. My interest is in increasing information on instructional methods used by teachers trained in differentiated instruction and how that affects their feeling of effectiveness in educating students. Data will be kept anonymous so this study can provide beneficial information to the educational community without a risk to the teacher, building, or school district.

In a few days you will receive e-mail from Donna Flood, Director of Staff Development informing you of the web-based survey to be used to gather information needed for the Home Based Teams that will be meeting for Differentiation II during June of 2003. This survey will take approximately 15 minutes for you to complete. The data from this survey will not be included in my study if you choose to request that it be excluded. In that case only the Office of Staff Development will use it.

Please contact me if you have any questions, concerns, or wish to have your data excluded from this study. I can be contacted at home: 402-697-8851; by cell phone: 402-699-0383, by e-mail: pacrum@mpsomaha.org; or by mail to Millard West High School.

Sincerely,

Patricia A Crum

Patricia A.Crum

IRB APPROVED
VALID UNTIL 4.14.06