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Louisiana INTECH Professional Development: Middle School Administrators' Perceptions of Change as Related to Student Achievement

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Louisiana INTECH Professional Development: Middle School Administrators' Perceptions of Change as Related to Student Achievement

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Abstract

School accountability requires administrators and policymakers to implement sound programs that sustain school improvement. Hundreds of Louisiana teachers participate in Louisiana Integration of Technology (INTECH) professional development as a strategy to change instructional practice and improve student achievement. The purpose of this quantitative research study was to investigate the Louisiana INTECH professional development model as an impetus for school change and increased student achievement. The study employed a survey and an ex-post facto, causal-comparative design to address the questions: 1) Do middle school administrators perceive the Louisiana INTECH professional development model as an impetus for school change? 2) Does the Louisiana INTECH professional development model contribute to increased achievement of sixth and seventh grade students as demonstrated by gains in total mathematics, reading, and language Standard Scores on the *Iowa Tests of Basic Skills*?

Fifty-two middle school administrators completed a Likert-type, 18-item survey entitled *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham et al., 1989; Klecker & Loadman, 1999). Eight mathematics and ten English Language Arts (ELA)/reading Louisiana INTECH certified teachers were matched with a similar group of non-INTECH certified teachers according the variables of years teaching experience, educational attainment, and school mean achievement as defined by the 2004 Louisiana baseline School Performance Score (SPS). Over two thousand student test scores of the 36 total mathematics, ELA/reading INTECH and non-INTECH teachers were compared for achievement gains.

The *Statistical Package for Social Sciences (SPSS)* software was used to calculate descriptive statistics for the survey and student achievement gains from 2004 to 2005.

Cronbach's Alpha, Pearson's *r,* and one-way ANOVA were used to analyze the survey data according to three constructs. Independent samples *t*-tests were used to verify equality of INTECH and non-INTECH groups. Crosstabs were utilized to show similarities and differences between the degrees earned by the teachers of each student group.

The results of this study suggest administrators who exhibit openness to Louisiana INTECH as an impetus for change are more likely to support implementation of Louisiana INTECH technology integration strategies in the classroom. Furthermore, the achievement data showed increased gains of students in Louisiana INTECH certified teachers' classrooms.

Key Words

administration, technology and student achievement, technology professional development, Louisiana INTECH, educational leadership, educational administration

Chapter One: Introduction

Introduction

Interest in school improvement has reached greater heights in the 21st century than most educators envisioned. The global society is increasingly complex and demands well-educated adults who continuously learn and work in diverse, collaborative, technology-rich environments. Furthermore, school leaders are often pressured to implement reform initiatives which include high quality professional development for teachers. However, administrators sometimes resist change and struggle with knowing which methodologies and strategies best support a change process, elevate student achievement, and support student needs in an information age.

Don Tapscott (1998), in the book *Growing up Digital: The Rise of the Net Generation,* states many youth are more technology savvy than their parents and technology tools and resources are vital to the lives of the Net Generation. Nearly 71% percent of today's youth use the Internet along with other technology resources as the major source for school projects (Levin & Arafeh, 2002). Additionally, more than 87% percent of children between the ages of 12 to 17 go online (Levin & Arafeh, 2002). However, since educational administrators are pressured to implement sound, researched-based programs aimed at increased student achievement, they are sometimes reluctant to spend time and money on initiatives with little empirical evidence to indicate improved student achievement. In the past, there has been minimal quantitative research to indicate how technology impacts student achievement.

Millennial students, children born between the years of 1982 - 2002, create an immediate need for researchers to examine technology integration professional development and the impact on student achievement. Howe and Strauss in *Millennials Rising: The Next Generation* (2000),

say millennial students expect technology to be a vital part of classroom learning experiences to conduct research, collaborate, and produce products. Furthermore, in a study conducted by the American Institutes for Research, student focus groups reported disconnects between school and personal use of the Internet as well as other technological resources (Levin & Arafeh, 2002). Youth in the Pew Research Study (Levin & Arafeh, 2002) reported that professional development for teachers is critical for full technology integration in the curriculum. Educational leaders must ensure funding for technology is supported at all levels and teachers are well-trained to implement standards-based, technology connected lessons to meet the needs of today's students. Since technology is an integral part of students' lives, it is more important than ever to examine the impact of the Louisiana INTECH professional development model on student achievement to determine whether this model significantly impacts school change and achievement growth.

Context/Background of the Problem

The impact of technology on student performance has been debated by educational leaders for a number of years. Critics say too much money has been allocated for equipment and software, student achievement gains are minimal, and scientific research is limited (Oppenheimer, 2003; Levin & Arafeh, 2002; Cuban, Kirkpatrick, & Peck, Winter 2001; Weglinsky, 1998). However, recent studies indicate student performance increases when teachers participate in professional development and utilize technology integration strategies closely aligned to curriculum standards (Kulik, 2003; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Middleton & Murray, 1999). John Cradler (2002), co-director of Center for Applied Research in Educational Technology (CARET), indicates there is sufficient evidence to connect technology integration strategies and student content mastery, higher order thinking skills, and

skills for the workplace. Teacher quality is the factor that matters most for student learning according to Darling-Hammond and Youngs (2002). Therefore, professional development for teachers becomes the key issue in using technology to improve the quality of learning in the classroom.

The 1983 *A Nation at Risk* report provided impetus for educational change throughout the United States; however, Louisiana leaders began wrestling with the problem of poor quality education in the middle 1960's by acknowledging a need for improved teacher skills and higher student achievement gains (National Commission on Excellence in Education,1983; Public Affairs Research Council of Louisiana, Inc. 1999). Louisiana educational reform has been a topic of policy-makers and administrators for more than three decades, but with little documented implementation success due to political controversies and limited resources (Findley, 1999). However, when the Louisiana oil and gas industry plummetted in the middle 1990's, legislators and key leaders recognized a critical need to diversify the economy. To achieve a diversified economy, Louisiana required a highly skilled workforce. Thus, in the middle 1990's, Louisiana educational reform began to gain traction among stakeholders. This economic change provided the momentum for legislation and monetary support for estabilishing the Louisiana accountability system whereby School Performance Scores (SPS) were first implemented in 1999 (Louisiana Department of Education, 2007b). The SPS index was developed by the state of Louisiana to report total school growth performance on an average of two's year of performance on standardized testing data, attendance, and dropout rates (Louisiana Department of Education, 2007b). In addition to establishing the accountability system utilizing the SPS as a focus of educational reform, the Louisiana legislature recognized the need to provide the necessary resources to build a technologically skilled workforce. To achieve a technologically skilled

workforce, legislative leaders acknowledged teacher and administrator technology training and equipment for kindergarten through twelfth grade classrooms were needed since the use of computers and the Internet were quickly becoming essential tools in the work place (Findley, 1999; Public Affairs Research Council of Louisiana, Inc. 1999).

As the state accountability program was implemented with a focus on improving student achievement, technology funds were flowing from both the state and the federal government to focus on improving student achievement through technology integration and the use of the Internet (Cage, 1999). This key federal funding and policy initiative served as the catalyst for creating a state technology leadership structure which developed the first state technology plan; began intensive standards-based, technology-embedded professional development; and changed the course of technology access in schools. Importantly, the grant provided the support and financial funding for the development of the Louisiana INTECH professional development model.

In the mid 1990's, Louisiana educational technology funding for equipment and professional development was limited resulting in a 48:1 student to computer ratio and little Internet connectivity in schools (Cage,1999). The available funding for educational technology was minimal and disjointed. Technology embedded professional development was not organized, sequential, or sustained. However, in 1997, the federally funded Technology Innovative Challenge Grant awarded 5.3 million dollars to five school districts in the state (Cage, 1999). This key federal funding, policy initiative served as the catalyst for creating a state technology leadership structure which developed the first state technology plan; began intensive standards-based, technology-embedded professional development; and changed the course of technology

access in schools. Importantly, the grant provided the support and financial funding for the development of the Louisiana INTECH professional development model.

Initially, the purpose for instituting Louisiana INTECH was to change instructional practice and train teachers to use computers and software to enhance standards-based curriculum. Louisiana Department of Education (LDOE) technology leaders in the Louisiana Center for Educational Technology (LCET) office learned of Georgia's INTECH model and adopted the concept for Louisiana to address technology professional development needs throughout the state. A team of administrators, teachers, LDOE representatives and LCET employees obtained the Georgia content and modified it to meet Louisiana expectations. Once the content was adapted to support Louisiana goals, teachers were given an opportunity to participate in the professional development program. Teachers who fully complete the intense, content-rich, 56-hour professional development receive Louisiana INTECH training certification. After nearly ten years of implementation and nearly 3,000 INTECH certified teachers statewide, the Louisiana INTECH model remains the premier technology integration professional development program in Louisiana today.

Currently, Louisiana INTECH is implemented throughout the state as a state, regional, and district initiative. The funding is primarily subsidized by Enhancing Education Through Technology (EETT) federal grant funds leveraged with individual district monies. Louisiana INTECH continues to be accepted as a program that provides opportunities for teachers to learn basic technology skills in addition to standards-based, technology integration strategies. Through INTECH, participants experience many examples of effective technology-based strategies that support and enhance curriculum and that can provide a catalyst for fundamental change in overall teaching and learning processes. INTECH participants also learn basic technology skills

while focusing on project-based activities that are based upon the rigorous and challenging Louisiana Content Standards.

Louisiana Content Standards were adopted in the 1990's as beginning steps to elevate academic standards. Currently, content standards are implemented for English language arts, mathematics, science, social studies, foreign languages, and the arts. In 2005, following the implementation of content standards, Louisiana developed a comprehensive curriculum based upon statements of what students should know or be able to do by the end of each grade, PreK-12 (LDE, 2007). The expectations were identified as Grade-Level Expectations (GLEs) and served as the core foundation for the comprehensive curriculum. Leaders of the Louisiana INTECH professional development model embraced the Louisiana Content Standards, GLEs, and Comprehensive Curriculum as an avenue to build high quality technology integration strategies while supporting mandated core curriculum content. Consequently, the Louisiana INTECH professional development activities were created for teachers to utilize the standards, GLEs, and comprehensive curriculum units with technology. Moreover, the design required teachers to critically examine their own practice while developing technology-embedded lessons for classroom implementation that support the Louisiana Content Standards, GLEs and Comprehensive Curriculum. Furthermore, upon conclusion of Louisiana INTECH training, certification is issued to the teachers who have fully completed the intense, content-rich, 56-hour professional development program. (Louisiana INTECH, 2006).

In the Calcasieu Parish School System, currently 541 of 2055 Calcasieu classroom teachers have completed Louisiana INTECH. To date, 142 middle school (grades 6-8) classroom teachers have earned the certification. The professional development training, with certification, is generally accepted by school leaders as the standard in the state for a technology trained

teacher. Thus, administrators often inquire about Louisiana INTECH certification while interviewing prospective teachers for positions in individual schools. The certification provides evidence teachers are adequately trained to utilize technology effectively in standards-based lessons.

The state of Louisiana continues to promote INTECH as the technology integration professional development model that should be implemented in every school district in the state. This implementation requires the expenditure of school district funds and the efforts of school district employees. In past years, the Calcasieu Parish School System invested a minimum of $450 per teacher participant just for substitute salaries (Calcasieu Parish School System, 2004). If this significant commitment of human and financial resources is to continue, there should be clear evidence of administrator perceptions of Louisiana INTECH professional development as an impetus for change and increased student performance as a result of highly trained teachers.

Statement of the Problem

National, state, and local funding sources often require administrators to implement research-based programs with proven student achievement gains. Louisiana INTECH has been implemented statewide for nearly ten years, but to date no quantitative studies have examined perceptions of administrators of Louisiana INTECH certified teachers or the impact of INTECH professional development on student achievement. With the current emphasis on federal and state requirements for school accountability, state and local stakeholders question whether Louisiana INTECH's impact on student performance is positive enough to warrant funding commitments and teacher time away from classroom instruction. School administrators are pressured to maintain professional development programs that clearly demonstrate improved student achievement. The professional development programs not aligned with vision and

accountability expectations are revised or removed. Documentation of student performance is essential. In a time when instructional strategies, tools and resources must be aligned to meet national, state, and local accountability expectations, there is a need to examine technology integration professional development and student achievement as related to the Louisiana INTECH model.

Purpose of Study

The purpose of this quantitative research study was to investigate the Louisiana Integration of Technology (INTECH) professional development model as an impetus for school change and increased student achievement. Changing schools positively and improving student achievement are critical needs as Louisiana administrators strive to meet the accountability challenges established by the state and federal government whereby educational leaders are expected to provide leadership for staff and students to reach or exceed School Performance Score targets. The results of this research contribute to the general body of knowledge about this specific technology professional development initiative, provide empirical evidence concerning the model, and glean insight into the administrator perceptions of Louisiana INTECH as an impetus for school improvement.

Research Hypotheses

Six research hypotheses guided investigations related to two components of the research study. The first component addresses administrators' perceptions of change on three constructs: affective, cognitive, and behavioral. The affective construct refers to the dimension of attitude toward change, which deals with the feelings people have about change. The cognitive construct is a component of attitude towards change that focuses on the degree to which a person believes that change tends to produce positive effects for the organization, for co-workers, and for

him/herself. The behavioral construct refers to the degree to which a person is likely to support change and is likely to initiate change. The subheadings, Affective Reactions to Change, Cognitive Reactions to Change, and Behavioral Reactions to Change, denote the hypotheses associated with administrators' perceptions of Louisiana INTECH as an impetus for change. The hypotheses affiliated with student achievement and Louisiana INTECH are listed with the subheadings, Mathematics Student Achievement, Reading Student Achievement, and English Language Arts Student Achievement.

Affective Reactions to Change

1) The null hypothesis (H_{o1}) was: Middle school administrators do not enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school.

The research hypothesis (H_{11}) was: Middle school administrators enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school.

Cognitive Reactions to Change

2) The null hypothesis (H_{o2}) was: Middle school administrators do not recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff.

The research hypothesis (H_{12}) was: Middle school administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff.

Behavioral Reactions to Change

3) The null hypothesis *(H_{o3})* was: Middle school administrators do not take actions to support or initiate changes related to the Louisiana INTECH professional development.

The research hypothesis *(H_{13})* was: Middle school administrators take actions to support or initiate changes related to the Louisiana INTECH professional development.

Mathematics Student Achievement

4) The null hypothesis *(H_{o4})* was: Students of Louisiana INTECH certified teachers do not exhibit higher mathematics student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{o4}: $\mu_1 - \mu_2 \leq 0$).

The research hypothesis *(H_{14})* was: Students of Louisiana INTECH certified teachers exhibit higher mathematics student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{14}: $\mu_1 - \mu_2 > 0$).

Reading Student Achievement

5) The null hypothesis *(H_{o5})* was: Students of Louisiana INTECH certified teachers do not exhibit higher reading student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{o5}: $\mu_1 - \mu_2 \leq 0$).

The research hypothesis *(H_{15})* was: Students of Louisiana INTECH certified teachers exhibit higher reading student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{15}: $\mu_1 - \mu_2 > 0$).

Language Student Achievement

6) The null hypothesis *(H_{o6})* was: Students of Louisiana INTECH certified teachers do not exhibit higher ELA student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{o6}: $\mu_1 - \mu_2 \leq 0$).

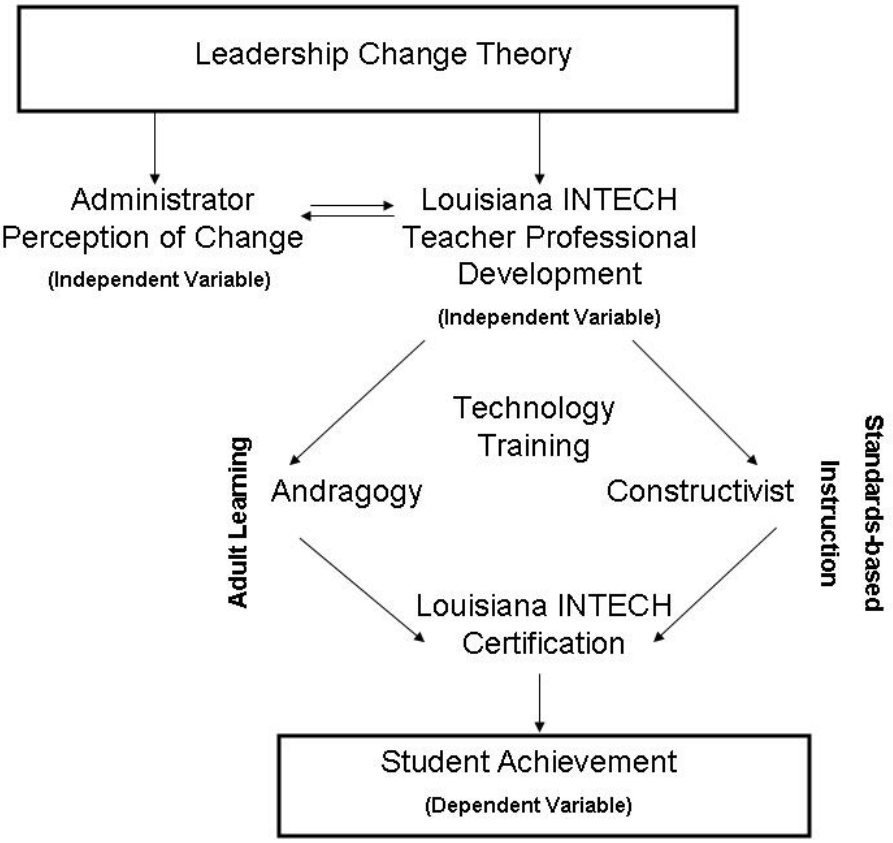
The research hypothesis *(H_{16})* was: Students of Louisiana INTECH certified teachers exhibit higher ELA student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{16}: $\mu_1 - \mu_2 > 0$).

Theoretical Framework

Theory is an organized set of principles, concepts, generalizations, and beliefs that explain certain phenomena through investigation (Leedy, 2005; Gay & Airasian, 2003). In quantitative research, a theory often represents a systematic view of phenomena by describing the relationship between independent and dependent variables (Creswell, 2003). Briner and Campbell (1964) suggest theory gives meaning to observable events in administrative practice and provides avenues for inventiveness and creativeness. It can help identify new ways of leading and influencing change (Allen & Cherrey, 2000). Furthermore, theory assists administrators in clarifying and understanding various leadership and organizational problems while providing guidance for changing human behaviors and interactions within an organization (Marzano, Waters, & McNulty, 2005). Theory appears to be the best way to describe the reality of administrative work and to explain the causes for various occurrences. Specifically, theoretical frameworks guide individuals to make sense of similarities and differences related to particular observations (Rudestam and Newton, 2001).

The theoretical framework for this study was meant to build a basic understanding of the relationship between principals' perceptions of Louisiana INTECH as an impetus for change (independent variable), Louisiana INTECH professional development (independent variable) and sixth and seventh grade mathematics, language, and reading student achievement (dependent variable). The theories selected to frame the research topic were leadership change theory (transformational leadership) and social constructivist theory. Change theory, developed by Michael Fullan (2001), is a form of transformational leadership. The second theory, social constructivist theory, is a variety of cognitive constructivism that emphasizes the collaborative nature of learning (Vygotsky,1978). Additionally, the premise for this study was founded upon two assumptions pertaining to Louisiana INTECH professional development and student achievement. The first assumption was that adult learning theory, andragogy, was at the core of the Louisiana INTECH professional development design for teachers. The second supposition was that social constructivist theory implemented as constructivist learning was central to technology integration, standards-based instruction as teachers learn and reflect upon ways technology integration strategies support mathematics, ELA, and reading achievement. The following conceptual map shown in *Figure 1* is a visual representation of the theoretical framework:

Figure 1. Conceptual map.



The theoretical framework represented by the conceptual map, provided a basic understanding for the relationship between principals' perceptions of Louisiana INTECH as an impetus for change, Louisiana INTECH teacher professional development, and sixth and seventh grade mathematics, reading, and language student achievement. The study began with a foundation in a form of transformational leadership, leadership change theory developed by Michael Fullan (2001). In Fullan's (1991, 2001) model, the identified components that affect school change and student achievement gains are: 1) collaboration with teachers, 2) materials, resources, and technologies, 3) teaching strategies, and 4) alteration of beliefs (Fullan & Hargreaves,1996). Furthermore, the administrator's role as a change agent (Burns,1978;

Bass,1985; Doyle & Smith, 2001) is to initiate, implement, and institutionalize change (Fullan, 2001). This study investigated administrators' perceptions of change regarding three aspects of attitude, affective, cognitive, and behavioral, and its relationship to school change as it pertains to teacher participation in the Louisiana INTECH professional development model and subsequent gains in student achievement (Allen & Cherrey, 2000; Dunham, et al, 1989; Fullan, 1992; Fullan, Hill & Crevola, 2006; Klecker & Loadman, 1999). It was built on the premise that if administrators strongly agreed with the Louisiana INTECH teacher professional development model as a positive impetus for school change in all three aspects of attitude, then the collaboration and support for teacher participation in the Louisiana INTECH would also be positive. Teachers would then engage in 56 hours of Louisiana INTECH professional development, encompassing adult learning theory (andragogy) and research-based, constructivist, technology integration strategies in standards-based instruction. Upon completion of the professional development hours, teachers would receive Louisiana INTECH certification, implement the instructional strategies in the classroom with students, and student achievement gain would be evident in mathematics, reading and/or language *ITBS* Standard Scores.

Theoretical history. An investigation of the literature indicates there are many definitions of leadership. One definition by Noonan (2003) defines leadership as building community and developing potential. In contrast, Heifetz (1994) says leadership is a change or adaptive process which addresses conflicts in values and the reality people face. In *Developing the Leader Within You*, Maxwell (2000) defines leadership just simply as influence. Moreover, James MacGregor Burns (1978), who won a Pulitzer Prize and a National Book Award for his book entitled *Leadership*, defined leadership as leaders inducing followers to act for certain goals. Later, Burns (1978), identified two types of leadership: transactional and transformational. Burns argued that

transactional leadership referred to a leader taking action in a superior to subordinate role compared to transformational leadership where the exchange focused more on valued outcomes (Kuhnert & Lewis, 1987; Marzano, Waters, McNulty, 2005). Bass (1985) utilized Burns' (1978) concepts and applied them to organizational management proposing that transformational leadership requires a leader with self confidence, inner strength, and vision (Kuhnert & Lewis, 1987).

Just as there are a variety of leadership definitions, there are also diverse paradigms that have been applied to leadership and research. A leadership paradigm, defined by Love and Estanek (2004), is a "system of assumptions about the nature of reality that is integrated, pervasive, holistic, and internally, consistent….It is from within a paradigm that human beings understand what is false, what is possible, and to what they should pay attention" (p. 1). Furthermore, paradigms are utilized to design leadership research and the way it is conducted (Kezar, Carducci, & Contreras-McGavin, 2006). The selected leadership paradigm from which to view this study was the post-modern paradigm because the assumptions appear to best explain the complex interactions between administrators' perceptions of change, professional development, and gains in student achievement. One major assumption affiliated with the post-modern paradigm includes viewing leadership as a complicated, complex, human experience which requires collaboration (Kezar, Carducci, & Contreras-McGavin, 2006). Furthermore, the post-modern paradigm encompasses the belief that multiple, complex forces, such as technology and political demands, rapidly change and affect leadership actions (Fullan, 1991; Kezar, Carducci, & Contreras-McGavin, 2006; Wagner, et al, 2006).

Several leadership theories are often affiliated with the post-modern paradigm. One specific leadership theory sometimes associated with the post-modern paradigm is

transformational leadership theory, more specifically change theory. Transformational leadership, change theory (Fullan 1991, 2001), elucidates how leaders serve as a catalyst for change and establish strategic vision for organizational improvement (Bass, 1985; Doyle & Smith, 2001; Lussier & Achua, 2007). Through charisma, motivation, intellectual stimulation, and personalized deliberation, the leader raises awareness, and increases consciousness about the significance and value of designated outcomes, such as change in schools as a result of implementation of professional development (Fullan, 1991, 2001). Fullan's specific model suggests a tri-level approach to transformation: the school, community, district or state. Furthermore, the context in which people are working creates a shared learning environment which sets the stage for collaborative interaction and change in the culture (Fullan, Hill, & Crevola, C., 2006). Additionally, vision for systemic reform requires changes in values and beliefs of acceptable professional practices and students' achievement ability (Stiegelbauer, 1994). Moreover, transformation of a school is influenced and shaped by individuals within the organization. However, recent research indicates the school administrator's role is vital to stakeholder involvement and the implementation of any change at the school level (Barth, 1990; Boyer, 1995; Fullan, 1991; Sarason, 1996). "There seems to be agreement that with strong leadership by the principal, a school is likely to be effective; without capable leadership, it is not" (Darling-Hammond, 1997, p. 64). Furthermore, school-based administrators, especially principals, are in positions to initiate, implement, and institutionalize any change that may positively impact instruction and increase academic achievement (Darling-Hammond, 1997, Fullan 1991). Consequently, the opinions of change and subsequent actions by school-based administrators frequently impact the overall implementation of programs, strategies, and approaches utilized to support positive school change (Allen & Cherrey, 2000). Therefore, the

success of any organization depends upon ownership at all stakeholder levels to ensure continuous improvement (Matusak, 1997). Moreover, there must be a willingness of school-based leaders to implement programs which serve as an impetus for school change (Matusak, 1997).

Michael Fullan's change theory (2001) utilizes leadership's moral purpose as the core. Furthermore, he advocates institutionalization of personalization for staff and students, precision in designing goals to affect higher standards, and expansion of professional learning for all (Fullan, 2006). However, Fullan's theoretical perspective might be viewed as insignificant because he maintains there should be certain existing conditions in order for change to occur. Additionally, Fullan has been criticized for being too general, lowering expectations of change, and pinpointing particular issues without taking a stand on them (Pomfret, 1983). Nevertheless, opponents agree his research is a work-in-progress (Pomfret, 1983).

Fullan's theory of change supports social constructivism in the context of change in classroom practices and the social collaborations among students, staff, and principals. Social constructivism grew out of the social and cultural evolution occurring in the 1900's with work on scientific paradigms (Kuhn, 1962). This perspective is closely associated with many contemporary theories, particularly the developmental theories of Vygotsky and Bruner, and Bandura's social cognitive theory (Shunk, 2000). The main underlying assumption of cognitive constructivism is derived from Flavell and Piaget in that learning is believed to be a process where an individual constructs his or her own meaning through cognitive processes (Flavell, 1963). Piaget's cognitive constructivism, paved the way for the emergence of the educational theory called social constructivism (McMahon, 1997). Vygotsky, a Russian psychologist and philosopher in 1930's, is usually associated with social constructivism because of his work

emphasizing the effects of one's environment (social interactions between family, friends, culture and background) on learning (Vygotsky, 1978). Another social constructivist theorist, Bruner, discusses the language of learning and learning in the context of mathematics and social science programs (Bruner, 1983). Bruner (1973) advocates learning as an active process in which learners construct new ideas or concepts based upon current/past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions relying on a cognitive structure to do so (Bruner, 1973). Opponents of social constructivist theory state the role of power may sometimes be limited to a few specific directives for action (Kezar, Carducci, & Contreras-McGavin, 2006). Additionally, critics believe it is virtually impossible to predict leadership processes, behaviors, and outcomes, because social constructivism does not appear to address the lack of predictability of human behavior (Kezar, Carducci, & Contreras-McGavin, 2006).

Leadership change theory. Michael Fullan (2001), known for leadership change theory, identifies three major components affecting school change and student growth: 1) materials such as a variety of resources, curriculum materials, and technologies, 2) varied and research-based teaching strategies, and 3) alteration of beliefs. Transformation of a school is influenced and shaped by individuals within the organization (Fullan, 2001). School-based administrators as well as executive leaders' perceptions of change, program opinions, and subsequent actions, frequently impact the overall execution of programs, strategies, and approaches utilized to support positive school change (Allen & Cherrey, 2000; Fullan, 1992). Moreover, to shape the actual learning experiences in the classroom it is not only the responsibility of teachers, but all leaders must also know what conditions lead to growth (Dewey, 1983). Fullan's change theory focuses on how to institutionalize change. He suggests three phases: initiation, implementation,

and institutionalization (Fullan 1991). Professional development, such as Louisiana INTECH, is a strategy to support school improvement efforts and institutionalize change. Furthermore, Fullan (1991) says classroom educators should be a part of developing the vision of change and educators must believe that students are capable of advanced work (Moussiaux & Norman, 1997). Moreover, teacher collaboration and professional development about effective instructional strategies leads to growth in student achievement (Fullan & Hargreaves, 1996). Similarly, for technology integration strategies to positively impact student achievement, leaders must embrace technology as an integral part of the school vision, support technology integration professional development, and maintain funding (Shibley, 2001). Knowledgeable and effective leaders are extremely important in determining whether technology use will improve learning for all students.

Fullan (2001) concludes that effective leaders must develop a shared school vision with a focus on interactive professionalism. Additionally, vision for systemic reform requires changes in values and beliefs regarding acceptable professional practices and students' achievement ability (Stiegelbauer, 1994). The success of any organization depends upon ownership at all stakeholder levels to ensure continuous improvement and support of change efforts (Matusak,1997).

Social constructivist theory. Social constructivism is based upon three basic assumptions: 1) reality is constructed through human activity and interaction (Kukla, 2000); 2) knowledge is a human product which is socially and culturally constructed where individuals create meaning from their interactions (Ernest, 1998; Gredler, 1997; Prawat & Floden, 1994); and 3) learning is a social process that is shaped by external forces when individuals are engaged in social activities (McMahon, 1997). Lambert, et al. (2002) define constructivist leadership as

"The reciprocal processes that enable participants in an educational community to construct meanings that lead toward a common purpose about schooling" (p.29). Reciprocal processes include gaining trust by means of professional and peer relationships, recognizing and restructuring commonly held assumptions and perspectives, creating new mutual knowledge, and altering individual and group behaviors to create new ways of doing school by engaging in conversations (Lambert et al., 2002). Proponents of social constructivism argue that most optimal learning environments are dynamic interactions between instructors, learners, and tasks (McMahon, 1997).

Researchers who disregard social constructivism suggest there are few specific directives for action. One such directive is the examination of the role of power (Kezar, Carducci, & Contreras-McGavin, 2006). Additionally, there is concern regarding the predictability of leadership processes, behaviors, and outcomes. Some believe that since this theory is heavily grounded in social context, it is difficult to determine whether the social situations have been adequately interpreted, thus creating concerns about the knowledge constructed, because the nature of human beings can be unpredictable (Kezar, Carducci, & Contreras-McGavin, 2006). However, improved student learning is ultimately the goal of every leader and classroom teacher.

Social constructivism is the basis for instructional strategies that enable students to build new content knowledge using higher order thinking and problem solving skills. Teachers must be knowledgeable about ways to actively employ constructivist pedagogy if student achievement is to benefit from social constructivism. With respect to technology and constructivist teaching, research indicates technology-using teachers consider learning to be an active process, with knowledge viewed as something students must construct rather than passively receive (Bracey 1994; Ertma, Gopalakrishnan, & Ross, 2001). Additionally, innovative technology-using

educators view the technology integration process as a constructivist venture which incorporates collaboration, reflection and negotiation thus potentially impacting student achievement within the context of authentic tasks (Vannatta, 2000; Vrasidas, 2001). This enables teachers to encourage student interaction for exchange of ideas and experiences to inspire deeper understanding and greater learning growth (Duffy & Jonassen, 1992). High quality professional development is an important link between social constructivist theory and constructivist teaching. Likewise, if technology is to enhance academic performance, then professional development must provide opportunities for teachers to make connections between standards-based instruction, constructivist teaching strategies, and effective technology use such as project-based learning activities. Louisiana INTECH engages teachers in using social constructivist-based, best practices with mathematics, reading, ELA, and technology to support increased student achievement.

As teachers become engaged in educational activities to improve instruction, they share experiences and develop a better understanding of how to motivate students by applying constructivist strategies. Constructivism has roots in psychology and anthropology disciplines (Fosnot, 1996). Additionally, this theory has a framework for student learning and pedagogy. Piaget and Vygotsky began researching the constructivist approach in the 1900's. Piaget emphasized doing and thinking at different levels of development where individual student learning occurred by discovery (Ackermann, 2001). Vygotsky viewed the student more like a researcher with emphasis on learning in context and cooperation within the learning community (Vygotsky, 1978). Furthermore, he believed students could solve complex problems with teacher guided questioning techniques and social interaction rather than simply learning through stages of development (Vygotsky, 1978). The differences between Piaget and Vygotsky have been

debated; however, Sujo De Montes and Gonzales (2000) believe the two complement each other and concentrate on varied aspects of the theory.

Research by Steffe and D'Ambrosio (1995) indicates constructivist teaching has only been widely accepted in mathematics and ELA since the early 1980's, but Piaget (1972) provided the basis for constructivist strategies in the early 1900's. Both Piaget and Glaserfield (1995) suggested new experiences are built upon existing knowledge through a process of assimilation and accommodation. Furthermore, constructivist teaching emphasizes thinking, understanding, reasoning and applying knowledge. Yet, it does not neglect basic skills (Moussiaux & Norman (1997). Moreover, it is guided by five basic elements; (1) activating prior knowledge, (2) acquiring knowledge, (3) understanding knowledge, (4) using knowledge, and (5) reflecting on knowledge (Tolman & Hardy, 1995). When teachers utilize the elements to become facilitators of learning rather than transmitters of knowledge, learners construct their own knowledge, rather than reproduce others' knowledge. This enables learners to gain new understandings as connections are made between learning and previous experiences, thus potentially improving achievement (Glaserfield, 1995).

Improved student learning is ultimately the goal of every leader and classroom teacher. However, teachers must be knowledgeable about ways to actively employ constructivist pedagogy if student achievement is to benefit from constructivist theory. High quality professional development is an important link between constructivist theory and constructivist teaching. Likewise, if technology is to enhance academic performance, then professional development must provide opportunities for teachers to make connections between standards-based instruction, constructivist teaching strategies, and effective technology use such as project-based learning activities.

The use of project-based learning in a technology-rich environment incorporating constructivist teaching enables students to obtain information from a variety of sources. Using technology expands opportunities for students to collaborate, investigate, and construct new knowledge. Similarly, research by Lundeberg, Coballes-Vega, Standiford, Langer, and Dibble (1997) found teachers committed to project-based learning with technology believed educators could best learn how to use constructivist strategies when professional development incorporated constructivist teaching. Thus, constructivist theory leads to a conclusion that sharing technology integration ideas in a professional learning environment can deepen teacher knowledge over time (Bitter & Pierson, 2002). Based on this constructivist view, the presence of computers in the classroom is not as important as the manner in which they are used (Strommen & Lincoln, 1992). In the constructivist classroom, learning is facilitated through the posing of problems and questions, rather than through the presentation of isolated facts (Dede, Loftin, Salzman, & Sprague, 1999). Consequently, project-based learning strategies are essential components for professional development founded in constructivist theory.

The Louisiana INTECH technology professional development model supports constructivist theory through varied technology integration demonstration lessons that employ thinking, learning in context, and project-based learning (Louisiana INTECH, 2000). Draper (2002) states constructivist theory may be the catalyst for change in mathematics teaching from the traditional, transmission model to one that engages students in building their own knowledge through active learning situations. This aligns with recent mathematics reform initiatives endorsed by advocates of the National Council of Teachers of Mathematics (2000) and researchers in the field of mathematics professional development who believe changing approaches to mathematics instruction will guide and empower students in their own learning

(Loucks-Horsley, S., Love, N., Stiles, K., Mundry, S., & Hewson, P., 2003). The National Council of Teacher of Mathematics Standards are primarily built on the constructivist theory about learning, which holds that students are not merely passive recipients of knowledge, but rather they are constantly reshaping their knowledge as they learn (National Council of Teachers of Mathematics, 2000).

Applying the pedagogical approaches based in constructivism to the use of computer technology indicates computer applications foster literacy when students are highly interactive (Klinger & Connet, 1992). High level interactivity means students are engaged in interacting with the technology so the learner is involved in the instructional process (Klinger & Connet, 1992). The constructivist perspective suggests students should be generating questions, creating concept maps, summaries, etc. The more actively students are involved in what they are reading, writing, or creating; the more likely they are to be engaged in learning (Kubota, 1991). Moreover, as teachers design and share technology integration, standards-based lessons to support mathematics, reading, and literacy learning, the student becomes the center of the learning experience.

Andragogy. Teaching is changing to meet the needs of students in an information age. Technology integration professional development employs adult learning theory to guide teachers' use of constructivist instructional practices to improve student achievement (Knowles 1974; Kent & Salazar, 2001; Padgett, H. & Buss, R., 2004). Malcolm Knowles was one of the first researchers in the 20th century to address adult education through adult learning theory. He was a leader in changing professional development concepts from "educating people" to "helping them learn" (Smith, 2002). Frequently, this approach is referred to andragogy. It is defined as the art and science of helping adults learn most effectively (Browning, 1987).

The roots of andragogy can be traced to Alexander Kapp, a German grammar teacher who used it to describe Plato's educational theory (Knowles, Holton, & Swanson, 1998). Since the late 1960's, Malcolm Knowles has been the primary expert in this field. He identified five major assumptions of the andragogical model: 1) adult learners are self-directed and need consultation about their needs; 2) adults engage in educational activities with a greater degree and quantity of experience than youth; 3) adults are ready to learn when they need to know or do something in order to perform a task or activity in their lives; 4) adults enter an educational activity with a life-centered, task-centered, or problem-centered orientation to learning; and 5) adults will respond to some external motivators, but more powerful motivators are internal, self-esteem, recognition, better quality of life, greater self-confidence, and self-actualization (Knowles, 1984a, 1974, 1984b).

Louisiana INTECH embraces andragogy whereby adult learners assist in planning educational experiences to meet personal and student learning goals. According to the andragogical model, adult learners bring a history of past experiences to professional development sessions that impact individual beliefs about teaching and learning. The Louisiana INTECH model recognizes and validates previous experiences and encourages participants to consult with INTECH instructors about ways to personalize the experience. Effective professional development activities focus clearly on learning and learners, replicate current understanding of best practice for adult learners, encourage teachers to be active, reflective practitioners, and reflect school and/or district priorities (Sparks & Loucks-Horsley, 1989).

Instructors of technology-based professional development recognize adult learners possess a vast quantity of experiences when compared to youth. Accordingly, teachers are

guided through group projects and activities that draw upon personal and professional teaching experiences. Through this process, teachers examine and collaborate about specific instructional strategies related to standards-based instruction and technology integrations, thus creating a learning environment for reflection and reevaluation of practice.

Louisiana INTECH instructors facilitate professional development sessions offering opportunities for teachers to share, collaborate, and reflect upon learning in both face-to-face and online situations. Participants engage in practical technology integration activities which focus upon constructivist strategies employed in standard-based lessons. Teachers learn from each other about ways to successfully implement technology, project-based, higher order thinking lessons. This purposeful design employing andragogical assumptions bridges understanding of how best constructivist practices with technology might improve student achievement.

Another assumption of the andragogy model is that adult learners often respond to activities that lead to job satisfaction and improved quality of life. Perhaps improving student achievement has the potential of motivating adult learners to take ownership in the learning process; thus leading to greater success in the classroom (Louisiana INTECH, 2000). In an examination of research on Louisiana INTECH by DiBenedetto (2005) the data indicated statistically significant differences in the areas of teaching pedagogy and attitudes toward technology use in the classroom. However, there are no data to suggest whether Louisiana INTECH professional development impacts student test scores. Potentially, the professional development experiences founded in andragogy contribute to improved attitudes and teaching strategies which could positively impact student achievement. This research study will provide data to indicate whether there is any impact on sixth and seventh grade mathematics, reading, and language achievement.

Importance of the Study

Many educational leaders across the country engaged in school change invest considerable human and monetary resources in professional development for teachers. Specifically, Louisiana INTECH requires significant investments as teachers are required to be absent from the classroom a minimum of six days. This directly impacts classroom instruction by requiring funds for substitutes and travel, but more importantly there are leadership questions regarding whether the gain in student performance is great enough to counter balance the loss of instructional time. In a time when instructional strategies, tools and resources must be aligned to meet national, state, and local accountability expectations, there was a need to examine the Louisiana INTECH model and student performance. This quantitative study was conducted to determine principals' perceptions of Louisiana INTECH as an impetus for change. Additionally, mathematics, reading, and language *ITBS* test scores of sixth and seventh grade students of Calcasieu Parish School System teachers who engaged in and received Louisiana INTECH certification were compared to those who did not.

Few studies exist about the INTECH professional development model implemented in Louisiana. One study by DiBenedetto (2005) was identified. DiBenedetto (2005) surveyed 200 INTECH and non-INTECH trained teachers about student-centered learning and utilization of technology skills. However, test score data were not examined nor were principals' perceptions of INTECH as an impetus for change. This research provides some of the first quantitative data about Louisiana INTECH with respect to leadership and student achievement in sixth and seventh grade mathematics, reading, and ELA. Stakeholders at various levels need research to make informed decisions about current and future technology integration professional development initiatives that impact student achievement. Educational leaders need the data to

indicate whether this program positively enhances school vision and academic goals established for students.

Scope of Study

The participants for this study were students and teachers in the Calcasieu Parish School System (CPSS) system located in southwest Louisiana. The CPSS, with an approximate enrollment of 32,000 students, is comprised of 32 elementary schools, 13 middle schools, 13 high schools, and one alternative school. Since Louisiana public schools were in a transitional testing program affecting all grades beginning in 2006, 2004 and 2005 *ITBS* student test data were used. The research data were derived from sixth and seventh grade middle school student mathematics, reading, and language total Standard Scores from the spring 2004 and spring 2005 exams.

The selection of sixth and seventh grade for this study was based upon several factors. First, there was a district emphasis on mathematics, reading, and ELA achievement in middle school grades. Secondly, fourth and eighth grade students in Louisiana take high-stakes, criterion-referenced tests rather than norm-referenced achievement tests. Additionally, most fifth graders were placed in elementary schools (usually one teacher teaches all subjects), while sixth and seventh graders were placed in middle schools (usually the teachers specialize in one content area). Consequently, only sixth and seventh grade mathematics, reading, and language student achievement were examined for growth using the *ITBS* total Standard Scores. Due to changes implemented in Louisiana's testing procedures in 2006, the pretest was 5th and 6th grade spring 2004 *ITBS* scores and the posttest was 6th and 7th grade spring 2005 *ITBS* scores.

Eight Louisiana INTECH certified mathematics teachers and ten ELA/reading Louisiana INTECH certified teachers were matched with a similar group of non-INTECH certified teachers

according to the following variables: years teaching experience, educational attainment, and school mean achievement, as defined by the 2004 Louisiana baseline SPS. Over two thousand *ITBS* test scores of the 36 total mathematics, ELA/reading INTECH and non-INTECH certified teachers were compared for achievement gains.

The participants were a representative sample of six and seventh grade mathematics, reading, and ELA teachers with students in sixth and seventh grades. The sample student population was sixth and seventh grade students of INTECH certified and non-INTECH certified mathematics, reading, and ELA teachers in Calcasieu Parish School Board (CPSB) middle school settings. The total student population in the study was 2,292.

Definition of Terms

For the purpose of this study, the following definitions apply to the terms used in the discussion. Terms are listed alphabetically and operationally defined for the purpose of this research.

Administrators. Refers to school-based leaders such as assistant principals and principals.

Affective change. Refers to a dimension of attitude toward change which deals with the feelings people have about change.

Andragogy. Is the art and science of helping adults learn.

Analysis of variance (ANOVA). Is a statistical technique used to compare two or more independent groups on the dependent variable. It is used to look for differences among three or more means by comparing the variances both within and across groups.

Behavioral change. Refers to the degree to which a person is likely to support change and is likely to initiate change.

Classroom-Based Technology (CBT). Is a Calcasieu Parish School System program which provides each teacher with a computer, printer, software and technology professional development as part of a refresh cycle whereby every four years each classroom receives at least one new computer system for instructional purposes.

Cognitive change. Is a component of attitude towards change that focuses on the degree to which a person believes that change tends to produce positive effects for the organization, for co-workers, and for him/herself.

Comprehensive Curriculum. Is a Louisiana curriculum built upon Louisiana Grade-Level Expectations and implemented in content areas at each grade level.

Constructivist theory. Refers to learning as a process through which learners construct their knowledge and understanding of the world by reflecting on their own experiences. Learning is a matter of modifying or rejecting existing mental models to accommodate new experiences.

English language arts (ELA). Refers to English and reading content areas.

Grade Level Expectations(GLEs). Are statements of what students should know or be able to do by the end of each grade, PreK-12 in each core curriculum content area.

Higher Order Thinking Skills (HOTS). Is a term used for higher order thinking skills. Pogrow's Socratic questioning techniques are assumed to be associated with HOTS.

INTECH certified teacher. Is a teacher who has successfully completed the 56-hour state-approved Louisiana INTECH professional development program.

Iowa Tests of Basic Skills (ITBS). Are a norm-referenced achievement tests published by Riverside Publishing of Itasca, Illinois. Scores derived from this standardization program are the norms that permit the test user to compare student performance with that of a larger representative group.

Louisiana Content Standards. Are rigorous and challenging curriculum content expectations adopted in the 1990's to initiate the elevation of academic standards in Louisiana. Content standards are implemented for English language arts, mathematics, science, social studies, foreign languages, and the arts.

Louisiana INTECH. Is a state-approved model of intense, content-rich, hands-on, 56-hour staff development designed to provide teachers with concrete examples of effective technology-based strategies that support and enhance curriculum.

Masters Plus 30. Is recognition of achievement of 30 graduate hours beyond the Masters Degree level.

Pedagogy. Is the art and science of teaching children.

Professional development. Is organized content delivered to classroom teachers and specifically designed to improve the job performance in the classroom.

Regression. Is the statistical technique for finding the best-fitting straight line for a set of data.

School Performance Score (SPS). Is Louisiana's guidelines and formulas used to calculate a school's academic performance. The SPS is an index developed by the state of Louisiana to report total school growth performance on an average of two's year of performance on standardized testing data, attendance, and dropout rates. The School Performance Scores used as a part of this study are the baselines scores for 2004.

Standard Scores (SS). Are produced from a single, equal-interval scale of scores that is continuous from kindergarten through twelfth grade. The Iowa Tests range from 80 for kindergarten through 400 for grade 12. For sixth grade the Standard Score is 227 and seventh grade is 239.

Statistical Package for Social Sciences (*SPSS).* Is a software package used for statistical calculations.

Student achievement. Is the dependent variable in this study. Student achievement was measured utilizing the 2004 and 2005 *ITBS* mathematics total Standard Scores.

Technology professional development. Is organized content delivered to teachers and specifically designed to improve the integration of technology in classroom curriculum.

t-test. Is a statistical technique to determine whether a statistically significant difference exists between two means. It is used to determine whether one group of numerical scores is statistically higher or lower than another group of scores.

Delimitations and Limitations of Study

Delimitations and limitations of a research study establish the boundaries, exceptions, reservations, and qualifications of a study (Creswell, 2003). These parameters provide the necessary background to fully understand the natural conditions that restrict the study and may impact the outcomes. Delimitations are deliberately imposed by the researcher to narrow the scope of the study (Creswell, 2003; Rudestarm, 2001). In contrast, limitations are restrictions in the study over which the researcher has no control and which could perhaps negatively affect the results or the generalizability of the research results (Rudestarm & Newton 2001; Gay & Airasian 2000).

The delimitations of a study enable the researcher to narrow the study's scope. Two delimitations for this study were related to the sample participants. Only CPSS middle school sixth and seventh grade mathematics, reading, and/or ELA teachers and their students were used in the sample. A third delimitation was the focus on sixth and seventh grade mathematics, reading, and language scores. The mathematics, reading, and language content areas are heavily

weighted in the School Performance Scores established by federal and state accountability guidelines. Thus, the mathematics, reading, and language content areas were selected to support national, state, and district data needs. The final delimitation was the data used in the study. Louisiana public schools in began a transitional testing program in 2006. Consequently, 2004 and 2005 *ITBS* scores were used to provide compatible test data for comparison.

This study provides important data about the impact of Louisiana INTECH professional development on sixth and seventh grade mathematics, reading, and language student achievement. However, there are limitations to the study that might negatively affect the results over which the researcher had no control. One limitation was related to the type and amount of accessible technology in each INTECH certified teacher's classroom. Funding resources at the school and district level impact the number of available computers and technological devices to support instruction in the classroom. Although each teacher received a new computer, printer, and software in 2003, additional amounts of technology available in the seventh grade mathematics, reading, and/or ELA classrooms vary.

A second limitation was related to teacher technology integration skills and the implementation of technology-embedded instructional strategies in the classroom. While all sixth and seventh grade mathematics, reading, and/or ELA teachers participated in a basic technology integration professional development program entitled Classroom-Based Technology (CBT), personal technology skills were unique to each individual. Each INTECH certified teacher may have implemented unique technology integration strategies based upon the individual interpretation of INTECH professional development sessions. However, it was assumed participating INTECH teachers are computer literate because of completion of the Louisiana INTECH professional development sessions.

A third limitation was the causal-comparative research design used for this study. Since the students were not randomly placed in the classes, the groups may have varied on other variables that may have had an effect on the dependent variable. The researcher used matching groups to control for the effect of extraneous variables. Then *ANOVA* was used to break down the variation within and between the groups. Although the causal-comparative design attempts to describe a relationship between the independent and dependent variables, the relationship may be more suggestive than proven because of the lack of control over the independent variable in an ex-post facto study (Gravetter & Wallnau, 2004).

A fourth limitation was the small pool of potential teacher participants. Although there were142 middle school teachers currently Louisiana INTECH certified, the sixth and seventh grade teacher data pool available for the 2004-2005 school year consisted of eight mathematics and ten ELA/reading teachers. Each participant in the experimental group completed INTECH certification prior to the 2004-2005 school year.

The final limitation for consideration was the scores from the *ITBS* norm-referenced achievement test. Norm-referenced achievement tests do not denote what a student does or does not know. The data only provide information about how a student's knowledge or skill compares to others in a specific norm group (University of Iowa 2006).

Organization of Study

This study consists of five chapters. Chapter One introduces the research topic for study, Louisiana INTECH professional development. It includes the statement of the problem, the purpose, the research question, and the implications of the study. The theoretical basis for the study is discussed and illustrated in the form of a conceptual map representing the framework. The scope of the study, definitions, and limitations are included in this chapter.

Chapter Two reviews the literature relevant to the study. The introduction speaks to the importance of leadership and the connection to the curiosities related to the independent variables (administrators' perceptions of change and Louisiana INTECH) and dependent variable (student achievement.) The literature review is sub-divided into topics directly related to the independent and dependent variables. The components include: technology professional development with sub-topics discussing the Georgia and Louisiana INTECH models; technology and student achievement in mathematics and literacy; and technology professional development and student achievement. A summary of current findings about technology professional development, Louisiana INTECH, and student achievement are addressed.

Chapter Three provides an overview of the research design for this study. Information regarding the site for the data collection and the participants in the study is included. The methodology, sampling method, instrumentation, and data collection for the study are defined. A discussion of the data analysis summarizes the statistical procedures employed to evaluate the data. Finally, the research procedures, limitations and delimitations, and summary concludes the contents of Chapter 3.

Chapter four presents the results of the analyses in four sections. The introduction provides an overview of the analyses utilized in the study and the organization of the chapter. The second area describes the samples represented in the research study. Thirdly, the findings are examined as related to individual hypotheses. Lastly, the chapter concludes with a summary.

Chapter Five includes the discussion of the study organized into five sections. First, the introduction provides the overview, purpose, and sequence of the chapter. Next, the second section denotes the study findings related to the samples' demographics and hypotheses in the context of theory and research. Limitations of the research study are included in the next section.

The fourth area is devoted to recommendations for future studies. Lastly, conclusions about the Louisiana INTECH Professional Development are shared.

Chapter Two: Review of Literature

Introduction

School accountability requires stakeholders to examine professional development programs and make recommendations for continuation and funding. Administrators are pressured to maintain professional development programs that clearly demonstrate improved student achievement. Those not aligned with school vision and accountability expectations are revised or discontinued. Documentation of student gains is essential for educational leaders to know which change initiatives and professional development programs are effective ways to improve student achievement. Specifically, there are questions about the value of the Louisiana INTECH technology professional development program for teachers in grades six through eight.

This study examined the relationship between middle school administrators' perceptions of Louisiana INTECH as an impetus for school change, the Louisiana INTECH professional development model, and sixth and seventh grade mathematics, language, and reading student achievement. The theoretical framework for the literature review is situated within the post-modern leadership paradigm. Furthermore, the research built upon two primary theories, leadership change theory and social constructivism. The premise for this study was founded upon two assumptions pertaining to Louisiana INTECH professional development and student achievement. The first assumption was related to the design and delivery of the professional development components. The components were designed using Andragogy, adult learning theory, as the basis for the conception and implementation of the participant tasks and activities. The second supposition was that related to social constructivist learning theory. Constructivist concepts were central to the professional development delivery and recommended technology

integration, standards-based instructional practices for teachers of mathematics, ELA, and reading.

The literature review is divided into topics related to this study. The first topic entitled Technology Professional Development is an overview with sub-headings specifically associated with the model examined in the study, Louisiana INTECH. The second topic section, Student Achievement in Mathematics, contains research related to current practice in mathematics instruction and its relationship to student achievement. Topic three is Student Achievement in Literacy. Lastly, the topic Technology Professional Development and Student Achievement examines relevant research specifically related to technology professional development and increased student achievement. The summary highlights the literature review's major themes and suggests why more research is needed on the topic of Louisiana INTECH and student achievement.

Technology Professional Development

Professional development is recognized as the process or method in which teachers engage in activities designed to improve or enhance pedagogical practices and change perceptions of teaching (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003; Fullan, 2001; Glenn Commission Report, 2000; Hassel, 1999; Gusky & Huberman,1995). Professional development enables educators to keep abreast of new knowledge and refine concepts to implement new or enhanced teaching strategies aligned with school change initiatives (Gusky & Huberman, 1995). Virtually every plan to reform, restructure, or transform schools emphasizes professional development as a vehicle to bring about desirable change (Guskey, 1994).

Technology professional development is often referred to as organized content delivered to teachers that is specifically designed to improve the integration of technology in classroom

curriculum. Technology integration, as defined by the National Forum on Education Statistics (2003), "is the incorporation of technology resources and technology-based practices into the daily routines, work and management of schools" (Chapter 7). During technology professional development sessions, teachers are traditionally engaged in a variety of activities that incorporate the use of computers, specialized software, networked communication systems, and collaborative work environments. Internet-based research, data retrieval, and other technology-based strategies are implemented within the context of lesson design and practical instructional applications.

Numerous studies reveal a need for teachers to engage in high quality professional development to effectively use technology in schools (Commerce, 2002; McCannon & Crews, 2000; Smerdon & Cronen, 2000). One study, the 1999 Fast Response Survey System's (FRSS) public school teachers' survey, asked questions of respondents regarding their technology integration preparation and training on topics such as: preparedness, perceptions of training, understanding technology, participation in different types of professional development activities, length of participation, and support for participation in training activities (NCES, 2000). The results showed only about one-third of the teachers surveyed reported confidence in using technology proficiently in classroom instruction, and approximately two-thirds felt they were not well-prepared to implement technology-integration strategies in lessons with students. Furthermore, the survey reported the amount and quality of available equipment varied in classrooms. Moreover, teachers needed time and principal support to implement technology and change practice (NCES, 2000).

Research on teacher change and instructional reform indicates change in instructional practice is slow due to a number of factors (Ball, 1990; Cohen, 1990; Peterson, 1990). One factor the literature identified in the area of technology is that teachers may have learned how to

use technology from a variety of sources, but they might not always have opportunities to use computers and adapt practices (Becker, 1990; President's Committee of Advisors on Science and Technology, 1997). Another factor is directly related to the type of professional development program. Isolated, single professional development sessions tend to generate an initial eagerness in teachers to implement new knowledge gained (Ravitz, 2003). However, the enthusiasm often changes when teachers encounter barriers and limited administrative support during implementation. Additionally, one-time professional development experiences frequently are insufficient to sustain technology integration. Furthermore, inadequate professional development results in overall limited use of technology to support instruction (Ravitz, 2003). Although the literature indicates technology integration may not always improve or enhance student achievement, substantial research studies support technology use for increased student motivation to learn (Apple 1995; Lowther, Ross, & Morrison, 2001).

Professional development and technology have been described as important vehicles for change and school reform; however, some professional development activities have been acknowledged as inadequate (Sprinthall, Reiman, & Theis-Sprinthall, 1996). In particular, a number of activities have been described as short term, lacking follow-up and feedback, isolated from participants' classroom and school contexts, and providing limited engagement in reflection and collaboration with colleagues (Fullan, 1991). Moreover, a national research study undertaken by the National Center for Education Statistics using a Fast Response Survey System (FRSS) indicated only a small percentage of teachers who participate in ill-developed and poorly implemented professional development initiatives report feeling very well prepared to implement technology-integration strategies which demonstrate change in practice (Lewis, Parsad, Carey, Bartfai, Farris, & Smerdon, 1999).

Levin and Arafeh (2002) conducted 14 focus groups with students from 36 different schools about technology and the Internet in schools. Middle and high school students expressed frustration with teacher use of technology and the Internet. The students reported a need for adequate access and appropriate online activities in the classroom. Furthermore, the subjects believed professional development and technical assistance for teachers were essential for effective technology integration in content (Levin & Arafeh, 2002). Additionally, in a study by Ertmer, Ottenbreit-Leftwich, and York (2005), teachers rated professional development as one of the most influential extrinsic factors for changing practice and utilizing technology.

Many types of professional development include technology integration strategies as a tool to enhance learning. The literature indicates that professional development with technology must be an integral part of both content and instructional strategies and teachers must assume active roles in helping students learn with and about technology (Glenn, 1997; McCannon & Crews, 2000). Eisenberg and Johnson (1996) support the idea that competent use of technology skills must connect to content, and the skills must fit together in a systematic instructional model such as a professional development setting. Accordingly, teachers should be taught best technology practices for successful technology integration such as active inquiry and problem solving so students learn "through computers, not about them" (Dockstader, 1999, p. 3).

Researchers agree that teaching is changing to meet the needs of students in an information age and teachers are the key to effective classroom learning (Padgett & Buss, 2004; Mergendoller, 1997; Soloway, 1996; Wenglinsky, 1998). In a study of how classroom teachers implement effective constructivist strategies and technology Coppola (2004) found constructivist, technology using teachers subscribe to different beliefs and skills than traditional teachers. To teach with technology and constructivist practices requires "deep knowledge of

subject and pedagogy" (Coppola, 2004, p. 30) in addition to technology proficiencies. Additionally, teachers must believe that technology integration makes a difference in student achievement and possess the necessary skills and knowledge to effectively model and teach with technology in a standards-based curriculum (Coppola, 2004).

High quality professional development can change teacher beliefs and instill self-efficacy assuming pedagogical knowledge is addressed in a supportive climate with collaboration and reflection (Watson, 2006; Dexter, Anderson, & Becker, 1999). Furthermore, teachers must have the ability to implement research-based, technology integration strategies in a standards-based curriculum where important linkages are made to learning expectations (Coppola, 2004; Padgett & Buss, 2004). Moreover, to ensure overall increased learning in a school, teachers must implement content, strategies, and technologies that support overall student and school needs (Fullan, 2001). Effective technology integration cannot occur without staff development (Becker, 1994; Cradler, 1996).

Technology-using teachers positively impact student achievement, but technology integration is a slow process, and it requires significant time and professional development to move early technology adopters to high-level implementation aligned with curriculum goals (Dwyer, Ringstaff, & Sandholtz, 1990; Martin, Hupert, Culp, Kanaya, & Light, 2003; O'Dwyer, 2004). King (2005) indicated there is a positive relationship between technology professional development and secondary teachers' utilization and new methodologies in the classroom. The adoption of a new strategy can be a catalyst for technology integration and school change, but teachers often need follow-up training and school administrator support. Byrom and Bingham (2001) recommend administrators work and learn side by side with teachers in a professional development setting. Furthermore, through teacher collaboration and support, administrators play

a vital role in ensuring research-based technology integration strategies are implemented, providing time for follow-up training, and protecting instructional time (Byrom & Bingham, 2001; Cappola, 2004).

Research indicates administrators should take action to provide opportunities for teachers to collaborate with other technology using teachers to glean successful integration tips (Becker & Riel, 2000). In a study by Becker and Riel (2000), 4000 teachers were surveyed about regarding attendance and opportunities to present at professional conferences. The results found that teachers who attend and present at professional conferences were stronger computer users and created more complex instructional environments with technology than those who did not attend or present (Becker & Riel, 2000). Additionally, the literature indicates teachers who are professionally engaged and comfortable with technology tend to ensure their students are actively involved in more constructivist types of instructional activities; thus providing opportunities for greater gains (Bradshaw, 2002).

One specific professional development model that provides opportunities for teachers to collaborate about technology and constructivist strategies originated at Kennesaw State University in Georgia. The Georgia Framework for Technology Integration model (InTech) was designed as a train-the-trainer model for classroom teachers. The forthcoming section describes the model and related research.

Georgia framework for technology integration model. In 1996, Dr. Traci Redish and Linda Whitacre pioneered the Georgia Framework for Technology Integration model (InTech) at Kennesaw State University (KSU). The technology professional development program was designed, implemented, and tested by the Educational Technology Center at KSU. This

train-the-trainer model based upon constructivist theory is now delivered statewide through regional technology centers and state institutes of higher learning.

The Georgia Department of Education adopted InTech as a solution for Georgia educators to meet the mandatory technology requirement in the *A+ Education Reform Act of 2000* (House Bill1187, 2000). According to the KSU web site, the model developed by Redish and Whitacre (1997) was found to be an effective approach for delivering technology staff development that focuses on how to successfully integrate technology into the k-12 curriculum (Kennesaw State University, 2006). Present findings related to the Georgia InTech model support the claim that teacher participation in the staff development program does improve classroom technology integration (Bennett, 2004; Redish & Whitacre, 1997; Sheumaker, Slate, & Onwuegbuzie, 2001). For example, Bennett (2004), at the University of West Georgia, conducted a causal-comparative study to examine three research questions:

a) "How does InTech affect teachers' personal computer use?

b) How does InTech affect teachers' level of technology implementation?

c) How does InTech affect teachers' current instructional practice?" (p. 1954-1957).

Results indicated teachers do realize gains in instructional uses of technology following InTech professional development. However, there was no indication of the impact of InTech professional development on student achievement. In a separate case, research by Sheumaker, Slate, and Onwuegbuzie (2001) analyzed survey data from InTech and non-InTech middle school teachers. The results showed teacher gains in use of technology in the classroom, but again there was no examination of student achievement. In her 1997 study of InTech and instructional use, Redish used teacher self-assessments and observations (Redish, 1997). Again, there was no mention of how the InTech professional development model impacts student

achievement. This void in the literature is problematic because national, state, and local funding sources often require administrators to implement research-based programs with proven records in the area of student achievement gains.

The Georgia Framework InTech model was the catalyst in the development of the Louisiana INTECH professional development model. Although the Georgia model was modified to meet Louisiana needs, the technology and constructivist strategies in standards-based practice which originated in Georgia InTech remain core components in the Louisiana INTECH professional development program today. Currently, the Louisiana INTECH model has been implemented statewide for nearly ten years and the teacher participants engage in 56 hours of professional development. However, few studies have been conducted to determine its effectiveness to improve instruction or student achievement. Furthermore, there are no known studies that investigated principals' perception of Louisiana INTECH as an impetus for change. The next section describes the present Louisiana INTECH professional development model.

Louisiana intech. Louisiana INTECH, a technology integration professional development model, was based upon the Georgia Framework for Integrating Technology model. Roughly ten years ago, Dr. Adrianne Hunt, Louisiana Department of Education Technology Specialist, coordinated the state technology office research team to investigate, develop, and implement a technology professional development program for Louisiana classroom teachers (Louisiana INTECH, 2006). The committee was composed of Louisiana Department of Education curriculum and technology representatives, school administrators, and classroom teachers. After reviewing the minimal literature published regarding technology professional development, Georgia's InTech Model appeared to be a program worthy of further inquiry. Subsequently, Dr. Hunt and team members visited with the Georgia State Department of

Education, and steps were taken to gain permission for Louisiana to adopt and modify the Georgia InTech model to meet Louisiana needs. One of Georgia's key goals, to provide fundamental change in overall teaching and learning processes, was retained. However, the Louisiana development team chose to not only focus on Louisiana Content Standards, Comprehensive Curriculum, and GLEs, but also to include Louisiana history and geography as the focal point for each professional development activity. INTECH design leaders believed Louisiana INTECH sessions would be best delivered in the context of learning about Louisiana, thus enabling classroom educators to learn more about Louisiana culture as well as experience examples of effective technology-based strategies that support and enhance the Louisiana curriculum expectations. Upon completion of the Louisiana INTECH certification, participants are expected to have learned basic technology skills while focusing on project-based activities with an emphasis on inclusion of (1) classroom management techniques, (2) new designs for learning, (3) best pedagogical practices, (4) curriculum standards, and (5) modern technologies (Louisiana INTECH, 2006).

A very limited number of research studies exist about the Louisiana INTECH model. To date, only one is related to the Louisiana model. Di Benedetto (2005) surveyed 200 INTECH and 200 non-INTECH trained teachers using a survey tool developed and validated by the University of West Georgia. The elements included use of student-centered learning, utilization of a variety of technology skills, teaching pedagogy, and attitudes toward technology use in the classroom. Using the *Statistical Package for Social Sciences (SPSS)* software program, Multivariate Analysis of Variance (MANOVA) was used to address five hypotheses: 1) There is no statistically significant difference between INTECH and non-INTECH trained teachers with respect to student-centered learning, utilization of a variety of technology skills, teaching

pedagogy, and attitudes toward technology use in the classroom; 2) There is no statistically significant difference between INTECH and non-INTECH trained teachers with respect to utilization of a variety of technology skills; 3) There is no statistically significant difference between INTECH and non-INTECH trained teachers with respect to teaching pedagogy; 4) There is no statistically significant difference between INTECH and non-INTECH trained teachers with the respect to teaching pedagogy; and 5) There is no statistically significant difference between INTECH and non-INTECH trained teachers with respect to their attitudes toward technology classroom use.

The results of Di Benedetto's study (2005) indicated statistically significant differences in the areas of teaching pedagogy and attitudes toward technology use in the classroom. INTECH trained teachers reported a significant difference from non-INTECH trained teachers in regard to teaching pedagogy. Di Benedetto (2005) reported a need to expand technology professional development to focus more on technology integration strategies in the curriculum, as with Louisiana INTECH. There is a need to move away from technology proficiencies, often utilized in some technology professional development sessions, and continue to expand technology professional development to include integration strategies and constructivism (Di Benedetto, 2005; McCannon & Crews, 2000).

There was no statistically significant difference in student-centered learning and teacher utilization of a variety of technology skills. However, DiBenedetto (2005) suggested future studies should have more balanced participant samples, as only 28 % of the non-INTECH trained teachers actually completed the surveys as compared to 56 % of the INTECH trained teachers. Also, there was no mention of administrators' perception of Louisiana INTECH professional

development as either an impetus for change or with regard to its potential impact on student achievement.

Technology and Student Achievement in Mathematics

When investigating the best mathematics practices to reach all students, options range from traditional to constructivist approaches. The traditional and constructivist styles are on opposite ends of the continuum, but each is implemented throughout the United States. Recent math reforms such as the Connected Mathematics Project at Michigan State, The Adventures of Jasper Woodbury problem-solving videodisks developed by the Cognition and Technology Group at Vanderbilt University, the University of Illinois at Chicago's Maneuvers With Mathematics initiatives, and Mathematics in Context at the University of Wisconsin tend to support constructivist practices (Crawford & Snider, 2000; Edwards, 1994).

According to Cauthen (2003), math reforms recommended by the National Council for Teachers of Mathematics (NCTM) are grounded in constructivist theory of learning so that teachers are expected to facilitate students' progress in making connections to the real world. Students are encouraged to work in small and whole group settings using inquiry techniques to engage in problem-solving rather than in rote practice (Cauthen, 2003; Pippenger, 2003). Furthermore, a research study in Pittsburgh, Pennsylvania examined the *ITBS* scores of fourth graders who participated in a reform mathematics model for five years for effects on student achievement (Briars & Resnick, 2000). The results indicated much higher math student achievement gains for the students who participated in the reform model than those who had not been exposed to the constructivist, NCTM-endorsed program (Briars & Resnick, 2000).

Strategies recommended by NCTM appear to clearly endorse technology applications that support constructivist theory and offer problem-solving in small group settings (NCTM,

2000). One strategy recommended is the use of problem-solving and small group techniques enhanced through the use of calculators and technology (NCTM, 2000). Furthermore, numerous studies indicate that students who learn with calculators and technology perform at the same or better rates than those who use only paper and pencil techniques (Cauthen, 2003; Dion, Harvey, Jackson, Klay, Jinghua, & Wright, 2001; Heid, 1988; Pippenger, 2003).

Also, in a three year study of elementary students conducted by Kloosterman, Raymond and Emenaker (1996), the researchers found that teacher messages about mathematics, whether positive or negative, impact students' beliefs about mathematics. Quantitative studies from the 1970s by Adrian (1978), Clark (1978), Cole (1974), Gordan (1978), Graham (1974), Rubin (1978) and Zeitz (1976) indicate a correlation between self-confidence and achievement in math (Reyes, 1984). According to Kloosterman and Cougan's (1994) study of student motivation and mathematics, high achievers had moderate to high confidence and low achievers had, at most, a moderate confidence in mathematics. The conclusions from Kloosterman and Cougan (1994) represent ideas for thought about what type of pedagogical techniques and professional development maximize student success in mathematics.

Further investigation of the literature regarding pedagogical techniques and professional development in math revealed a report entitled, The Glenn Commission Report (2000). The purpose was to establish goals to improve the quality of math and science. One goal focuses specifically on professional development for teachers and is based upon the belief that professional development in mathematics improves student achievement especially in inquiry groups where teachers share ideas, engage in study, learn more about technology, and design lessons that focus on rich content (Glenn Commission, 2000).

Another research study by Sciulli (2004) conducted on science and math integration strategies were based on the belief that professional development for teachers can be structured to deliver a philosophy. The professional development experience lays the foundation for changed pedagogical techniques which changes teacher beliefs about practice; thus improving achievement. The results of the causal-comparative study indicated two key results: 1) Teacher instructional knowledge of inquiry and supporting math strategies, positively impact learning in the classroom specially when the curriculum materials are units or modules, focusing on a different content and technology; and 2) Professional development, a process by which school systems prepare teachers to use the curriculum and to advance their pedagogical experiences, must be on-going and in-depth (Sciulli, 2004).

Finally, the results of a quantitative research study by Peterson and Fennema (1985) indicate classroom mathematics activities, when engaging, improve student achievement. The researchers go on to say that boys and girls should have equity in mathematics learning (Peterson & Fennema, 1985). Interest in mathematics and motivation greatly impacts student achievement; thus teacher knowledge, skills, and instructional practices are crucial to student success (Schiefele & Csikszentmihalyi, 1995).

Technology and Student Achievement in Literacy

Most research investigating technology and student achievement in literacy focuses on the impact of technology on improving reading in the early years. Several studies report student gains in early reading through improved comprehension and motivation with digital storybooks. One study conducted by Matthew (1997) compared a group of third grade students reading printed storybooks with a group interacting with a CD-ROM. Results indicated greater comprehension and motivation with the CD-ROM group (Matthew, 1997). A similar comparison

study of electronic books versus printed storybooks by Doty, Popplewell, and Byers (2001), confirmed Matthew's findings. Additionally, Dutch immigrant kindergarteners showed significant vocabulary increase when youngsters were trained to manipulate the story and vocabulary component with an instant decoding feedback feature in literacy software (Labbo, 1996).

Although electronic storybooks are very common practice in classrooms, teachers of young children also use software and websites to support literacy. Additionally, KidPix and Microsoft PowerPoint are two software packages that assist students with decoding skills. A variety of websites such as *Enchanted Learning* and PBS Kids & Sesame Street's *Letter of the Day* support instructional literacy in the classroom. These technology strategies that encompass internet activities, internet projects, internet inquiries, and internet workshops lead to effective literacy instruction and increased reading comprehension (Leu, 2002).

The national standards for English Language Arts states, "….being literate in contemporary society means being active, critical, and creative users of print and spoken language…It also means being able to use an array of technologies to gather information and communicate with others" (National Council of Teachers of English/International Reading Association, 1996, p.2). Technology supports writing instruction with software packages such as Inspiration and Microsoft Office in project-based, constructivist approaches. Also, using the "tracking changes" feature in word processors to collaborate, Blogs for journaling, games, word searches, Keypals, webquests and inquiry web pages, and Interactive Whiteboards provide engaging activities that further higher order thinking and advance writing skills (Ferdig & Trammell, 2004). Creating Venn diagrams with software such as Inspiration or utilizing another technology tool for prewriting, enables students to demonstrate better organizational writing

skills (Goldberg, Russell, & Cook, 2003). Additionally, Goldberg, Russell, & Cook (2003) recommend implementing technology strategies to showcase writing and share with authentic audiences. Furthermore, in a study where students each utilized a laptop in a classroom one-to-one initiative, reading and writing skills improved when students were highly engaged in projects utilizing constructivist strategies aimed at improving literacy (Gulek & Demirtas, 2004). Moreover, students with disabilities particularly demonstrated higher achievement gains when technology strategies were implemented with writing (Gulek & Demirtas, 2004).

The National Research Center on English Learning and Achievement at the University in Albany, New York developed non-print media and technology literacy standards for k-12 teaching and learning (Swan, 1999). The standards endorse the use of video and audio in computer simulations and exploratory environments to support teaching and learning in diverse environments with varied student populations (Swan, 1999). Furthermore, digital technology strategies support reading and writing by providing technology access to images, audio, online communication, and other media for differentiated instruction. For example the *Technology-Enhanced Literacy Environment-Web* project was developed as a literacy program for students to meet the needs of struggling readers (Zhao, Englert, Jones, Chen, & Ferdig, 2000). Moreover, discussion forums, online journals, and audio and video recorders provide students opportunities to learn in a differentiated, multi-sensory environment; thus meeting individual literacy needs (Tomlinson, 2000). Additionally, results from a comparison study of interactive online and classroom-based technology enhanced methodologies indicated improved reading and writing skills of middle schoolers (Perez-Prado & Thirunaravanan, 2002).

In a recent meta-analysis study published by Learning Point Associates in 2005, the data indicate increased use of digital tools and new forms of media technology improves student

performance in middle school literacy (Pearson, Ferdig, Blomeyer, & Moran, 2005). The research specifically examined reading strategy use, metacognition, motivation, engagement, and comprehension with a wide range of digital technologies such as images, video and audio clips, hypertext, hypermedia, and web pages. The study clearly indicated improved reading performance in middle school grades six through eight (Pearson, Ferdig, Blomeyer, & Moran, 2005).

Technology, Professional Development and Student Achievement

Recent data indicate technology can improve education under certain conditions (Kulik, 2002; Waxman, Connell, & Gray, 2002). Technology implemented with high instructional expectations and clear learning objectives incorporating higher order skills contributes to greater student achievement and support for school change (Coppola, E.M., 2004; Kulik, 2003; Mann et all, 1999). Supporters of educational technology believe it makes a difference in academic performance. Lipscomb (2003) recorded anecdotal data that indicate technology enhances student learning in social studies. When he interviewed exemplary teachers, technology integration strategies appeared to improve student motivation and provide avenues for addressing different learning styles (Lipscomb, 2003).

High quality professional development, including technology professional development, should be based on evidence of student achievement and more closely connected to classroom practice (Hawley & Valli, 1999; NCTM, 2000). Standards-based instruction demands teachers instruct using higher-order thinking skills to solve complex problems in situations similar to real classroom experiences (NRC, 2000). Furthermore, with accountability expectations, it is more important than ever that every child be given the opportunity to learn at high levels. One example of a long term professional development and technology initiative aimed at improving

student achievement was implemented in West Virginia. During the eight-year program, West Virginia teachers were provided technology along with staff development aligned with state curriculum goals and objectives. The staff development contributed to student achievement gains, with 11% of student gains being attributable to the technology initiative. In their study of technology use in reading and mathematics, they found a significant difference in student learning between students whose teachers were strong technology users and students whose teachers used technology poorly or not at all. (Mann, Shakeshaft, Becker, & Kottkamp, 1998; Middleton & Murray,1999). Kulik (2003) concluded that professional development for teachers causes them to use classroom technology more effectively.

Student learning increases when teachers are well-trained in technology integration strategies and technology is embedded in the schools' daily routines (Adams, 2004; Fisk, B. & Sloan, K. 2004). In a report reviewing eleven controlled evaluations of technology application of Integrated Learning Systems (ILS) in elementary and secondary schools, Kulik (2003) found ILS to be most effective when the ILS software supported what the teacher was presenting in the classroom and when students had ample time to work through the lessons presented. Use of technology in the classroom, rather than in labs separated from the classroom, yields superior results in a study conducted by West Virginia where schools had the option of placing computers in classrooms or in lab settings (Mann, Shakeshaft, Becker, & Kottkamp, 1999). Researchers followed students from first to sixth grade and consistently there was an 11% gain on statewide tests. Teacher-led, standards-based lessons were more effective in promoting student learning than lessons delivered by computer alone (Mann, Shakeshaft, Becker, & Kottkamp, 1999). A similar research study by Weglinsky (1998) indicated eighth grade mathematics students whose teachers used technology for drill and practice scored lower on the *National Assessment of*

Educational Progress (NAEP) than students who were taught by teachers who implemented higher-order uses of computers.

Pogrow (2005), creator of Higher-Order Thinking Skills (HOTS), says HOTS combined with the use of technology and Socratic teaching strategies heightens student interest and allows students opportunities to test their ideas. When teachers receive intensive training in HOTS, curriculum content, and technology-integration, student achievement improves. (Klieman, 2004; Pogrow, 2005). Further research indicates that computer technology can help support learning and is especially useful in developing the higher-order skills of critical thinking, analysis, and scientific inquiry "by engaging students in authentic, complex tasks within collaborative learning contexts" (Roschelle, Pea, Hoadley, Gordin & Means, 2000).

As teachers learn new teaching strategies to improve student achievement, they need ongoing support. Soloman (2002) contends that leaders should have a clear vision about how technology can make a difference in student learning and provide ongoing, broad-based support. Lilly (2004) examined student and teacher technology survey data in Tennessee student achievement in third, fifth and eight grades on both criterion and norm-referenced tests. The results indicated little correlation. However, in Lilly's discussion, he suggests administrators must provide support and vision for using technology integration strategies that focus on higher-order thinking and problem solving. This is a consistent finding with Pogrow (2005), Klieman (2004), and Soloman (2002).

Waxman and Huang (1996) found instruction in classrooms where technology was not often used tended to be whole group approaches as compared to classrooms where technology was moderately used (more than 20 % of the time) which had less whole-group instruction and more independent work. Student-teacher interactions were more student-centered and

individualized in classrooms where technology was implemented. More time on task was noted in classrooms utilizing technology. This supports the research findings in mathematics (Cauthen, 2003; Pippenger, 2003).

In Union City, New Jersey, Project Explore combined classroom technology integration, teacher professional development, and student access to computers both at school and at home. School leadership was supportive, school improvement plans included technology, student creativity was valued, and multiple entry points into assignments were encouraged for students of varying ability. As a result of these combined efforts, student performance improved on standardized tests of reading and mathematics (Honey, 1999).

The use of digital video clips to enhance instruction increases student achievement (Boster, Meyer, Roberto, & Inge, 2002; Boster, Meyer, Roberto, Lindsey, Smith, Strom, & Inge, 2004). Two experimental studies, one in Virginia (Boster, 2002) and the other in California (Boster, 2004), examined the impact of UnitedStreaming video segments which aligned with standards in science, social studies, and math. The pre- and post- assessments examined third and eighth graders' knowledge of standards related to specific content. The results indicated the experimental group gained as much as 12.6% when compared to the control group in several areas.

Wenglinsky (1998) investigated the relationship between educational technology and student achievement in mathematics. He used data from the 1996 *NAEP* for fourth and eighth grade students. He found that computers did increase student achievement in mathematics, especially when used by teachers trained in the use of the equipment and software and when the software taught higher-order concepts.

Integration of technology with curriculum and professional development increases student achievement. In an eight-year longitudinal study of *SAT I* performance at New Hampshire's Brewster Academy, students participating in the technology integrated school reform effort demonstrated average increases of 94 points in combined *SAT I* performance over students who participated in traditional school experiences (Bain & Ross, 2000). Brewster's school reform effort was a pioneering laptop school where students and faculty carried portable computers and accessed a campus network. The reform initiative focused on "rethinking the way we teach, how we build curriculum and the way we support and evaluate faculty" (Bain & Smith, 2000).

Summary

A review of the literature indicates technology integration, with sound pedagogy, improves student achievement and student performance growth is often based on the classroom teacher's skills, knowledge, and linkage to curriculum. Professional development, grounded in andragogy, enables teachers to experience learning and gain important research-based strategies that lead to positive instructional practices in the classroom. Constructivist theory, endorsed by researchers in technology, mathematics, and literacy, appears to positively impact technology integration and student achievement.

With current accountability expectations, technology professional development must be high quality and warrant the time and funding for implementation. An examination of research studies revealed both the Georgia Framework for Technology Integration model and the Louisiana INTECH model improve the use of technology in the classroom (Bennett, 2004; Di Benedetto, 2005; Sheumaker, Slate, & Onwuegbuzie, 2001; Redish, 1997), but there is no

quantitative data to indicate administrators' perceptions of Louisiana INTECH as an impetus for change or how the technology professional development model impacts student achievement.

According to the change model developed by Guskey (1986), there are three major outcomes of professional development: a) change in the practice of classroom teachers, b) change in beliefs and attitudes, and c) change in student learning outcomes (Guskey, 1986). There is evidence the Louisiana INTECH model changes technology integration practice, beliefs, and attitudes. However, in a time when instructional strategies, tools and resources must be aligned to meet state and local accountability expectations, there is a need to examine technology integration professional development and student performance as it relates to the Louisiana INTECH model.

This study examined administrators' perceptions of change to gain insight into the Louisiana INTECH professional development model as an impetus for school change. Additionally, an ex-post facto, causal-comparative, quantitative research design component was employed to determine if there was a significant difference in sixth and seventh grade student mathematics, reading, and ELA achievement of Louisiana INTECH and non-Louisiana INTECH certified teachers as evidenced by performance on the *ITBS*.

Chapter Three: Methodology

Introduction

This chapter describes the approach used to gather survey data regarding Calcasieu Parish School System (CPSS) middle school principals' perceptions of Louisiana INTECH as an impetus for change in the schools. Additionally, this section explains the methodology and procedures employed to compare the mathematics, reading, and language achievement gains of CPSB sixth and seventh grade students in Louisiana INTECH teacher classrooms to their peers in non-Louisiana INTECH teacher classrooms. Furthermore, the population from which the teacher and student samples were drawn and the characteristics of the sampling method are described. A brief description of the survey and test instrument is given to provide a better understanding of the techniques, measurements and data used in this study. Moreover, data gathering procedures are discussed. Finally, the statistical procedures for survey reporting, data analysis and appropriateness to this study are examined.

Research Design

Applied educational research is conducted to gain greater understanding about current educational questions, issues, or topics (Gay & Airasian, 2003). Quantitative research studies employ quantitative data which are numeric in nature, whereas qualitative data are nonnumeric. Quantitative research methods utilize quantitative data in order to study and compare sources of variation and to make decisions and draw inferences from empirical observations. Many times the focus of quantitative methods is on average or group effects (Rudestam & Newton, 2001). Quantitative methods were appropriate for this study because numeric data, survey results and

the *ITBS* mathematics, reading, and language total Standard Scores, were collected and analyzed. Then statistics were employed to analyze the data.

Generally, statistics have two purposes. The first is to utilize descriptive statistics to describe data. The second is to employ inferential statistics to draw inferences from the data (Leedy & Ormrod, 2005). More particularly, descriptive statistics are used to describe the data results by providing summaries about the sample and measures. Contrastingly, inferential statistics, are used to make decisions about the data such as determining the difference between two groups. (Gay & Airasian, 2003). Both types of statistics serve as a vital part of the analyses used in this study.

The research questions of interest in this study were as follows:

1) Do middle school principals perceive Louisiana INTECH professional development as an impetus for change in the school?

2) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade mathematics on the *Iowa Test of Basic Skills*?

3) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade reading on the *Iowa Test of Basic Skills*?

4) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade language on the *Iowa Test of Basic Skills*?

Through examination of the questions, quantitative data were collected, reported, and analyzed. To explore question one related to principals' perceptions and change, a total of 52

middle school administrators (15 principals and 37 assistant principals) responded to an 18-item survey validated by Klecker and Loadman (1999) in a study entitled, *Measuring Principals' Openness to Change on Three Dimensions: Affective, Cognitive and Behavioral.* The survey results were reported as frequency descriptive statistics. Furthermore, inferential statistics, one-way *ANOVA* (with appropriate post hoc tests) and Pearson's *r* correlation, were used to provide information relative to how CPSS middle school administrators perceive the Louisiana INTECH professional development program as an impetus for change according to three factors: affective, cognitive, and behavioral change. A Cronbach's alpha of .915 indicated the survey was reliable and a Pearson's *r* correlation found high correlation between the subscales.

Research questions two through four were explored via examination of test score data using descriptive and inferential statistics. Descriptive statistics were used to explain the mean and standard deviation for each variable related to the students in INTECH and non-INTECH trained teacher groups. Also, descriptive statistics were used to report the mean and standard deviation of each student group relative to growth from 2004 to 2005 in mathematics, reading, and language. Independent samples *t*-tests were used to verify equality of the INTECH and non-INTECH groups. A crosstabulation test was utilized to show similarities and differences between the teacher years of experience within the INTECH and non-INTECH student groups.

There are several types of quantitative studies that can be either experimental or quasi-experimental designs. In a true experimental design, the sample is obtained randomly, or any experimental treatments are randomly assigned to the experimental unit. A quasi-experimental design is employed when random sampling or random assignment of treatments is not possible (Rudestam & Newton, 2001). The research design for this study was quasi-experimental because the students had already been assigned to classrooms, not randomly assigned to teacher

respondents. Additionally, the treatment (Louisiana INTECH professional development) was not randomly assigned. All the Louisiana INTECH trained teachers in sixth and seventh grade mathematics, reading/English language arts classrooms that were trained during the timeframe from June 2000 to June 2003 were included in the sample. Each teacher participated in seven days of professional development experiencing the same the content, format, and similar instructor experience. Students from the following numbers of INTECH and non-INTECH teachers were identified as participants in the study:

Table 1

Number of INTECH and Non-INTECH Teacher Participants per Content Area

	INTECH			Non-INTECH		
	6th Grade	7th Grade	Total	6th Grade	7th Grade	Total
Mathematics	4	4	8	4	4	8
Reading & ELA	4	6	10	4	6	10
Total	8	10	18	8	10	18

The study utilized an ex-post facto design since the test data were examined after the fact. Also, the Louisiana INTECH certified teachers selected for the study had already participated in the Louisiana INTECH professional development program. Furthermore, the student pretest data were drawn from fifth and sixth grade middle school student *ITBS* mathematics, reading, and language total Standard Scores from spring 2004 data. The posttest data were drawn from sixth and seventh grade middle school student *ITBS* mathematics, reading, and language total Standard Scores from the spring 2005 testing period. Only student test scores with both a pretest and posttest scores were used in the study.

Whether a quantitative study is an experimental or quasi-experimental design, independent and dependent variables guide the basis for the hypotheses. For this quasi-experimental research study, the independent variables were administrators' perceptions of change and Louisiana INTECH professional development. The dependent variable was student achievement growth on mathematics, reading, and language total Standard Scores. The following hypotheses guided the study:

Six research hypotheses guided investigations related to two components of the research study. The subheadings, Affective Reactions to Change, Cognitive Reactions to Change, and Behavioral Reactions to Change, denote the hypotheses associated administrators' perceptions of Louisiana INTECH as an impetus for change. The hypotheses affiliated with student achievement and Louisiana INTECH are listed with the subheadings, Mathematics Student Achievement, Reading Student Achievement, and Language Student Achievement.

Hypothesis 1: Affective Reactions to Change

Middle school administrators enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school.

Hypothesis 2: Cognitive Reactions to Change

Middle school administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff.

Hypothesis 3: Behavioral Reactions to Change

Middle school administrators take actions to support or initiate changes related to the Louisiana INTECH professional development.

Hypothesis 4: Mathematics Student Achievement

Students of Louisiana INTECH certified teachers exhibit higher mathematics student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{14}: $\mu_1 - \mu_2 > 0$).

Hypothesis 5: Reading Student Achievement

Students of Louisiana INTECH certified teachers exhibit higher reading student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{15}: $\mu_1 - \mu_2 > 0$).

Hypothesis 6: Language Student Achievement

Students of Louisiana INTECH certified teachers exhibit higher language student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{16}: $\mu_1 - \mu_2 > 0$).

Many experimental or quasi-experimental designs are treatment/control group designs which allow for causal relationships to be explored. A causal comparative model provides a way of comparing a treatment group to a control group and thereby examining a causal relationship between groups or determining a causal effect of a treatment (Leedy & Ormrod, 2005). This ex post facto, causal-comparative research model, attempts to identify a causative relationship between Louisiana INTECH professional development and student mathematics, reading, and language achievement, the dependent variables. In this study, the relationship between the variables could only be linked, not established, because the researcher could not control or manipulate the independent variable (Gay, Mills, & Airasian, 2006; Leedy & Ormrod, 2005).

The teachers in the sample were already Louisiana INTECH certified and the student test score data were from previous years. Student achievement gain on the *Iowa Test of Basic Skills*

mathematics, reading, and language total Standard Scores were calculated by using a pretest (5th grade 2004 & 6th grade 2004) and posttest (6th grade 2005 & 7th grade 2005). Due to these parameters, the design was quasi-experimental, and there could only be an attempt to establish a relationship between the variables.

Site

The research data for this study were derived from school administrators, teachers, and students in the CPSS middle school settings. The CPSS is the sixth largest school district in Louisiana and encompasses all of Calcasieu Parish which is located in southwest Louisiana. The school system extends a total of 1,094.5 square miles from the Texas boarder east to Iowa, Louisiana, north to DeQuincy, Louisiana, and South to the Cameron Parish line.

The major urban and suburban cities of Calcasieu Parish are Lake Charles and Sulphur, which are centrally located in the parish. There are five additional rural, farming communities situated on the parish peripheries. The population of Calcasieu Parish is approximately 185,000 with nearly 80,000 residents living in the city of Lake Charles (Kurth & Burchkel, 2007). The primary economic base has been petrochemicals and refining, the Port of Lake Charles, casino gambling, and aviation, but the community is attempting to diversify to meet the current employment concerns (Kurth & Burchkel, 2007).

The current employment concerns of the area are reflected in a recent report by the Southwest Louisiana Economic Development Alliance. The Southwest Louisiana Economic Development Alliance data indicate a surplus of accessible workforce for administrative positions and mid-level jobs, but there is a lack of available workers for skilled and industrial positions affiliated with the oil, gas, petrochemical and construction industries (Kurth & Burchkel, 2007). To address these issues, there are plans for the Southwest Louisiana Alliance to

work with educational leaders in higher education and the CPSS to ensure educational programs meet future workforce needs for all students in prekindergarten through grade sixteen (Southwest Louisiana Economic Development Alliance, 2007).

The CPSS is the largest employer in Calcasieu Parish with 5,100 full and part-time employees. There are 2,858 teachers employed in the system with 85.8% of the population represented by females and 14.2% males (CPSS, 2007a). The classroom instructors' ethnic demographics reflect the following: .06% Asian, 12.94% Black, .27% Hispanic, .03% Indian, and 86.7% White (CPSS, 2007a). The total number of school-based administrators, principals and assistant principals, are 142 with 54% represented by females and 48% represented by males (CPSS, 2007a). Furthermore, the ethnic makeup is characterized by 23.9% Black and 76.1% White (CPSS, 2007a).

The CPSS is comprised of 59 school sites represented by kindergarten through grade 12 enrollments of approximately 33,000 students. There are 32 elementary schools with grades prekindergarten through fifth grade and 13 middle schools servicing grades six through eight. Two schools in the CPSS educate prekindergarten through eighth grade. The high schools are comprised of 13 sites and one alternative school. Of the 13 locations, 11 schools service ninth through twelfth grades and two schools educate kindergarten through grade 12. The student demographic composition is 33.5% black, 65.2% white, and 1.3% represent other ethnicities. All schools are accredited by the Southern Association of Colleges and Schools Council on Accreditation and School Improvement (SACS CASI).

Participants

The population of interest in the study consisted of a total of 52 middle school administrators of which 15 were school principals and 37 were assistant principals. Of the school principals, 34% were female and 66% were male. With regard to the assistant principal make-up, 47% were female and 54% were male. Additionally, 18 Louisiana INTECH certified teachers and 18 non-INTECH certified teachers of sixth and seventh grade mathematics and/or reading/ELA, with the 2,292 students the teachers taught during the 2004-2005 school year were included as participants in this study. All available sixth and seventh grade Louisiana INTECH trained middle school teachers who taught mathematics, reading, and/or ELA during the 2004-2005 school year were included in the study.

The teacher sample was selected from the total middle school teacher population by first gathering a list of sixth and seventh grade INTECH certified teachers in mathematics and/or reading/ELA in 2004-2005 from the CPSS Curriculum and Technology Departments. Then the list was given to the CPSS Management Information Services Department (MIS). The MIS Department worked with the CPSS Personnel and Testing Departments to provide an anonymous matched group of teachers and an anonymous list of the students the teachers taught during the 2004-2005 school year for the study. Efforts were made by the MIS and Testing Departments to ensure the data sample was reflective of the CPSS demographics and the INTECH and non-INTECH groups were appropriately matched to the following variables: years of teaching experience, educational attainment, and similar school mean achievement as defined by the School Performance Score (SPS) baseline in 2004. The purpose of the matching was to control for bias and extraneous variables in teachers.

All CPSS sixth and seventh grade mathematics, reading, and/or ELA teachers received three days of basic technology integration professional development through the Classroom-Based Technology Program often referred to as the CBT Project. The teachers attended the CBT professional development training session in 2002-2003 or 2003-2004 and received a new computer, printer and software for instructional use. Although the student data was anonymous, efforts were made by the MIS and testing departments to ensure the student data sample included both males and females of various ages, ethnic backgrounds, and academic ability reflective of the total student population demographics in the CPSS. The target population to which this study was meant to generalize was the students of CPSS teachers who completed Louisiana INTECH.

Based upon a power of analysis used in this study, approximately 400 students were needed per group to determine a small effect size at a power level of .80 with an α (alpha) equal to .05 on the independent, one-tailed *t*-test (Rudestam & Newton, 2001). Every effort was made to obtain a sample size as large as possible in order to reduce the likelihood of failing to reject the null hypothesis when it is false. A total of 2,292 students' *ITBS* mathematics, reading, and language total Standard Scores were used in the study. A minimum of 485 student scores to a maximum of 698 student scores were utilized in the mathematics, reading, and language INTECH and non-INTECH groups. A total of 1,109 student Standard Scores were represented in the non-INTECH group and a total of 1183 student Standard Scores were utilized in the INTECH group. Table 2 reflects the number of students that were included in each INTECH and non-INTECH group.

Table 2

Number of Students in INTECH and Non-INTECH Groups

	INTECH n	Non-INTECH n
Math	698	601
Reading	485	507
Language	485	507

Instrumentation

Two instruments were used in this research study. One was used to investigate principals' perceptions of Louisiana INTECH as an impetus for change and the other to examine student achievement. The first, a survey entitled *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham et al., 1989; Klecker & Loadman,1999) was administered to 52 Calcasieu Parish School Board middle school administrators (15 principals and 37 assistant principals) of sixth and seventh grade Louisiana INTECH certified teachers of mathematics and reading/ELA . The second instrument, the *ITBS* (Hoover & Dunbar, 2003), provided student test score data for examination of student achievement growth in mathematics, reading, and language.

Survey research frequently uses questionnaires to learn about people's behaviors, characteristics, attitudes, and opinions (Leedy & Ormrod, 2005). A checklist or rating scale is often used to quantify behaviors or perceptions of a topic. Checklists allow the participant to simply check whether each behavior or perception is present or true. A rating scale is suitable when a behavior, attitude, or other phenomenon of interest is to be evaluated on a continuum (Leedy & Ormrod, 2005). The survey utilized in this research was a Likert-type rating scale

whereby the responder answered questions in a range from one to four with one equaling strongly disagree and four equaling strongly agree.

The survey instrument in this study was first obtained, with the authors' permission (See Appendix A), from a research study conducted by Klecker and Loadman (1999). Then the author of this study collaborated with Sheryl Abshire (2007) to create the *Perceptions of Louisiana INTECH Professional Development Survey* which was given to the middle school administrator population involved in this research. Abshire (2007) utilized the same survey to gather data from elementary principals. The title of the survey, which was adapted for this research study, was entitled *Measuring Principals' Openness to Change on Three Dimensions: Affective, Cognitive and Behavioral* (Klecker & Loadman, 1999). The context of the Klecker and Loadman's study was 307 schools funded by Ohio's legislature to implement self-designed restructuring plans. The researchers measured principals' openness to change on three dimensions: 1) affective, 2) cognitive, and 3) behavioral. Klecker and Loadman (1999) used the survey items developed by Dunham, Grube, Cummings and Pierce (1989) from an 18-item *Change in Organizational Culture* instrument and a scenario describing changes in school culture located in the literature (Huang, 1993). The modifications the author and Abshire (2007) made to the *Perceptions of Louisiana INTECH Professional Development Survey* included two adjustments. First, the number of response choices were reduced from five to four by eliminating a category, neither disagree nor agree, to force the respondents to answer with one of the following responses: 1 = strongly disagree, 2 = disagree, 3 = agree, or 4 = strongly agree. Second, the scenario created by Huang (1993) was replaced with an overview of the Louisiana INTECH professional development model. The survey was reviewed by colleagues to determine whether the questions and overview scenario were understandable. The format was edited to place the items in a larger

font, but no content changes were made to the items or the overview. The Klecker and Loadman (1999) survey item content was utilized in the final survey format.

Klecker and Loadman's (1999) definition of attitude, the same used for this study, was derived from Dunham, et al. (1989). Dunham, et al (1989) defined attitude toward change as, "Attitude toward change in general consists of a person's cognitions about change, affective reactions to change, and behavioral tendency toward change. Attitude toward a specific change consists of a person's cognitions about that change, affective reactions to that change and behavioral tendency toward that change (Dunham, et al, 1989, p. 11)." Three subscales with six items were developed as analyses of the data collected by Dunham. The Cronbach's coefficient alpha reliabilities for the subscales ranged from .82 to .92 (Klecker & Loadman, 1999). The Cronbach's alpha range was in the acceptable range. Moreover, Huang (1993) conducted a pilot to validate the scenario and survey items, used in the Klecker and Loadman study, which resulted with the following: "The item discriminative index, obtained from subtracting the mean from of the high score group (33%) to that of the low score group (33%) of each item, ranged from .89 to 2.78, indicating that each of the items had a positive function in distinguishing different attitude responses" (Huang, 1993, p. 62). Furthermore, the pilot study "yielded an internal consistency of coefficient of .88 for the cognitive scale, .78 for the affective scale, .86 for the behavioral scale, and .92 for the total scale" (Huang, 1993, p. 62). Thus, the survey items and subscales validated in Klecker and Loadman study were used in this research study.

The *Iowa Tests of Basic Skills* are norm-referenced achievement tests originally developed by the University of Iowa, College of Education and published by Riverside Publishing of Itasca, Illinois. The *ITBS* are nationally recognized as a reliable and valid battery of norm-referenced achievement tests. The reliability coefficient is between .00 and .99, and

generally for standardized test the range is between .60 and .95 using an internal-consistency Kuder-Richardson Formula 20 (Hoover, Dunbar, & Frisbie, 2003). Moreover, the fifth through seventh grade *ITBS* battery has a mean Kuder-Richardson Formula 20 score range of .93 to .94 for mathematics, .95 to .96 for reading, and .93 to .96 for language (Hoover, Dunbar, & Frisbie, 2003). These score falls within the excellent range (Data Recognition Corporation, 2003). The validity of a test must be judged in relation to the purpose for using the test (Rudestam & Newton, 2001). Procedures for developing and revising test materials along with interpretive information were all part of determining the validity of the *ITBS.* The *ITBS* have been constantly revised for over sixty years by researchers and professionals with expertise from numerous educational content areas (Hoover, Dunbar, & Frisbie, 2003). Additionally, numerous pilots were conducted to ensure the items were constructed to correlate with nationally accepted instructional goals (Hoover, Dunbar, & Frisbie, 2003). Furthermore, the test guides prescribed specified testing conditions with scripted directions to assure the tests were administered similarly with each group. Additionally, the authors recommend that school systems carefully examine the results to be certain the tests are interpreted appropriately (Hoover, Dunbar, & Frisbie, 2003).

Scores derived from the standardization program were the norms that permitted the test user to compare student performance with that of a larger representative group. Thus, the norms provided a method for comparing the achievement of specific groups of students in the same grade. Norms also offered a vehicle for comparing the performance of individual students with the performance of students in the national norm group (Louisiana LEAP, 2005).

The *ITBS* authors consider basic skills to be the entire range of skills a student needs to progress satisfactorily through school. This includes higher-order thinking skills, interpretation, classification, comparison, analysis, and inference (Hoover, Hieronymous, Frisbie, & Dunbar,

1996). The average standard score for the fifth grade is 214, with an expected gain of 13 points for the sixth grade average of 227, while there is an expected gain of 12 for the seventh grade average standard score of 239 (Riverside Publishing, 2003).

The mathematics battery includes two tests, Math Concepts/Estimation and Math Problem Solving/Data Interpretation. There are 46 items on the seventh grade Math Concepts/Estimation test and 43 on the comparable sixth grade exam. Each test assesses the student's ability to understand number properties and operations, algebra, probability and statistics, and geometry (LDE, 2005). The Math Problem Solving/Data Interpretation test consists of 30 items on the seventh grade exam and 28 on the sixth grade test (LDE, 2005). Most tasks on the *ITBS* require some amount of critical thinking. Critical thinking is defined as completing tasks which involve analysis, problem solving, or judgment. The use of critical thinking varies from task to task and from person to person depending upon how the individual selects to complete items (LDE, 2005).

The *ITBS* total reading Standard Score is composed of two parts. One part is the vocabulary test whereby words are presented in the context of a short phrase or sentence with 37 to 42 items on various level tests (University of Iowa, 2006). Students must select an answer that best represents the same meaning of the word. Nouns, verbs and modifiers are tested and the target words represent general vocabulary. Few specialized vocabulary items from various subject-matter areas are represented (LDE, 2005). The second test is the reading comprehension portion. It is administered in two parts and consists of passages that vary in length from a few lines to a full page. Various types of passages included are fiction, fables, tales, poetry, interviews, diaries, biographical sketches, science and social studies materials, and other nonfiction. Passages frequently contain excerpts from published works. Approximately two-

thirds of the questions require students to draw inferences or make generalizations and range in number of items from 45 to 52 (LDE, 2005).

The *ITBS* total language Standard Score is comprised of four tests. Levels 11 through 13 Language tests for grades 5 through 7 assess spelling, capitalization, punctuation, and usage and expression with a range in number of items from 28 to 43 on specified level tests (LDE, 2005). Each of the formats is similar in that the test format requires students to select which of four items might be incorrect with a fifth option for, *No mistakes* (University of Iowa, 2006). The spelling test requires students to identify errors such as common substitutions, reversals, omissions, or unnecessary additions (University of Iowa, 2006). In the capitalization test, students are presented brief written contexts with a line of text containing an error (University of Iowa, 2006). The punctuation test focuses on varying uses of punctuation such as terminal punctuation, commas, apostrophes, colons, and semicolons in written text (University of Iowa, 2006). The final test, usage and expression, contains one or two sentences whereby students must make selects relative to conciseness, clarity, appropriateness of expression, and the organization of sentence and paragraph elements (University of Iowa, 2006).

The Louisiana Educational Assessment Program (LEAP) used *ITBS* to measure student performance in grades three, five, six, and seven 1998-2005. These tests were used to compute School Performance Scores (SPS) and were the foundation for the Louisiana school accountability program. The SPS is an index developed by the state of Louisiana to report total school growth. To ensure the School Performance Scores were reliable as possible, guidelines were developed. The current guidelines include the following: 1) The use of an index rather than pass/fail is implemented; 2) The use of tests at every grade between 3 and 11 are included in the SPS; 3) Schools are required to meet a goal from a combination of the tests rather than from

individual tests; 4) Schools are required to meet goals for several subgroups; and 5) The data are averaged over two years (LDE, 2007a; LDE, 2007b).

Since the SPS is an indicator of academic growth, virtually every educational leader in the state utilizes the *ITBS* scores, as well as the other information included in the SPS, to formulate school and district improvement plans (LDE, 2005). Accordingly, leaders expect classroom teachers to utilize *ITBS* data and other data sources to guide instruction. Due to the heavy focus on student achievement and the alignment of resources to school improvement plans and expectations, there continues to be a critical need to examine the impact of Louisiana INTECH professional development on student achievement.

Data Analysis

This research study addressed the questions:

1) Do middle school principals perceive Louisiana INTECH professional development as an impetus for change in the school?

2) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade mathematics on the *Iowa Tests of Basic Skills*?

3) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade reading on the *Iowa Tests of Basic Skills*?

4) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in sixth and seventh grade language on the *Iowa Tests of Basic Skills*?

Descriptive and inferential statistics were used to report the findings of the principals' perception of change survey. The survey results were reported as frequency descriptive statistics. Furthermore, inferential statistics, one-way ANOVA (with appropriate post hoc tests) and Pearson's r Correlation, were used to provide information relative to how CPSS middle school administrators perceive the Louisiana INTECH professional development program as an impetus for change according to three factors: affective, cognitive, and behavioral change.

The student achievement data were analyzed using a nonrandomized control group pretest and posttest design. This method indicates change which occurs following the particular treatment, Louisiana INTECH. However, the design differs from a true experimental design because the test group and the control group were created ex-post facto which means the relationship between the independent and dependent variables may be more suggestive than proven (Leedy & Ormrod, 2005).

The student achievement data analyses were conducted using the *SPSS* software. To calculate gain scores, the pretest scores (*ITBS* mathematics, reading, and language total Standard Score 2004) earned prior to having a teacher who received INTECH training and certification were compared to the posttest scores (*ITBS* mathematics, reading, and language total Standard Score 2005) for students with a Louisiana INTECH certified teacher (experimental group) and students with non-Louisiana INTECH certified teacher (control group). Table 3 displays the design for examining the student test data.

Table 3

Nonrandomized Control Group Pretest-Posttest Design

	Pretest	Treatment	Posttest
Group 1 **(INTECH/experimental)**	✓	✓	✓
Group 2 **(Non-INTECH/control)**	✓		✓

Descriptive statistics were used to explain the mean and standard deviation for each variable related to the students in INTECH and non-INTECH trained teacher groups. Also, descriptive statistics were used to report the mean and standard deviation of each student group relative to *ITBS* Standard Score growth from 2004 to 2005 in mathematics, reading, and language. Additionally, frequency distributions were calculated for each of the two groups of teachers (INTECH and non-INTECH) in order to validate the equality of the groups of teachers according to years of experience, degrees earned, and SPS of the schools. A frequency distribution is an organized tabulation of the number of individuals located in each category on the scale of measurement (Gravetter & Wallnau, 2004).

The common statistical data analysis techniques employed to compare means with quantitative data are the *t*-test and the analysis of variance (*ANOVA*). The independent sample *t*-test compares the means of two independent samples. The *ANOVA* is used when comparing two or more group means. When only two groups are used, the single factor analysis of variance is mathematically equivalent to the independent samples *t*-test (Gravetter & Wallnau, 2004). A comparison between two groups of individuals, a control group and an experimental group, was conducted by utilizing *t*-tests (Bluman, 2004;Gravetter & Wallnau, 2004; Winer, B.J. et al, 1991). Independent samples *t*-tests were used to report equality of groups. Crosstabulations were

utilized to show similarities and differences between the teacher years of experience within the INTECH and non-INTECH taught student groups.

The ex-post facto research design does not involve direct data coding of the independent variable. Therefore, no causal relationship could be established from this study (Leedy & Omrod, 2005). However, the findings may suggest important links between the INTECH professional development model and student achievement in mathematics, reading, and language.

Research Procedures

Permission to conduct this study was obtained through the University of New Orleans (UNO) and the CPSS during the Summer 2007 semester. Initial permission to begin this study was at the direction of the dissertation committee. This study required a review by the UNO Institutional Review Board (IRB). It was considered for expedited review because it met Category B, section H and I of the Expedited Review Categories: "H) The study of existing data, documents, records, pathological specimens, or specimens; I) Research on individual or group behavior or characteristics of individuals, such as studies of perception, cognition, game theory, or test development, where the research investigator does not manipulate subjects' behavior and the research will not involve stress to subjects (UNO, 2006)."After completing the required IRB Human Participants Protection Education for Research Teams online course, the appropriate UNO IRB forms were submitted seeking approval for the study. Approval was granted (See Appendix B).

During the data collection for this study, ethical concerns were considered. Participants were not put at risk. Vulnerable populations, such as minors under the age of 19, were respected in regard to anonymity and confidentiality (Creswell, 2003). In addition, any procedures

conducted as part of the data collection process were approved by all gatekeepers at the district and school level. The CPSS provided permission to conduct the study (See Appendix C).

Upon approval to conduct the study, the *Perceptions of Louisiana INTECH Professional Development* survey was administered to the all the CPSS middle school principals and assistant principals during an administrators' in-service meeting (See Appendix D and E). Each administrator participant was given a cover letter explaining the purpose of the research study, which was attached to the survey document. The administrators were given an overview of the Louisiana INTECH professional development model and instructed to complete the survey based upon their perceptions of the model as an impetus for change in the schools. The anonymous surveys were placed in an envelope upon completion. After all documents were collected, the envelope was placed in a secure area until the analyses could be conducted.

Descriptive statistics were used to analyze the survey results. One-way *ANOVA* (with appropriate Post Hoc tests) and Pearson's r Correlation were used to examine the survey subscales. Additionally, participants in the experimental group were identified by obtaining a list of Louisiana INTECH certified sixth and seventh grade mathematics, reading/ ELA teachers from the CPSS Technology Department and CPSS Curriculum Dept. Four sixth and four seventh grade mathematics teachers were Louisiana INTECH certified. Four sixth grade and six seventh grade ELA/reading teachers were Louisiana INTECH certified. Student rosters were collected from the CPSS student information system and individual school sites. The control group, a matched teacher sample, was obtained from district personnel records. Test score data for this study was secured from the district testing office with approval from the CPSS Superintendent.

Since Louisiana public schools were in a transitional testing program, 2004 and 2005 *ITBS* student test data was used. Beginning March 2006, 6th and 7th grade students were administered the *Iowa-Louisiana Educational Assessment Program (LEAP)* test. Prior to March 2006, students were tested using the *ITBS.* Fourth and eighth grade students in Louisiana take high-stakes, criterion-referenced tests. Sixth and seventh graders are placed in middle schools (usually the teachers specialize in one content area). Based on these considerations, it was determined that sixth and seventh grade student data would be most appropriate for this study. A comparison was made between the gain standard scores of sixth and seventh grade students of Louisiana INTECH certified mathematics, ELA/reading teachers and students of non-Louisiana INTECH certified mathematics, ELA/reading teachers. Standard Scores were used to indicate achievement gains on a continuum (Leedy & Omrod, 2005). The *ITBS* mathematics, reading, and the language total Standard Scores for spring 2004 and spring 2005 were obtained for each student of teachers in the experimental and control groups.

During the late summer 2006 semester and early 2007 fall semester, groups of sixth and seventh grade INTECH certified and sixth and seventh grade non-INTECH certified teachers were matched by the CPSS assessment office according to the following variables: years of teaching experience, educational attainment, and similar school mean achievement defined as SPS. The purpose was to control for bias and extraneous variations in teachers. The participants were a representative sample of sixth and seventh grade teachers in mathematics, ELA/reading and students in sixth and seventh grades. Using the statistical software package entitled *SPSS,* descriptive statistics and independent *t*-tests were calculated on the difference between fifth and sixth and sixth and seventh grade *ITBS* total mathematics, reading, and language Standard Scores (Bluman, 2004). This process obtained the actual gain score per student; thereby eliminating the

variability between groups. Independent *t*-tests were used to determine the equality of means between the gain scores of each group. Lastly, the researcher analyzed and reported on the research data.

Limitations of the Study

Creswell (2003) defines delimitations and limitations of a research study as the boundaries, exceptions, reservations and qualifications of a study. Delimitations are deliberately imposed by the researcher to narrow the scope of the study (Creswell, 2003; Rudestarm, 2001). In contrast, limitations are the parameters over which the researcher has no control, but could possibly negatively affect the results or the generalizability of the research data (Rudestarm & Newton 2001; Gay & Airasian 2000).

The delimitations of a study enable the researcher to narrow the study's scope. The first two delimitations were related to the samples. First, the scope of this study was narrowed to include only middle school sixth and seventh grade students in the CPSS. Secondly, the Louisiana INTECH certified teachers selected for the study were restricted to CPSS sixth and seventh grade mathematics and reading/ELA teachers.

The third delimitation was the focus on sixth and seventh grade mathematics, reading, and ELA scores. The mathematics and reading/ELA content areas were selected because each is heavily weighted in the SPS established by federal and state accountability guidelines. Also, local educational leaders need mathematics and reading/ELA quantitative data related to Louisiana INTECH to make informed decisions about continued support for Louisiana INTECH professional development.

The last delimitation was the *ITBS* data used in the study. Since Louisiana public schools are in a transitional testing program beginning in 2006, existing 2004 and 2005 *ITBS* scores were

used. The total sixth and seventh grade student mathematics, reading, and language Standard Scores from the spring 2004 and spring 2005 were the data source for the study.

The results of this study provide important data about principals' perceptions of Louisiana INTECH as an impetus for school change. Additionally, it includes data about the impact of Louisiana INTECH professional development on sixth and seventh grade mathematics, reading, and language student achievement. For this reason, it is important to denote the limitations that could potentially affect the results or the generalizability of the research data.

One limitation was connected to the survey data. Each middle school administrator responded to the questions individually during a middle school administrators' meeting. The setting may not have been the best conducive environment for each administrator. Furthermore, the questionnaire captured responses during a single point in time.

The second limitation was related to the amount and type of technologies available in each INTECH certified teacher's classroom. The amount of funding available for technology at the school and district level may inhibit the accessibility of computers and other technological devices for instructional purposes. However, each teacher received a new computer, printer, and software in 2002-2003 or 2003-2004 from the district in addition to any other equipment and resources that may have been provided by the mathematics or ELA/reading department or individual school.

The third limitation was related to teacher technology integration skills and the implementation of technology-embedded instructional strategies in the classroom. Each sixth and seventh grade mathematics, reading/ELA teacher participated in a basic technology integration professional development program entitled Classroom-Based Technology (CBT). However, personal technology skills may vary. Also, based upon individual interpretation and application

of Louisiana INTECH integration strategies, there may be variance in the way technology integration strategies are implemented with students in mathematics or reading/ ELA classrooms. However, it was assumed participating INTECH teachers were computer literate because of completion of the Louisiana INTECH professional development sessions.

The fourth limitation was the causal-comparative research design used for this study. Although the causal-comparative design attempts to describe a relationship between the independent and dependent variables, the relationship is more suggestive than proven because of the lack of control over the independent variable in an ex-post facto study (Gravetter & Wallnau, 2004). The students were not randomly placed in the classes so the groups may vary on other variables that have an effect on the dependent variable. However, matching groups were used to control for the effect of extraneous variability. ANOVA was used to break down the variation within and between the groups.

The fifth limitation was associated with the sample size. There were only 18 of 142 middle school teachers with Louisiana INTECH certification that taught sixth and seventh grade mathematics or reading/ELA in the CPSS during the timeframe of the study. The participants in the experimental group all completed INTECH certification prior to the 2004-2005 school year.

A final limitation for consideration was the scores from the *ITBS* norm-referenced achievement test. The data only provides information about how a student's knowledge or skill compares to others in a specific norm group. The information does not represent what a student does or does not know about a particular concept (University of Iowa 2006).

Summary

The methodology described in this chapter provided the groundwork for investigating four research questions regarding the impact of Louisiana INTECH professional development.

The first question used a survey to determine middle school principals' perceptions of Louisiana INTECH as an impetus for change in schools. Two other inquiries were specifically related to the impact of Louisiana INTECH professional development on student achievement in sixth and seventh grade mathematics, reading, and ELA as evidenced by achievement gains on the *ITBS.*

The results of this study add to the body of research about the relationship between administrators' perceptions of Louisiana INTECH as an impetus for change in schools. Secondly, the results indicate the impact of Louisiana INTECH on sixth and seventh grade student achievement as evidenced by growth on the *ITBS* mathematics, reading, and language total Standard Scores. School leaders are challenged to identify professional development that will result in improved school performance. If middle school administrators perceive Louisiana INTECH to be a beneficial impetus for change and a positive relationship is denoted between Louisiana INTECH and student achievement, the study may provide evidence that Louisiana INTECH is an effective professional development model. Finally, the results of this study might facilitate more informed decisions for future funding of Louisiana INTECH. Educational leaders need empirical data as evidence funds are being well spent, positive change is taking place with instruction, and student achievement indicates increased growth.

Chapter Four: Results

Introduction

The purpose of this research study was to investigate the Louisiana INTECH professional development model as an impetus for school change and increased student achievement. Increasing student achievement and positively changing schools are significant needs as Louisiana administrators struggle to meet the accountability challenges established by the state and federal government. The results of this research contribute to the general body of knowledge about this specific technology professional development initiative. Furthermore, it presents empirical evidence concerning the model and provides evidence of the administrators' perceptions of Louisiana INTECH as an impetus for school improvement.

Chapter four presents the results of the analyses in four sections. The introduction provides an overview of the analyses utilized in the study and the organization of the chapter. The second area describes the samples represented in the research study. Thirdly, the findings are examined as related to individual hypotheses. Lastly, the chapter concludes with a summary.

The *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) data analysis examined middle school administrators' perception of Louisiana INTECH as an impetus for school change in the Calcasieu Parish School System. The *Statistical Package for Social Sciences* (SPSS) software was used to calculate frequencies, percentages, means, and standard deviation related to the respondents and the 18 survey items on the *Perceptions of Louisiana INTECH Professional Development Survey.* Overall, the Cronbach's alpha (.915) indicated high reliability on each of the items and the three subscales. Then Pearson's *r* determined correlation between each survey subscale and total scale

score. Lastly, one-way *ANOVA* (with appropriate post hoc tests) was used to compare means and provide information relative to how CPSS middle school administrators perceive the Louisiana INTECH professional development program as an impetus for change according to the three factors: affective, cognitive, and behavioral change.

Descriptive statistics were used to provide the mean and standard deviation for each variable related to the students in the INTECH and non-INTECH trained teacher groups. Also, descriptive statistics were used to report the mean and standard deviation of each student group relative to *ITBS* Standard Score growth from 2004 to 2005 in mathematics, reading, and language. Independent samples *t*-tests were used to verify equality of the INTECH and non-INTECH groups. A Crosstabulation test was utilized to show similarities and differences between the degrees earned by the teachers within the INTECH and non-INTECH student groups.

Description of the Sample

Middle School Administrators

During an administrator in-service, all 52 Calcasieu Parish middle school administrators were invited to participate in the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) through a letter (See Appendix D). Those agreeing to respond, completed a pencil and paper survey at that time. One hundred percent of the administrators completed the anonymous survey and placed it in an envelope to be included in the research study analysis. A total of 15 principals and 37 assistant principals fully responded to the 18-item, Likert-type survey regarding perceptions of Louisiana INTECH professional development as an impetus for change in schools. The survey was composed of two parts. The first portion of the survey was devoted to collecting general demographic data and the

second section was comprised of the 18 items related to administrators' perceptions of Louisiana INTECH as an impetus for school change.

The forthcoming tables, four through ten, share specific middle school administrator information collected from the demographic section of the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999). Table 4 depicts the number of principals, assistant principals, and gender demographics of the administrator groups included in this study. Of the total 52 middle school administrators surveyed, 46.2% (n = 24) were female and 53.8% (n = 28) were males. Further examination of the principal data indicated 34% (n = 5) were female and 66% (n = 10) were males. The middle school assistant principal makeup showed 51% (n = 19) females and 48% (n = 18) males.

Table 4

Number of Principals, Assistant Principals, and Gender

Role	n	%
Principals		
Male	10	66
Female	5	34
Assistant Principals		
Male	18	48
Female	19	51

The data indicate there were one-half as many female principals as male principals who responded to the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999). Furthermore, the gender demographics of the assistant

principals appear to be balanced between males and females. Overall, the middle school assistant principals have similar administrator gender statistics as reported by the Calcasieu Parish School System about the total administrator population. The CPSS reported the gender makeup of the school-based administrators employed in the system as 54% females and 48% males (CPSS, 2007a).

The next table reflecting demographic information collected from the administrator survey, Table 5, is related to the highest education degrees each middle school administrator earned. The degrees ranged from the Master's level to Doctorate level with the data indicating that 86.6% (n = 46) of the administrators surveyed held a Master's or Master's plus 30 degree. Those who earned a Master's degree represented the highest percentage at 46.2% (n = 24) of the population and the administrators holding a Masters +30 degree were a close second with 40.4% (n = 21). Six administrators earned a Specialist degree and one gained a Doctorate. The descriptive statistics related to degrees earned are listed in Table 5.

Table 5

Highest Level of Education

Degrees Earned	n	%
Master's	21	40.4
Master's +30	24	46.2
Specialist	6	11.5
Doctorate	1	1.9

These data were consistent with the policy and guidelines established by the Calcasieu Parish School Board as employee expectations for employment as an administrator in the

Calcasieu Parish School System. Prospective administrators must have earned a minimum of a Master's level degree to be qualified to serve in the job role of principal or assistant principal in the Calcasieu Parish School System (CPSS, 2007b).

Tables 6, 7, and 8 illustrate the middle school administrator demographics regarding years of experience as an educator, years of experience as an administrator, and years of experience as an administrator in the current school setting. In Table 6, the frequencies analysis indicated a range of experience from one year to twenty-six or more years of experience as an educator, which refers to the total number of practicing years in education. The majority of the administrators indicated 11 to 26+ years (n = 50) of experience in education. Only two administrators reported 10 or fewer years in education.

Table 6

Experience as an Educator

Years	n	%
0-5	1	1.9
6-10	1	1.9
11-15	14	26.9
16-20	9	17.3
21-25	13	25
26+	14	26.9

Table 7 illustrates the number of years of experience as an administrator. The survey revealed 44 of the 52 middle school administrators possessed 10 or less years of experience as a school-based administrator. The majority of the administrators, 61.5% (*n* = 32), had 0-5 years administrative experience and 23.1% (*n* =12) of the respondents had served in an administrative role for five years or less years.

Table 7

Experience as an Administrator

Years	n	%
0-5	32	61.5
6-10	12	23.1
11-15	4	7.7
16-20	0	0
21-25	3	5.8
26+	1	1.9

Table 8 depicts the administrators' years of experience as a principal or assistant principal in the present school. The survey revealed 73.1% (n = 38) of the respondents indicated they had been an administrator in the current school setting for five years or less.

Table 8

Experience as an Administrator in Current School

Years	n	%
0-5	38	74.1
6-10	9	17.3
11-15	4	7.7
16-20	0	0
21-25	1	1.9
26+	0	0

The demographic data collected from the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham et al., 1989; Klecker & Loadman, 1999) and displayed in Tables 5 through 8 provided general data about the overall experience of the administrators included in the study. These data may give insight into how various administrators might collaborate with teachers and students to solve daily problems and ensure Louisiana INTECH professional development strategies are adequately implemented in classrooms with students. In a study of the relationship between years of professional experience and resourcefulness scores, 196 teachers and 33 administrators in Illinois were surveyed regarding techniques utilized to solve various school and classroom issues (Gaier, Jones, & Simpson, 1953). The results of particular interest to this research study are related to teaching experience and administrative roles. The data collected in the Gaier, Jones, and Simpson study (1953) indicated that the longer administrators were out

of actual teaching, the less likely they were to be in face-to-face contact with classroom issues. Furthermore, Gaier, Jones & Simpson (1953) found administrators with one to three years of experience were more resourceful than those with seven to twelve years experience as an administrator. This might suggest that Calcasieu administrators with a greater number of years of administrative experience may need to consistently collaborate with teachers to assess the Louisiana INTECH strategies implemented in classroom instruction and evaluate the general impact on school change.

Tables 9 and 10 report the demographic survey findings regarding the number of total teachers and the number of INTECH certified teachers currently employed in the middle school administrators' present school settings. Table 10 indicates most of the schools employed 26 to 50 (40.4%, *n* = 26) or 51 to 75 classroom teachers (32.7%, *n* = 17).

Table 9

Teachers in Administrators' Current School

Teachers	n	%
0-25	7	13.5
26-50	21	40.4
51-75	17	32.7
76-100	6	11.5
101-150	1	1.9

Table 10 depicts the results obtained from the demographics survey item indicating the number of INTECH certified teachers in the middle school administrators' present school site. Of the classroom teachers employed in the administrators' present school, 96.2% reported 25 or less INTECH certified teachers on staff.

Table 10

INTECH Certified Teachers in Administrators' Schools

Teachers	n	%
0-25	50	96.2
26-50	2	3.8
51-75	0	0
76-100	0	0
101-150	0	0

The data displayed in Table 10, the number of INTECH certified teachers in the middle school administrators' present school sites, aligned with the district report indicating 142 classroom teachers in grades six through eight have earned the Louisiana INTECH certification. Based upon the survey results and the district INTECH certified teacher report, the data indicated an average of nine to ten teachers per school site are INTECH certified (CPSS, 2007).

The second portion of the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) was devoted to the survey items related to perceptions of Louisiana INTECH as an impetus for school change. To determine the reliability of the survey, a Cronbach's alpha analysis was conducted for each subscale (affective, cognitive, and behavioral) and for the total instrument items. The results indicated each of the individual subscales scored a moderately high reliability. The affective domain resulted in an alpha of .817, the cognitive domain yielded .822, and the behavioral construct showed .811. Overall, the Cronbach's alpha was .915 indicating a high reliability. Table 11 illustrates the Cronbach's alpha for each construct.

Table 11

Cronbach's Alpha

Subscale	α	Survey Items
Affective	.817	3,4,7,12,13,16
Cognitive	.822	1,2,5,6,9,11
Behavioral	.811	8,10,14,15,16,17
Total	.915	All

The Cronbach's alpha statistic determines the internal consistency reliability of a survey instrument. The statistical process involves analyzing the questions from various perspectives to determine the correlations between them. The closer the value is to one, the higher the reliability of the instrument (Leech, Barrett, & Morgan, 2005). The overall alpha for the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) was .915. This result indicates a strong reliability in the survey instrument.

There were three constructs associated with the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) instrument. Furthermore, one hypothesis was affiliated with each domain: 1) affective reactions to change; 2) cognitive reactions to change; and 3) behavioral reactions to change. The results of the hypotheses are reported in this study within the section entitled *Testing the Hypotheses*.

The survey item scale range was one to four on a Likert-type item rating scale where 1= strongly disagree and 4=strongly agree. The midpoint was 2.5. Descriptive statistics were used to report the results of the survey by subscales. The behavioral subscale, indicating middle school administrators' willingness to take actions to support or initiate changes related to the Louisiana INTECH professional development data indicated the lowest mean rating (*M = 3.22, SD = .40*);

however it was above the midpoint. The affective subscale, measuring how administrators felt about changes in the organization as related to implementation of Louisiana INTECH professional development in the school was above the midpoint (*M =3.29, SD = .47*). The cognitive subscale, middle school administrators' recognition of the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff, mean score was the highest (*M = 3.38, SD = .38*).

Examination of the correlation with the three subscales was conducted through a Pearson's *r* test. Table 12 illustrates the Pearson *r* correlation results of the three subscales. The data indicate a significant correlation at $p<.01$ level.

Table 12

Pearson's r Correlation of the Survey Subscales

Subscales	Affective	Cognitive	Behavioral
Affective			
Cognitive	.583(**)		
Behavioral	.618(**)	.874(**)	
Total Scale Score	.845(**)	.905(**)	.922(**)

Note. Correlation is significant at the 0.01 level (2-tailed).

The next statistic utilized to analyze the data was one-way *ANOVA.* One-way *ANOVA* was employed to compare means for each of the survey subscales using the following six variables: gender, administrative role, highest level of education, experience as an educator, experience as an administrator, and experience as an administrator in present school. Tables 13 through 25 display the means, standard deviations, and *ANOVA* results for the subscales and variables listed above.

First, the subscales were examined with respect to gender. Tables 13 and 14 display the survey means and *ANOVA* results related to the survey subscales and gender. In Table 13, the mean and standard deviation of the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) for each subscale by gender and total are shown. The data indicate females were more open to change in all subscales as evidenced by higher mean scores than the male administrators.

Table 13

Means and Standard Deviations by Gender and Subscales

		Affective		Cognitive		Behavioral	
	n	M	SD	M	SD	M	SD
Female	24	3.5	.44	3.58	.31	3.4	.36
Male	28	3.1	.38	3.20	.35	3.10	.38
Total	52	3.22	.47	3.38	.38	3.22	.40

In Table 14, the one-way *ANOVA* test, indicated a statistically significant difference between the mean scores for males and females in each subscale at the $p<.01$ level. Table 14 shows that females were more likely to agree or strongly agree with each of the survey items connected to the individual subscales: affective, cognitive, and behavioral.

Table 14

One-way ANOVA by Gender and Subscales

Subscale	df	SS	MS	F
Affective				
Between groups	1	2.70	2.70	16.17*
Within groups	50	8.36	.17	
Cognitive				
Between groups	1	1.75	1.75	15.98*
Within groups	50	5.48	.11	
Behavioral				
Between groups	1	1.41	1.41	10.22*
Within groups	50	6.90	.14	
Total Scale Score				
Between groups	1	1.92	1.41	19.12*
Within groups	50	5.02	.14	

*p<.01

These data indicating females responded more favorably than males to the survey questions, may suggest middle school female principals and assistant principals in the CPSS were more open to Louisiana INTECH as an impetus for school change when attitude was

examined on the three constructs, affective, cognitive, and behavioral. In a study by Klecker and Loadman (1999), the results were similar. Klecker and Loadman (1999), using the same survey items to gather data regarding change in Ohio schools, reported statistically significant differences in the cognitive and behavioral constructs for the middle school principals. Furthermore, in a survey conducted by Shakeshaft (1989) of school and central office administrators regarding gender differences in the workplace and in an article by Shakeshaft, Nowell, and Perry (1991), female administrators were reported to be more often focused on teaching and learning than male administrators. Since the purpose of the Louisiana INTECH professional development model is to improve instruction and student performance, perhaps Calcasieu female administrators' perception of Louisianan INTECH was a reflection of the research conducted by Shakeshaft (1989).

The next two analyses examined the survey results by subscales and the variable, administrative role. The data displayed in Table 15 were the descriptive statistics related to the survey by administrative role and the data in Table 16 reflect the *ANOVA* test results. The mean scores indicated minimal differences between principals' and assistant principals' overall responses to the items on each subscale and the *ANOVA* test resulted in no significant differences between the subscale results and principals' or assistant principals' responses.

Table 15

Means and Standard Deviations by Administrative Role and Subscales

	Principal		Assistant Principal		Combined	
	M	SD	M	SD	M	SD
Affective	3.37	.40	3.26	.50	3.29	.47
Cognitive	3.27	.42	3.42	.352	3.38	.38
Behavioral	3.12	.39	3.26	.41	3.22	.40
Total Scale Score	3.25	.37	3.31	.37	3.30	.37

The one-way *ANOVA* test indicated no statistically significant difference between the administrative roles in each subscale at the $p = .05$ level. These data suggest that both principals' and assistant principals' responded similarly to the survey items regarding perceptions of the Louisiana INTECH professional development model as an impetus for school change. Table 16 depicts the *ANOVA* results.

Table 16

One-way ANOVA by Administrative Roles and Subscales

Subscale	df	SS	MS	F
Affective				
Between groups	1	.13	.13	.59
Within groups	50	10.93	.22	
Cognitive				
Between groups	1	.26	.26	1.89
Within groups	50	6.97	.14	
Behavioral				
Between groups	1	.19	.20	1.19
Within groups	50	8.12	.16	
Total Scale Score				
Between groups	1	.04	.04	.28
Within groups	50	6.90	.12	

The third variable, highest level of education, was analyzed with respect to the survey responses by construct. The data displayed in Table 17 show the means and standard deviation related to the constructs and degrees earned and Table 18 illustrates the results of the one-way *ANOVA.* Of the 52 administrators, 40.4% (n = 21) earned a Masters degree and 46.2% (n = 24), possessed Masters +30 degree. Additionally, 11.5% (n = 6) reported an education level of Specialist and 1.9% (n = 1) a Doctorate degree. The administrators with a Masters +30 degree or a Doctorate degree responded more favorably Louisiana INTECH as an impetus for change than individuals with a Masters or Specialist degree. There also was a higher mean score in each subscale by one respondent who possessed a doctorate education level. Overall, administrators with a Masters +30 graduate hours responded more favorably to change than individuals with a Masters or Specialist degree.

Table 17

Means and Standard Deviations by Educational Level and Subscales

	Degree Earned	n	M	SD
Affective	Master's	21	3.09	.55
	Master's +30	24	3.43	.30
	Specialist	6	3.28	.47
	Doctorate	1	4.00	
	Total	52	3.29	.47
Cognitive	Master's	21	3.23	.33
	Master's +30	24	3.54	.36
	Specialist	6	3.17	.30
	Doctorate	1	3.83	
	Total	52	3.38	.38
Behavioral	Master's	21	3.11	.37
	Master's +30	24	3.33	.40
	Specialist	6	3.00	.37
	Doctorate	1	4.00	
	Total	52	3.22	.41
Total Scale Score	Master's	21	3.14	.39
	Master's +30	24	3.44	.29
	Specialist	6	.15	.32
	Doctorate	1	3.94	
	Total	52	3.30	.37

Table 18 depicts the results of a one-way *ANOVA* to determine if there were any statistically significant differences between three of the degrees earned and the survey responses relevant to each construct. It appeared from the descriptive statistics that the doctorate category exhibited the highest mean in each subscale. However, to determine any specific statistically significant differences, it was necessary to conduct another *ANOVA* without the doctorate category so a post hoc test could be utilized. A post hoc test could not be performed with one case in a category as was the situation with one respondent possessing a Doctorate degree. The follow-up *ANOVA* indicated a significant difference in affective, cognitive, and total subscales when the doctorate category was removed. These data confirm that administrators with a Masters' +30 degree agreed or strongly agreed with the survey items in two of the three constructs.

Table 18

One-way ANOVA by Education Level without Doctorate

Subscale	df	SS	MS	F
Affective				
Between groups	2	1.37	.69	3.60*
Within groups	48	9.17	.19	
Cognitive				
Between groups	2	1.37	.68	5.80*
Within groups	48	5.65	.12	
Behavioral				
Between groups	2	.83	.42	2.92
Within groups	48	6.85	.14	
Total Scale Score				
Between groups	2	1.09	.55	4.85*
Within groups	48	5.41	.11	

*p<.05

The results of the post hoc test confirmed that administrators with a Masters +30 graduate hours rated change significantly higher in each survey domain. Table 19 indicates statistically significant differences in the Masters +30 education level in the Affective, Cognitive, and Total Scale Scores at the $p = .05$ level.

Table 19

Post Hoc by Education Level without Doctorate

	Master's (1)		Master's +30 (2)		Specialist (3)		
Subscale	M	SD	M	SD	M	SD	Post hoc
Affective	3.09	.55	3.43	.30	3.28	.47	1 < 2
Cognitive	3.23	.33	3.54	.36	3.17	.30	1 < 2
Behavioral	3.11	.37	3.33	.40	3.00	.37	1 = 2 = 3
Total scale score	3.14	.39	3.44	.29	.15	.32	1 < 2

Note. The numbers in parentheses in the column heads refer to the numbers used for illustrating significant differences (at $\alpha = .05$) in the last column title "Post hoc."

Overall, the data displayed in Tables 17, 18, and 19, related to the variable highest level of education, indicate administrators with higher degrees appear to be more open to change as it relates to the Louisiana INTECH professional development model. Perhaps the administrators who participated in advanced degree coursework were exposed to rich content related to technology or general school improvement strategies. In research conducted by Trider and Leithwood (1988) regarding influences on principal behavior, surveys and interviews of school-based administrators revealed the "principal's special knowledge is one of the central determinants of the pattern of policy implementation behavior in which they engage" (p. 307). Knowledge about various school change initiatives, whether obtained from coursework,

professional development opportunities, or independent reading is a key factor in how receptive administrators are to change (LaPlant, 1986; Trider & Leithwood, 1988).

The fourth variable explored was experience as an educator. Tables 20 and 21 are devoted to sharing the data related to the fourth variable. Table 20 displays the means and standard deviations for years of experience as an educator as related to the three survey factors and Table 21 shows the results the *ANOVA* test associated with educator experience. The affective subscale results indicated the highest mean score was 3.46 of administrators with 21-26 years (n = 14, 26.9%) of educational experience. In the cognitive domain, administrators with 11-15 years (n = 9, 17.3%) of educational experience scored the highest with 3.51. With respect to the behavioral construct, administrators with 11-15 years (n = 14, 26.9%) of experience scored the highest mean at 3.31. To conduct the follow-up *ANOVA*, the categories 0 to 5 years experience and 6 to 20 years experience were removed before conducting the *ANOVA* since only one respondent in was reported in each of those categories. The *ANOVA* data are shown in Table 21.

Table 20

Means and Standard Deviations by Educator Experience and Subscales

	Years	n	M	SD
Affective	0-5	1	3.17	
	6-10	1	2.67	
	11-15	14	3.13	.43
	16-20	9	3.31	.60
	21-26	13	3.46	.44
	26+	14	3.32	.42
	Total	52	3.29	.47
Cognitive	0-5	1	3.17	
	6-10	1	3.17	
	11-15	14	3.51	.35
	16-20	9	3.37	.44
	21-26	13	3.42	.30
	26+	14	3.24	.42
	Total	52	3.38	.38
Behavioral	0-5	1	3.00	
	6-10	1	3.00	
	11-15	14	3.31	.39
	16-20	9	3.22	.49
	21-26	13	3.30	.35
	26+	14	3.08	.43
	Total	52	3.21	.40
Total Scale Score	0-5	1	3.11	
	6-10	1	2.94	
	11-15	14	3.32	.36
	16-20	9	3.30	.50
	21-26	13	3.39	.26
	26+	14	3.21	.40
	Total	52	3.29	.37

A one-way *ANOVA* revealed no statistically significant difference between the survey results by subscales and years of experience as an educator even without the categories of 0-5 and 6-10 years experience. Table 21 displays the results of the analysis. These data suggest years of experience as an educator may not have much impact on the way the Calcasieu Parish middle

school administrators perceive Louisiana INTECH professional development as an impetus for change.

Table 21

One-way ANOVA by Years Experience as an Educator and Subscales without 0-5 & 6-10

Subscale	df	SS	MS	F
Affective				
Between groups	5	1.16	.23	1.07
Within groups	46	9.90	.22	
Cognitive				
Between groups	5	.64	.13	.90
Within groups	46	6.59	.14	
Behavioral				
Between groups	5	54	.11	.64
Within groups	46	7.76	.17	
Total Scale Score				
Between groups	5	.38	.07	.53
Within groups	46	6.56	.14	

The fifth variable investigated with respect to the survey subscales was years of administrative experience. The data are shared in Tables 22 and 23. Table 22 reflects the means and standard deviations of administrative experience and each of the subscales. The category of 21 to 26 (n = 3) years of administrative experience had the highest mean score of 3.61. The category of 0 to 5 years administrative experience (n = 32) was the next highest with a mean of 3.61. In the cognitive area, the category of 0 to 5 (n = 32) reported a mean score of 3.45 and those with 6 to 10 years of experience (n = 12) showed a mean score of 3.36. The category of 0 to 5 years of administrative experience had the highest mean in the behavioral construct. The administrators with 6-10 (n =12) years of administrative experience scored a mean of 3.21.

Table 22

Means and Standard Deviations by Administrative Experience and Subscales

Subscale	Years	n	M	SD
Affective	0-5	32	3.26	.50
	6-10	12	3.39	.38
	11-15	4	3.17	.36
	21-26	3	3.61	.38
	26+	1	2.67	
	Total	52	3.29	.47
Cognitive	0-5	32	3.45	.35
	6-10	12	3.36	.37
	11-15	4	3.25	.52
	21-26	3	3.06	.20
	26+	1	2.67	
	Total	52	3.38	.38
Behavioral	0-5	32	3.28	.41
	6-10	12	3.21	.35
	11-15	4	3.13	.48
	21-26	3	3.00	.00
	26+	1	2.33	
	Total	52	3.22	.40
Total Scale Score	0-5	32	3.33	.38
	6-10	12	3.32	.34
	11-15	4	3.19	.45
	21-26	3	3.22	.15
	26+	1	2.56	
	Total	52	3.30	.37

The one-way *ANOVA* test revealed no significance difference in administrator years of experience and the survey item results in any of the three subscales. Table 23 depicts these findings.

Table 23

One-way ANOVA by Years of Administrative Experience and Subscales

Subscale	df	SS	MS	F
Affective				
Between groups	4	.92	.23	1.06
Within groups	47	10.15	.22	
Cognitive				
Between groups	4	1.07	.27	2.04
Within groups	47	6.16	.13	
Behavioral				
Between groups	4	1.09	.27	1.78
Within groups	47	7.22	.15	
Total Scale Score				
Between groups	4	.66	.17	1.24
Within groups	47	6.27	.13	

Finally, the last variable examined with respect to the three subscales, affective, cognitive, and behavioral, was administrative years of experience *in the present school.* Tables 24 and 25 display the results. In Table 24, the data indicate no respondents with 26+ years of experience as an administrator *in the present school.* Furthermore, administrators with fewer years experience as an administrator scored higher on the cognitive and behavioral subscales than their colleagues with greater experience. In the cognitive subscale, the category 0 to 5 (n = 32) scored the highest mean of 3.45 and in the behavioral construct, administrators with 0 to 5 years (n = 32) of administrative experience in the present school was the highest mean score at 3.28. This suggests that Calcasieu Parish middle school administrators with less administrative experience may have a greater openness to Louisiana INTECH as an impetus for school change with respect to each subscale. However, it was also the category with the most number of respondents. So, further testing was necessary to determine whether there were any significant differences. Table 24 depicts the means and standard deviations for administrative experience in the present school as related to the three survey domains.

Table 24

Means and Standard Deviations by Administrative Experience in Present School and Subscales

Subscale	Years	n	M	SD
Affective	0-5	32	3.26	.50
	6-10	12	3.39	.38
	11-15	4	3.17	.36
	21-26	3	3.61	.38
	Total	51	3.30	.46
Cognitive	0-5	32	3.45	.35
	6-10	12	3.36	.37
	11-15	4	3.25	.52
	21-26	3	3.06	.10
	Total	51	3.40	.37
Behavioral	0-5	32	3.28	.41
	6-10	12	3.21	.35
	11-15	4	3.12	.48
	21-26	3	3.00	.00
	Total	51	3.24	.39
Total Scale Score	0-5	32	3.33	.38
	6-10	12	3.32	.34
	11-15	4	3.19	.45
	21-26	3	3.22	.15
	Total	51	3.31	.36

A one-way *ANOVA* confirms that administrators with fewer years of administrative experience in their present school responded more favorably to INTECH as an impetus for change in the Cognitive and Behavioral constructs. Table 25 depicts the results of the *ANOVA* test indicating a significant difference in the responses of administrators 15 or less years experience in the present school setting.

Table 25

One-way ANOVA by Years of Administrative Experience and Subscales with 21-26 Omitted

Subscale	df	SS	MS	F
Affective				
Between groups	2	.467	.23	1.09
Within groups	48	10.29	.21	
Cognitive				
Between groups	2	1.03	.51	4.01*
Within groups	48	6.15	.13	
Behavioral				
Between groups	2	1.07	.54	3.57*
Within groups	48	7.19	.15	
Total Scale Score				
Between groups	2	.79	.39	3.07
Within groups	48	6.15	.13	

*p<.05

Intech and Non-intech Groups

All available Louisiana INTECH certified teachers in sixth and seventh grade mathematics and reading/English Language Arts classrooms that were trained during the timeframe from June 2000 to June 2003 were included in the study sample. Each INTECH certified teacher participated in similar Louisiana INTECH professional development experiences with comparable instructors, equivalent content, and similar format.
The student data from a total of 18 INTECH and 18 non-INTECH trained teachers were included in the analysis. An overview of the INTECH and non-INTECH certified teachers were included in Table 1.

A total of 2,292 students' *ITBS* mathematics, reading, and language Standard Scores were examined in the study. Descriptive statistics were used to explain the mean and standard deviation for each variable related to the students in each INTECH and non-INTECH trained teacher groups. The pre-test data was drawn from fifth and sixth grade middle school student *ITBS* mathematics, reading, and language total Standard Scores from spring 2004 data. The post-test data was drawn from sixth and seventh grade middle school student *ITBS* mathematics, reading, and language total Standard Scores from the spring 2005 testing period. Only student test scores with both a pretest and posttest scores were used in the study.

Table 26 displays the number, mean, and standard deviation baseline for the variables utilized as a part of the student achievement analysis. The baseline data indicate similar groups prior to calculating growth scores and comparing INTECH and non-INTECH groups. Each group was composed of a minimum of 400 student *ITBS t*est scores. Moreover, Louisiana places schools with ranges of School Performance Scores in similar demographic comparison groups. For example an SPS of 80.0 to 99.0 are classified as the same type of demographics as are

schools with an SPS of 100.0 to 119.9 (LDE, 2005). The 2004 SPS baseline mean score for the non-INTECH group (n = 1109) was 99.89 with at standard deviation of 5.87. The mean score for the INTECH group (n = 1183) was 96.92 with a standard deviation of 7.00. The mean difference of the 2004 group SPS scores was 2.97 which were acceptable for comparison of the group data. Furthermore, the 2005 SPS baseline mean score SPS for the non-INTECH group was (n = 1109) was 102.13 with a standard deviation of 5.98. The mean score for the INTECH group (n = 1183) was 100.00 with a standard deviation of 7.08. The mean difference of 2.13 indicated the School Performance Scores for each group in 2005 were in the acceptable range for comparison. Table 26 displays the means and standard deviations by variables.

Table 26

Means and Standard Deviations by Variables

	INTECH		Non-INTECH	
	M	SD	M	SD
2004 SPS Baseline	96.92	7.00	99.88	5.87
2005 SPS Baseline	99.80	7.08	102.13	5.98
2004 Reading Total	222.38	21.51	228.58	22.01
2005 Reading Total	235.24	25.51	241.12	26.62
2004 Language Total	235.28	28.46	242.87	28.48
2005 Language Total	249.47	32.20	251.60	32.50
2004 Mathematics Total	227.30	24.01	230.84	25.28
2005 Mathematics Total	240.13	27.51	243.96	28.69

Also, descriptive statistics were used to report the mean and standard deviation of each student group relative to *ITBS Standard Score* change from 2004 to 2005 in mathematics, reading, language, and school performance score. The findings reported in Table 27 indicate a greater increase in the mean *ITBS* Standard Scores of the INTECH reading and language groups than in the non-INTECH groups. These data may indicate Louisiana INTECH positively impacts student achievement particularly in reading and language.

Table 27

Change in Means and Standard Deviations of ITBS Standard Scores by INTECH and Non-INTECH Groups

	INTECH		Non-INTECH	
	M	SD	M	SD
Math Change	12.83	16.76	13.12	16.81
Reading Change	12.87	14.50	12.54	15.43
Language Change	14.19	19.15	8.73	19.82

An Independent samples *t*-test was used to examine equality of groups with respect to teachers' years of experience. The mean difference between the groups was -.739. The *t*-test score was -2.39 with a significance of .017 on a 2-tailed test. The data indicated no significant differences between the groups with respect to years of teaching experience.

Next, independent samples *t*-tests were used to examine the degree of gain in the overall student *ITBS* test scores from 2004 to 2005. The *t*-test was used to compare the means of the *INTECH* and non-INTECH groups using the student *ITBS* test scores obtained in three different content areas: mathematics, reading, and language. Table 28 illustrates a significant difference at the .05 level with language scores.

Table 28

Independent Samples t-Test for INTECH and Non-INTECH Groups

	MD	df	t
Math Gain	.29	1297	.311
Reading Gain	-3.28	990	-.344
Language Gain	-5.46	990	-4.410 *

*$p < .05$

A crosstabulation test was utilized to show similarities and differences between the degrees earned by the teachers within the INTECH and non-INTECH student groups. The purpose of this test was to determine whether there was equity between the groups with respect to the teachers' educational attainment. Table 29 indicates 104 more students in the INTECH group than students in the non-INTECH were taught by teachers with a Master +30 degree. This may suggest that the teachers who selected to participate in the Louisiana INTECH professional development model may be more inclined to be involved in ongoing professional growth from a variety of choices such as college coursework or in-depth professional development offerings such as Louisiana INTECH.

Table 29

Crosstabulation of Degrees Attained

Degrees Attained	Non-INTECH	INTECH	Total
BA	887	1022	1909
Masters	222	57	279
Masters + 30	0	104	104
Total	1109	1183	2292

Testing the Hypotheses

Hypotheses

Six research hypotheses guided this study:

Hypothesis 1: Affective Reactions to Change. Middle school administrators enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school.

Hypothesis 2: Cognitive Reactions to Change. Middle school administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff.

Hypothesis 3: Behavioral Reactions to Change. Middle school administrators take actions to support or initiate changes related to the Louisiana INTECH professional development.

Hypothesis 4: Mathematics Student Achievement.

Students of Louisiana INTECH certified teachers exhibit higher mathematics student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{14}: $\mu_1 - \mu_2 > 0$).

Hypothesis 5: Reading Student Achievement.

Students of Louisiana INTECH certified teachers exhibit higher reading student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{15}: $\mu_1 - \mu_2 > 0$).

Hypothesis 6: Language Student Achievement. Students of Louisiana INTECH certified teachers exhibit higher ELA student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_{16}: $\mu_1 - \mu_2 > 0$).

Hypothesis 1

The first hypothesis, Affective Reactions to Change, stated: Middle school administrators enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school. The *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) items 3, 4, 7, 12, 13, and 18 were used to test hypothesis one. Several analyses were conducted. A Cronbach's Alpha of .817 determined the affective domain to be reliable. Then Pearson's *r* indicated a significant correlation between the affective domain subscale and the total scale score (r =.845). The descriptive statistics related to each survey item testing the affective construct are listed in Table 30. Negative survey items were reverse coded when entered into *SPSS.* The results of the hypothesis related to Affective Reactions to Change indicate the majority of the respondents enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school.

Table 30

Affective Reactions to Change

	Strongly Disagree		Disagree		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%
*Item 3: I usually don't resist change.	0	0	8	15.4	21	40.4	23	44.2
*Item 4: I like change.	0	0	4	7.7	26	50	22	42.3
*Item 7: Change does not frustrate me.	0	0	5	9.6	30	57.7	17	32.7
Item 12: I often suggest new approaches to things in my school.	0	0	4	7.7	28	53.8	20	38.5
*Item 13: Most changes are not irritating.	0	0	5	9.6	31	59.6	16	30.8
*Item 18: I don't hesitate to try new ideas.	0	0	6	11.5	22	42.3	24	46.2

*Reverse coded negative items.

Hypothesis 2

The second hypothesis, Cognitive Reactions to Change, stated: Middle school administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff. The *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) items 1, 2, 5, 6, 9, and 11 were used to test hypothesis two. Several analyses were conducted. A Cronbach's Alpha of .822 determined the cognitive domain to be reliable. Then Pearson's *r* indicated a significant positive correlation between the cognitive domain subscale and the total scale score (*r* =.905).

The descriptive statistics related to each survey item testing the affective construct are listed in Table 31. The analyses of hypothesis two related to Cognitive Reactions to Change indicate the majority of the administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff.

Table 31

Cognitive Reactions to Change

	Strongly Disagree		Disagree		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%
Item 1: I look forward to changes in my school.	0	0	8	15.4	27	51.9	25	48.1
Item 2: Changes usually benefit my school.	0	0	1	1.9	30	57.7	21	40.4
Item 5: Most school members would benefit from change.	0	0	1	1.9	34	65.4	17	32.7
Item 6: I am inclined to try new ideas.	0	0	1	1.9	27	51.9	24	46.2
Item 9: I would support the change.	0	0	5	3.8	33	63.5	17	32.7
Item 11: Other people would think that I support the changes.	0	0	6	11.5	33	63.5	19	36.5

Hypothesis 3

The third hypothesis, Behavioral Reactions to Change, states: Middle school administrators take actions to support or initiate changes related to the Louisiana INTECH professional development. The *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) items 8, 10, 14, 15, 16, and 17 were used to test hypothesis three. Several analyses were conducted. A Cronbach's Alpha of .811 determined the behavioral domain to be reliable. Then Pearson's *r* indicated a significant correlation between the behavioral construct subscale and the total scale score (r =.922). The descriptive statistics related to each survey item testing the behavioral construct are listed in Table 32. The results of the hypothesis related to Behavioral Reactions to Change indicate the majority of the Middle school administrators surveyed agree with taking actions to support or initiate changes related to the Louisiana INTECH professional development. However, 1.9% strongly disagree and 7.7% disagree that the changes would help improve unsatisfactory situations in their school.

Table 32

Behavioral Reactions to Change

	Strongly Disagree		Disagree		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%
Item 8: Changes would help me perform better at work.	0	0	4	7.7	33	63.5	15	28.8
Item 10: Changes tend to stimulate me.	0	0	6	11.5	32	61.5	14	26.9
Item 14: The changes would help improve unsatisfactory situations in my school.	1	1.9	4	7.7	29	55.8	18	34.6
Item 15: I would do whatever possible to support the changes.	0	0	0	0	33	63.5	19	36.5
Item 16: I find most change to be pleasing.	0	0	6	11.5	35	67.3	11	21.2
Item 17: I would benefit from the changes.	0	0	0	0	39	75	13	25

Hypothesis 4

Hypothesis four, Mathematics Student Achievement, states: Students of Louisiana INTECH certified teachers exhibit higher mathematics student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_1: $\mu_1 - \mu_2 > 0$). *ITBS* mathematics test score data were analyzed using the *SPSS* software. Independent sample *t*-tests were performed comparing gain scores of sixth and seventh grade students' mathematics total Standard Scores of INTECH certified teachers and

non-INTECH certified teachers. No statistically significant difference was found between the student mathematics gain scores of INTECH trained teachers when compared to non-INTECH trained teachers. Table 33 presents the findings.

Table 33

ITBS Mathematics Gain Scores of INTECH and Non-INTECH Groups

	INTECH		Non-INTECH			
	M	SD	M	SD	df	t
Math	13.03	16.76	13.12	16.81	1297	.311

Hypothesis 5

Hypothesis five, Reading Student Achievement, states: The research hypothesis *(H_1)* was: Students of Louisiana INTECH certified teachers exhibit higher reading student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_1: $\mu_1 - \mu_2 > 0$). *ITBS* reading test score data were analyzed using the *SPSS* software. Independent sample *t*-tests were performed comparing gain scores of sixth and seventh grade students reading total Standard Scores of INTECH certified teachers and non-INTECH certified teachers. The reading gain scores of students of INTECH trained teachers when compared to those of non-INTECH trained teachers were higher with a gain of .33 even with 22 fewer cases in the INTECH group. Table 34 depicts the findings.

Table 34

ITBS Reading Gain Scores of INTECH and Non-INTECH Groups

	INTECH		Non-INTECH			
	M	SD	M	SD	df	t
Math	12.87	14.50	12.54	15.43	1297	-.344

Hypothesis 6

Hypothesis six, Language Student Achievement, states: Students of Louisiana INTECH certified teachers exhibit higher language student achievement than students of non-Louisiana INTECH certified teachers as evidenced by the difference between mean pretest and mean posttest scores (H_1: $\mu_1 - \mu_2 > 0$). *ITBS* language test score data were analyzed using the *SPSS* software. Independent sample *t*-tests were used to examine the gain in total Language Standard

Scores of sixth and seventh grade students who were taught by INTECH certified teachers and non-INTECH certified teachers. There was a significant difference between the language gain scores of INTECH trained teachers' students when compared to non-INTECH trained teachers. The INTECH group mean was 5.39 points higher than the non-INTECH group. Table 35 presents the findings.

Table 35

ITBS Language Gain Scores of INTECH and Non-INTECH Groups

	INTECH		Non-INTECH			
	M	SD	M	SD	df	t
Language	14.12	19.15	8.73	19.82	990	-4.41**

**p<.01

Summary

The data collected from the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunham, et al., 1989; Klecker & Loadman, 1999) were used to investigate middle school administrators' perceptions of the Louisiana INTECH professional development model as an impetus for school change in the Calcasieu Parish School System. *SPSS* was used to calculate frequencies, percentages, means, and standard deviation to analyze the responses to the 18 survey items. The results indicated female administrators responded more favorably to Louisiana INTECH professional development as an impetus for school change. Additionally, administrators with fewer years of experience in a school setting indicated a greater openness to change. No significant differences were denoted between the principals' and assistant principals' responses to the survey items or constructs. Pearson's *r* indicated significant correlation between

the three subscales: affective, cognitive, and behavorial. Cronbach's Alpha confirmed the reliability of the survey items.

Pearson's *r* and one-way *ANOVA* (with appropriate post hoc tests) were used to examine response items particularly related to the three constructs: affective, cognitive, and behavioral change. The *ANOVA* confirmed female administrators scored significantly higher with respect to openness to change. Data analysis related to hypothesis one, Affective Reactions to Change, indicated the majority (90.3%, n = 47) of the 52 respondents enjoy the change in the organization as it relates to implementation of Louisiana INTECH professional development in the school. The data results of hypothesis two, Cognitive Reactions to Change, indicate the majority (98.1%, *n* = 51) of the administrators recognize the occurrence of Louisiana INTECH professional development and its potential benefit to school and staff. The results of the survey items related to hypothesis 3, Behavioral Reactions to Change, indicate the majority (92.3%, *n* = 48) of the middle school administrators responded favorably to the questions related to taking actions to support or initiate changes related to the Louisiana INTECH professional development. These data imply the principals and assistant principals surveyed agree or strongly agree that they would take action to embrace the Louisiana INTECH profressional development model by supporting teachers and implementing the necessary changes to support total school implementation. However, it is important to note that 1.9% (*n* = 1) strongly disagree and 7.7% (*n* = 4) disagree that Louisiana INTECH professional development changes resultant of school-wide implementation may not improve unsatisfactory situations in the administrators' current school setting.

Descriptive statistics were used to explain the mean and standard deviation for each variable related to the students taught by teachers in the INTECH and non-INTECH trained

groups. The results indicated the groups were similar. The *t*-test analysis for hypothesis four, mathematics student achievement, indicated students taught by teachers in the non-INTECH group showed greater gain scores than students taught by teachers in the INTECH trained group. The *t*-test analysis for hypothesis five, reading student achievement, indicated students of teachers in the INTECH group showed greater gain scores than students of teachers in the INTECH trained group. The *t*-test analysis for hypothesis six, language student achievement, indicated students of teachers in the INTECH group showed greater gain scores than students of teachers in the INTECH trained group. Independent samples *t*-tests indicated equality of among the groups. The crosstabulation test showed a slightly greater number of INTECH students (n =109) of the total student population (N = 2292) were taught by teachers with a Masters +30. Further discussion of the findings is found in Chapter Five.

Chapter Five: Discussion

Introduction

The purpose of this study was to investigate the Louisiana Integration of Technology (INTECH) professional development model as an impetus for school change and increased student achievement. This research examined two specific research questions related to Louisiana INTECH: 1) Do middle school principals perceive Louisiana INTECH professional development as an impetus for change in the school? 2) Does the Louisiana INTECH professional development model contribute to increased student achievement of sixth and seventh grade students as demonstrated by gains in mathematics, reading, and language on the *Iowa Test of Basic Skills*? Chapter five presents the findings related to the specific research questions and hypotheses associated with this study. Furthermore, the discussion of results in this section associates the data with theory and research.

This chapter was organized into five sections. First, the introduction provides the overview, purpose, and sequence of the chapter. Next, the second section denotes the study findings related to the samples' demographics and hypotheses in the context of theory and research. Limitations of the research study were included in the next section. The fourth area was devoted to recommendations for future studies. Lastly, conclusions about the Louisiana INTECH Professional Development model were shared.

Findings

Middle School Administrators

A total of 15 principals and 37 assistant principals were included in the administrator sample. Of the 52 administrators, 46% (n = 24) were female and 53.8% (n = 28) were males. All of the administrators earned advanced degrees with 86.6% (n = 45) holding a Master's or Master's +30. Two administrators had ten or fewer years of experience as an educator with 96.2% of the population possessing 11 or more years of educational experience. The Calcasieu Parish School System requires administrators to have a minimum of five years of teaching experience and at least a Master's degree to be employed in an administrative role. These data were congruent with the employment practices established by the Calcasieu Parish School System (CPSS, 2007b).

The administrator survey indicated 96.2% of the schools currently have zero to 25 INTECH certified teachers on staff. These data were aligned with the district report indicating 142 middle school (grades six through eight) classroom teachers have earned the certification(CPSS, 2007a). Based upon the survey results and the district INTECH certified teacher report, the data indicate an average of nine to ten teachers per school site are INTECH certified (CPSS, 2007a).

The *Perceptions of Louisiana INTECH Professional Development Survey* (Dunhan, et al., 1989; Klecker & Loadman, 1999) items employed three constructs: 1) Affective Reactions to Change; 2) Cognitive Reactions to Change; 3) Behavioral Reactions to Change. Although the *Perceptions of Louisiana INTECH Professional Development* (Dunham, et al., 1989; Klecker & Loadman, 1999) survey was modified by the author of this study and Sheryl Abshire (2007) to accommodate an overview of the Louisiana INTECH professional development model, the items

were the same as those used by the original authors (Dunham, et al., 1989; Klecker & Loadman, 1999). The only adaption to the items was to offer four response choices rather than five as in the original surveys. With the adaptions, the Cronbach's alpha still indicated high reliability on the individual constructs and the items overall. This confirms the research results from two previous studies which utilized nearly identical survey items (Dunham, et al., 1989; Klecker & Loadman, 1999).

One-way *ANOVA* was utilized to compare means for each of the three subscales using the following variables: gender, administrative role, highest level of education, experience as an educator, experience as an administrator, and experience as an administrator in the present school. The tests showed no statistically significant difference in the survey item results related to the following variables and the subscales: highest level of education, experience as an educator, and experience as an administrator. With respect to gender, the mean scores for females were higher than for their male colleagues in each of the constructs: affective (Females $M = 3.5$, Males $M = 3.1$), cognitive (Females $M = 3.6$, Males $M = 3.2$), and behavioral (Females $M = 3.4$, Males $M = 3.1$). The *ANOVA* test revealed statistically significant differences between the mean scores for males and females at the $p<.01$ level. These data provide evidence that females were more likely to perceive Louisiana INTECH as an impetus for school change than their male counterparts. Additionally, these results were consistent with the study conducted by Klecker and Loadman (1999) in which female middle school administrators were found to be more open to change with respect to the cognitive and behavioral constructs. This finding implies that female administrator perceptions of change, program opinions, and subsequent actions may positively impact the overall implementation of programs, strategies, and approaches utilized to support positive school change, such as Louisiana INTECH professional

development (Allen & Cherrey, 2000; Fullan, 1992). Furthermore, the *ANOVA* results indicate the respondents with fewer years experience as an administrator scored higher on the total subscales (0-5 $M = 3.33$, 6-10 $M = 3.32$, 11-15 $M = 3.19$, 21-16 $M = 3.22$) than their colleagues with greater experience. These results suggest administrators with less administrative experience have a greater openness to Louisiana INTECH as an impetus for school change. Furthermore, the gender and administrative experience data provide evidence to support change theory in that to build leadership for change, there must be openness for change and a willingness to advocate for programs, initiatives, and collaborations necessary to move an organization forward (Fullan, 2001).

Research hypothesis one addressed administrators' affective reactions to change. According to Dunham, et al., (1989), a person who enjoys change (affective reaction to change) in the organization is one who expects pleasant, but perhaps challenging circumstances. One critical leadership characteristic of transformational leadership theory, specifically change theory, is openness to change and willingness to serve as a catalyst for change (Bass, 1985; Doyle & Smith, 2001; Lussier & Achua, 2007). Overall, the majority (90.3% , $n = 47$) of middle school administrators in this study appeared to enjoy change in the organization as it relates to implementation of Louisiana INTECH professional development in the school. Furthermore, this finding is an indication that the principals and assistant principals included in this study are open to the Louisiana INTECH professional development model as an impetus for school change.

The second hypothesis, dealt with cognitive reactions to change. An overwhelming majority of the administrators (98.1%, $n = 51$) recognized that change occurred in the school as a result of teacher participation in the Louisiana INTECH professional development model. Moreover, the principals and assistant principals in the study acknowledged that the change

tended to benefit the school organization and its members. These findings concurred with Fullan's theoretical model and research which advocate school change occurs through personalization for staff and students, precision in designing goals to affect higher standards, and professional development (Fullan, 2006). Additionally, if an administrator believes the change tends to produce positive effects for the organization, then there is a greater likelihood the change will be successful (Dunham, et al., 1989; Stiegelbauer, 1994). Furthermore, the results supported the assumptions of social constructivist theory by encouraging change through individual engagement in social activities such as the Louisiana INTECH professional development program where participants collaborate and construct meaning about the common purpose of improved student achievement (Ernest, 1998; Gredler, 1997; McMahon, 1997, Prawat & Floden, 1994).

Hypothesis three encompassed the behavioral reactions to change. Higher scores in this dimension tend to indicate whether individuals might be change agents, persons who initiate change, or ones who support change (Dunham, et al., 1989; Klecker and Loadman, 1999. A majority of the middle school administrators (93.2%) were likely to support Louisiana INTECH as a change initiative in the school. However, it is interesting to note that four administrators (7.7%) did not believe Louisiana INTECH would help them perform better at work or improve unsatisfactory situations in the school. Additionally, six respondents disagreed with the idea that the change would be stimulating or pleasing (11.5%). The change theory leadership model, focuses on ways to institutionalize change through three phases: initiation, implementation, and institutionalize (Fullan 1991). These results suggest perhaps some of the respondents may not view themselves as change agents or fully embrace the Louisiana INTECH professional development model as an impetus for change and school improvement. Perhaps the

Louisiana INTECH components were only minimally instituted; thus further research might be needed to confirm the data.

INTECH and Non-INTECH Groups

All available Louisiana INTECH certified teachers in sixth and seventh grade mathematics and reading/English language arts classrooms that were trained during the timeframe from June 2000 to June 2003 were included in the research sample. Student data from a total of 18 INTECH and 18 non-INTECH certified teachers were included in the analysis. A total of 2,292 students' *ITBS* mathematics, reading, and language Standard Scores were examined in the study. Pretest data were drawn from the fifth and sixth grade middle school student spring 2004 testing period and the posttest data were drawn from the sixth and seventh grade spring 2005 scores. Only student test scores with both a pretest and a posttest were utilized in the study. The number, mean, and standard deviation baseline for the variables utilized as a part of the student achievement analysis indicated similar groups prior to calculating growth scores and comparing INTECH and non-INTECH groups. A minimum of 400 scores were included in each group. The independent samples *t*-tests examining the equality of the groups indicated no significant differences between the teachers' years of experience when comparing the groups.

Research hypothesis four, addressing mathematics student achievement, indicated no statistically significant difference was found between the student mathematics gains of students taught by INTECH trained teachers compared to those of non-INTECH trained teachers. These results do not support the research findings of the National Council of Teachers of Mathematics for the middle grades. NCTM endorses problem-solving and small group techniques through the use of calculators and technology which are a vital part of the Louisiana INTECH professional

development model (Briars & Resnick, 2000). Numerous studies indicate students who learn with calculators and technology perform at the same or better rates than those who use only paper and pencil techniques (Cauthen, 2003; Dion, Harvey, Jackson, Klay, Jinghua, & Wright, 2001; Heid, 1988; Pippenger, 2003). Additionally, research indicates teachers who are committed to implementing mathematics as a part of project-based learning with technology rather than as isolated facts, tend to produce greater student gains (Dede, Loftin, Salzman, & Sprague, 1999). The mathematics research data resulting from of this study suggest further investigation is necessary to determine whether the technology-based, constructivist strategies taught teachers during Louisiana INTECH professional development were actually implemented with students in the classroom environment. Furthermore, INTECH professional development leaders may want to evaluate the activities used in INTECH to ensure the technology professional learning experiences reflect current instructional, research-based mathematics practices.

Hypothesis five focused on reading student achievement. The independent sample *t*-test indicated a higher achievement gain for the INTECH group (INTECH $M = 12.87$, non-INTECH $M = 12.54$). The reading student achievement increase may be in part due to the implementation of identified research-based technology strategies that increase students' reading achievement in grades preschool through sixth grade. Specific research related to literacy, particularly reading in preschool through sixth grade, indicated electronic books, decoding features in software, and digital media appreciably contribute to increased reading achievement (Matthew, 1997; Doty, Popplewell, and Byers, 2001; Labbo, 1996; Leu, 1999). Additionally, a comparison study of interactive online and classroom-based technologies indicated improved reading skills of middle school students (Perez-Prado & Thirunaravanan, 2002). A study by Pearson, Ferdig, Blomeyer,

& Moran (2005), clearly indicated improved reading performance in middle school grades six through eight with the implementation a wide range of digital technologies such as video and audio clips, web pages, and hypermedia. Although Louisiana INTECH infuses a variety of technology integration strategies and approaches aligned with the aforementioned study, it may be worth further investigation of two areas: 1) exploration of actual teaching strategies implemented in the classroom as a follow-up to participation in Louisiana INTECH and 2) examination of the professional development components to ensure constructivist strategies incorporate a variety of digital media.

The last research hypothesis, hypothesis six, investigated student achievement comparisons between the total language Standard Scores of the INTECH and non-INTECH groups. The data indicate a noteworthy difference in growth in one of the two groups. The INTECH student group scored significantly higher than the non-INTECH students (INTECH $M = 14.19$, non-INTECH $M = 8.73$). The student growth may be attributed to the diverse implementation of constructivist-based activities infused with writing in the Louisiana INTECH professional development sessions. Moreover, the andragogy methodologies, helping adults to learn (Smith, 2002), embedded in the Louisiana INTECH professional development sessions engage teachers in reflection about student achievement through verbal and written means; thus, modeling various language-based activities that may have an impact on language student achievement. These results appear to be consistent with the substantial research documentation that indicates student achievement improves in language when students are engaged in technology-based activities that further higher order thinking and advanced writing skills using technology (Ferdig & Trammell, 2004; Goldberg, Russell, & Cook, 2003; Gulek & Demirtas, 2004).

Limitations

One limitation was related to the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunhan, et al., 1989; Klecker & Loadman, 1999). The research results provide data about middle school administrators' perceptions of Louisiana INTECH as an impetus for school change. Each principal and assistant principal answered the survey items during the same timeframe at a middle school administrators' district meeting. Although each respondent fully completed a survey, it is important to note the administrator responses reflect a single point in time rather than an in-depth explanation of each concept addressed in the survey items. Furthermore, the survey gathers information only about the questions asked rather than enabling participants to expand a response (Goyder, 1986). In contrast, during an interview, the interviewer could explore the subjects more in depth. Thus, perhaps providing additional information related to the topic of the survey.

The second limitation was related to the availability of technologies in each INTECH certified teacher's classroom. Constraints on the amount of funding for technology at the school and district level may reduce the accessibility of computers and other technological devices for instructional purposes. However, each teacher received a new computer, printer, and software in 2002-2003 or 2003-2004 from the district in addition to any other equipment and resources that may have been provided by the mathematics or ELA/reading department or individual school.

The third limitation was related to teacher technology integration skills and the implementation of technology-embedded instructional strategies in the classroom. Each sixth and seventh grade mathematics, reading/ELA teacher participated in a basic technology integration professional development program entitled Classroom-Based Technology (CBT). However, personal technology skills may vary. Also, based upon individual interpretation and application

of Louisiana INTECH integration strategies, there may be variance in the way technology integration strategies are implemented with students in mathematics or reading/ ELA classrooms. However, it was assumed participating INTECH teachers were computer literate because of completion of the Louisiana INTECH professional development sessions.

A fourth limitation was the causal-comparative research design. Although the causal-comparative design attempts to describe a relationship between the independent and dependent variables, the relationship is more suggestive than proven because of the lack of control over the independent variable in an ex-post facto study (Gravetter & Wallnau, 2004). The students were not randomly placed in the classes; however, matching groups were used to control for the effect of extraneous variability. Furthermore, *ANOVA* tests generated results to explain any variation within and between the groups. Also, of the 142 Louisiana INTECH certified middle school teachers in the school system, 18 taught sixth and seventh grade mathematics, reading/ELA in the Calcasieu Parish School System during the timeframe of the study.

The fifth limitation was associated with the sample size. There were only 18 of 142 middle school teachers with Louisiana INTECH certification that taught sixth and seventh grade mathematics or reading/ELA in the CPSS during the timeframe of the study. The participants in the experimental group all completed INTECH certification prior to the 2004-2005 school year.

A final limitation for consideration was the scores from the *ITBS* norm-referenced achievement test. The data only provides information about how a student's knowledge or skill compares to others in a specific norm group. The information does not represent what a student does or does not know about a particular concept (University of Iowa 2006). Furthermore, the specific scores used in this study were total Standard Scores. No independent subset scores were examined separately.

Implications

The purpose of this quantitative research study was to investigate the Louisiana Integration of Technology (INTECH) professional development model as an impetus for school change and increased student achievement. Changing schools positively and improving student achievement are critical needs as Louisiana administrators strive to meet the accountability challenges established by the state and federal government whereby educational leaders are expected to provide leadership for staff and students to reach or exceed School Performance Score targets. Furthermore, national, state, and local funding sources often require administrators to implement research-based programs with proven student achievement gains. Moreover, there have been concerns about the amount of time teachers are away from students to participate in INTECH professional development. In past years, the CPSS invested a minimum of $450 per teacher participant just for substitute salaries (Calcasieu Parish School System, 2004). If this significant commitment of human and financial resources is to continue to be supported, there should be clear evidence of administrator perceptions of Louisiana INTECH professional development as an impetus for change and increased student performance as a result of highly trained teachers.

Few studies exist about the Louisiana Integration of Technology (INTECH) professional development model implemented statewide in Louisiana. One identified study focused on comparisons of INTECH and non-INTECH teachers with respect to classroom implementation of student-centered learning, utilization of technology skills, teaching pedagogy, and attitudes toward technology use in the classroom (Di Benedetto 2005). The Di Benedetto (2005) survey results of INTECH and non-INTECH certified teachers indicated INTECH trained teachers were more likely to implement pedagogical strategies with technology to support instruction.

However, student achievement and administrators' perceptions of INTECH as an impetus for school change were not examined.

The results derived from this study build upon the current available Louisiana INTECH research data and expand the literature to include information regarding administrative leadership and increased student achievement. The administrator findings provide valuable data regarding middle school administrators' perceptions of INTECH as an impetus for change. Furthermore, the results from the *Perceptions of Louisiana INTECH Professional Development Survey* (Dunhan, et al., 1989; Klecker & Loadman, 1999) offer insight into leadership viewpoints from three constructs: affective, cognitive, and behavioral.

The data suggest female administrators may be more open to Louisiana INTECH as an impetus for change in schools when compared to their male counterparts. In each of the subscales, females scored higher mean scores and the *ANOVA* test verified a significant difference in all constructs. The mean score for females was 3.5 and the mean score for males was 3.1 in the affective subscale. The cognitive subscale mean score for females was 3.58 and the mean score for males was 3.20. The behavioral subscale mean scores were 3.4 for females and 3.10 for males. The *ANOVA* test indicated a statistically significant difference between the mean scores for males and females at the $p<.01$ level in each subscale. The data indicate females were more likely to agree or strongly agree with each of the survey items connected to the individual subscales than the males surveyed in each construct: affective, cognitive, and behavioral. The results of a study by Klecker and Loadman (1999), using the same survey items to gather data regarding change in Ohio schools, reported statistically significant differences in the cognitive and behavioral constructs for the female middle school principals surveyed. Furthermore, in a survey conducted by Shakeshaft (1989) of school and central office

administrators regarding gender differences in the workplace and in an article by Shakeshaft, Nowell, and Perry (1991), female administrators were reported to be more often focused on teaching and learning than male administrators. Since the purpose of the Louisiana INTECH professional development model is to improve instruction and student performance, perhaps Calcasieu female administrators' perception of Louisianan INTECH was a reflection of the research conducted by Shakeshaft (1989).

Another finding implies administrators with fewer years of administrative experience may be more open to implementation of Louisiana INTECH as a strategy for school improvement and increased student achievement. As referenced in Chapter One, change theory suggests transformation of a school is influenced and shaped by the individuals within the organization (Fullan, 1991, 2001). The opinions of change and subsequent actions by school-based administrators frequently impact the overall implementation of programs, strategies, and approaches utilized to support positive school change (Allen & Cherrey, 2000).

Lastly, a relationship may exist between the Louisiana INTECH professional development and student achievement. The findings indicate the Louisiana INTECH professional development model may positively impact student achievement particularly in middle school reading and language. The independent sample *t*-test indicated a higher achievement gain for the INTECH group (INTECH $M = 12.87$, non-INTECH $M = 12.54$) with respect to examination of *ITBS* reading Standard Scores. Furthermore, the INTECH student group scored significantly higher than the non-INTECH students (INTECH $M = 14.19$, non-INTECH $M = 8.73$) when *ITBS* language standard scores were analyzed using a *t*-test. The achievement data suggest Louisiana INTECH may improve student achievement. However, it is recommended leaders of Louisiana INTECH revisit the professional development content to

ensure constructivist strategies are clearly aligned with proven mathematics, reading, and language technology integration approaches. In mathematics, technology integration activities should clearly focus on inquiry and problem-solving in small groups with connections to the real world (Cauthen, 2003; Dion, Harvey, Jackson, Klay, Jingua, & Wright, 2001;Briars & Resnick, 2000). Reading integration should include a wide range of digital technologies such as video and audio clips, web pages, and hypermedia (Pearson, Ferdig, Blomeyer, & Moran, 2005). Furthermore, interactive online technologies appear to be a key component to improving middle school reading skills (Perez-Prado & Thirunaravanan, 2002). The literature indicates language achievement improves when students are engaged in technology-based activities that further higher order thinking and advanced writing skills using technology (Ferdig & Trammell, 2004; Goldberg, Russell, & Cook, 2003; Gulek & Demirtas, 2004).

Recommendations for Further Research

This research study gleaned valuable insight from middle school administrators' perceptions of Louisiana INTECH as an impetus for change. However, no data were collected regarding the implementation of specific Louisiana INTECH professional development strategies in classrooms. This is a vital part of successfully transforming schools and supporting standards-based, constructivist practices (Fullan, 2001; Vygotsky, 1978). It is suggested that further research that involves classroom observations to assess technology integration instructional strategies as aligned with research-based practices that improve student achievement be conducted.

The present study suggests that Louisiana INTECH certified teachers are more likely to implement technology integration strategies aimed at increased student achievement, particularly in reading and language. However, this research did not investigate science or social studies. It is

recommended further research be conducted to examine test score data predominantly in mathematics, science, and social studies.

Lastly, with accountability issues facing school-based administrators, teacher time in the classroom is a real concern. It is recommended that Louisiana INTECH professional development leaders give consideration to reduction of time for face-to-face training. With the research data that supports online learning and writing, it is recommended interactive online activities replace some of the face-to-face professional development days (Perez-Prado & Thirunaravanan, 2002). Additionally, efforts should be made to ensure that adult learning strategies, andragogy, are implemented throughout the prescribed professional development program.

Conclusions

This research is the first known study to examine middle school administrators' perceptions of Louisiana INTECH as an impetus for change and increased student achievement. The findings suggest that middle level administrators who exhibit openness to Louisiana INTECH as an impetus for change on all three constructs, affective, cognitive, and behavioral, are more likely to support and encourage teachers to implement Louisiana INTECH technology integration strategies in the classroom. Furthermore, sixth and seventh grade student achievement data, particularly in the areas of reading and language, appear to show greater gains of students in Louisiana INTECH certified teachers' classrooms when compared to non-INTECH certified teachers.

Overall, the findings support the theoretical framework and model presented in Chapter One, which was meant to build a basic understanding of the relationship among principals' perceptions of Louisiana INTECH as an impetus for change, Louisiana INTECH professional

development, and sixth and seventh grade mathematics, reading, and language student achievement. Leadership change theory (Fullan, 2001) appears to suitably frame administrators' perceptions of change with respect to impact, acceptance, and implementation of Louisiana INTECH as an impetus for school improvement. Furthermore, the Louisiana INTECH professional development model appears to be solidly grounded in social constructivist theory, specifically constructivist learning both in the professional development components as well as in recommended classroom practices utilizing technology. Moreover, the professional development model clearly aligns with adult learning strategies, andragogy. This research study provides empirical data to support the Louisiana INTECH professional development model as an impetus for school improvement and increased student achievement.

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Appendices

Appendix A

Permission to Use Survey Items

Thank you so much for your prompt response.
Diane Mason

Diane R. Mason
Tech Training Center Coordinator
"Advancing Quality Education Through Technology-Connected Learning"

600 South Shattuck Street
Lake Charles, LA 70601
Tech Center #: 337.491.1797
Office #: 337.437.8351
Fax #: 337.491.1704
Email: diane.mason@cpsb.org

From: Don Gardner [mailto:dgardner@uccs.edu]
Sent: Thursday, April 05, 2007 4:12 PM
To: mason, diane
Cc: Jon L Pierce; rdunham@bus.wisc.edu
Subject: Re: Request to Use Survey

The items are in the public domain, so there shouldn't be any problems with using them.

Good luck with your research.

Donald G. Gardner, PhD
Professor of Management and Organization
College of Business and Administration
University of Colorado at Colorado Springs
1420 Austin Bluffs Parkway
Colorado Springs, CO 80933-7150
USA

Telephone: (719)262-3727
FAX: (719)262-3494
e-mail: dgardner@uccs.edu
----- Original Message -----
From: mason, diane
To: dgardner@uccs.edu
Cc: Diane Rae Mason
Sent: Thursday, April 05, 2007 2:25 PM
Subject: Request to Use Survey
Dr. Gardner,

I am a doctoral candidate conducting my dissertation under the direction of Dr. Tammie Causey-Konate', an associate professor in the Department of Education, Leadership, Counseling and Foundations at the University of New Orleans. The focus of my dissertation is on investigating the effects of Louisiana INTECH professional development on perceptions of change and middle school 6th and 7th grade mathematics, reading, and English language arts.

I am requesting permission to use the 18-item Change in Organizational Culture instrument developed by Dunham, Grube, Gardner, Cummings, and Pierce (1989) for use at that time with two groups: (a) an

automobile travel club (N=473), and (b) police officers from a mid-sized mid-western city (N=269). The survey items I am referring are listed below:

Factor 1: Affective Reaction to Change
Item 3. I would resist the change.
Item 4. I don't like the changes.
Item 7. The changes would frustrate me if they happened in my school.
Item 12. I would suggest these changes for my school.
Item 13. Most of the changes are irritating.
Item 18. I would hesitate to press for such changes.

Factor 2: Cognitive Reaction to Change
Item 1. I would look forward to such changes at my school.
Item 2. The changes would benefit my school.
Item 5. Most school members would benefit from the changes.
Item 6. I would be inclined to try the changes.
Item 9. I would support the changes.
Item 11. Other people would think that I support the changes.

Factor 3: Behavioral Reaction to Change
Item 8. The changes would help me perform better at work.
Item 10. The changes tend to stimulate me.
Item 14. The changes would help improve unsatisfactory situations at my school.
Item 15. I would do whatever possible to support the changes.
Item 16. I would find going through these changes to be pleasing.
Item 17. I would benefit from the changes.

(Dunham, et al., 1989, p. 11).

The survey would be administered to 50 middle school administrators in the Calcasieu Parish Public School System in Lake Charles, LA as a part of the data collection component of my dissertation. Please let me know if this is permissible as I would like to be able to move forward with data collection later this month. If you have any questions, please feel free to contact me by email, or by phone at my office (listed below in the email message) or cell phone (337.540.9389). Our school system will be out on spring break starting tomorrow, April 6. We will resume on Monday, April 16. However, if you need to speak to me during that time, please feel free to contact me at my cell phone number.

Thanks in advance for your assistance.
Diane Mason

Diane R. Mason
Tech Training Center Coordinator
"Advancing Quality Education Through Technology-Connected Learning"

600 South Shattuck Street
Lake Charles, LA 70601
Tech Center #: 337.491.1797
Office #: 337.437.8351
Fax #: 337.491.1704
Email: diane.mason@cpsb.org

Thank you so much for your prompt reply. Certainly, I will be happy to provide whatever information you might need.
Thanks,
Diane

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Email: diane.mason@cpsb.org

From: Randall B. Dunham [mailto:rdunham@bus.wisc.edu]
Sent: Thursday, April 05, 2007 4:17 PM
To: mason, diane
Cc: Randi Huntsman
Subject: Re: Request to Use Survey

Diane,

You have my permission to do so if you will provide me with a summary of your findings. My assistant, Randi Huntsman, will send you an email next week with a copy of the instrument so you can verify the items, a spreadsheet for scoring, and a copy of the paper that reported some of our findings.

Good luck.

Randy

On Apr 5, 2007, at 3:43 PM, mason, diane wrote:

Dr. Dunham,

I am a doctoral candidate conducting my dissertation under the direction of Dr. Tammie Causey-Konate', an associate professor in the Department of Education, Leadership, Counseling and Foundations at the University of New Orleans. The focus of my dissertation is on investigating the effects of Louisiana INTECH professional development on perceptions of change and middle school 6th and 7th grade mathematics, reading, and English language arts.

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(Dunham, et al., 1989, p. 11).

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Thanks in advance for your assistance.
Diane Mason

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Thank you so much for sending the documents. I truly appreciate it.
Diane

Diane R. Mason
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From: Randi Huntsman [mailto:rhuntsman@bus.wisc.edu]
Sent: Mon 4/9/2007 3:50 PM
To: mason, diane
Cc: Diane Rae Mason
Subject: Dunham Survey Materials

Hi Diane,

Attached are the items that Professor Dunham mentioned, as well as a PowerPoint document that helps to explain the issues. I hope you find them helpful.

Randi

Randi K. Huntsman
Assistant to Randall B. Dunham
UW School of Business
voice: 608-262-0891
FAX: 608-262-8773
rhuntsman@bus.wisc.edu

mason, diane wrote:
Thank you so much for your prompt reply. Certainly, I will be happy to provide whatever information you might need.
Thanks,
Diane

Diane R. Mason
Tech Training Center Coordinator
"Advancing Quality Education Through

Technology-Connected Learning"

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Tech Center #: 337.491.1797
Office #: 337.437.8351
Fax #: 337.491.1704
Email: diane.mason@cpsb.org

Thank you so much for your timely response. Certainly, it will be given due credit. If I need any additional information for the University of New Orleans, I will let you know.
Thanks,
Diane

Diane R. Mason
Tech Training Center Coordinator
"Advancing Quality Education Through
Technology-Connected Learning"

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Fax #: 337.491.1704
Email: diane.mason@cpsb.org

From: Bill Loadman [mailto:loadman.1@osu.edu]
Sent: Thursday, April 05, 2007 11:58 AM
To: mason, diane
Subject: RE: Request permission for survey use

Hi Diane,

I am giving you permission to use the Openness to Change Instrument. I just ask that you just cite it appropriately in your work. Best wishes as you proceed with your dissertation.

Bill Loadman

From: mason, diane [mailto:diane.mason@cpsb.org]
Sent: Thursday, April 05, 2007 12:20 PM
To: loadman.1@osu.edu
Subject: Request permission for survey use

Dr. Loadman,

I am a doctoral candidate conducting my dissertation under the direction of Dr. Tammie Causey-Konate', an associate professor in the Department of Education, Leadership, Counseling and Foundations at the University of New Orleans. The focus of my dissertation is on investigating the effects of Louisiana

INTECH professional development on perceptions of change and middle school 6th and 7th grade mathematics, reading, and English language arts.

I am requesting permission to use the survey published in the *Journal of Instructional Psychology* article entitled Measuring Principals' Openness to Change on Three Dimensions: Affective, Cognitive and Behavioral - Statistical Data Included. It was published in December 1999 by Dr. William E. Loadman and Dr. Beverly M. Klecker. I'm hopeful you are the correct contact for this request.

The survey would be administered to 50 middle school administrators in the Calcasieu Parish Public School System in Lake Charles, LA as a part of the data collection component of my dissertation. Please let me know if this is permissible as I would like to be able to move forward with data collection later this month. If you have any questions, please feel free to contact me by email, or by phone at my office (listed below in the email message) or cell phone (337.540.9389). Our school system will be out on spring break starting tomorrow, April 6. We will resume on Monday, April 16. However, if you need to speak to me during that time, please feel free to contact me at my cell phone number.

Thanks in advance for your assistance.
Diane Mason

Diane R. Mason
Tech Training Center Coordinator
"Advancing Quality Education Through
Technology-Connected Learning"

600 South Shattuck Street
Lake Charles, LA 70601
Tech Center #: 337.491.1797
Office #: 337.437.8351
Fax #: 337.491.1704
Email: diane.mason@cpsb.org

Appendix B

IRB Approval Letter

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Campus Correspondence

Principal Investigator:	Tammie Causey-Konaté
Co-Investigator:	Mason, Diane R.
Date:	June 28, 2007
Protocol Application:	"Louisiana INTECH professional development: Middle school administrator perceptions of change as related to student achievement."
IRB#:	05Apr07

The IRB has deemed that the research and procedures described in this protocol application are compliant with the University of New Orleans guidelines and exempt from human subjects regulations at 45 CFR 46 per exempt research under 45 CFR 46.101 (b) (2) (4).

Any changes to the procedures or protocols must be reviewed prior to implementation by the IRB to ensure continued exemption.

Best of luck with your project!
Sincerely,

Kari Walsh, (acting for IRB Chair)
IRB member

Laura Scaramella, Ph.D.
Chair, University Committee for the Protection of Human Subjects in Research

Appendix C

Calcasieu Parish School System's Permission to Conduct Research

CALCASIEU PARISH SCHOOL BOARD
P.O. BOX 800
LAKE CHARLES, LOUISIANA 70602

Application requesting permission to do Graduate Study in Calcasieu Parish Public Schools

Name of Graduate Student: Diane R. Mason

Home Address: 3030 Henderson Bayou Road; Lake Charles, LA ; 70605

Home Telephone:337-477-9749

Local Address (if different): _____

Local Telephone: (if different):_____

Current Place of Employment: Calcasieu Parish School Board - Technology Department

Position: Technology Training Center Coordinator

Business Telephone: 337-437-8351 Home Telephone: 337-477-9749 Cell: 337-540-9389

Email Address: diane.mason@cpsb.org

Title of Study
Louisiana INTECH Certified Teachers' Impact on Student Achievement
Name of University: University of New Orleans
Location of University: New Orleans, Louisiana

Proposed Time Period for conducting study: Fall 2006 and Spring 2007

Purpose of study: The purpose of this causal-comparative, quantitative study is to determine the impact of Louisiana INTECH certified teachers in Calcasieu Parish classrooms on seventh grade student achievement as determined by student performance on the *Iowa Test of Basic Skills (ITBS)* in mathematics.

What value will Calcasieu Parish School Board derive from information obtained from this study?
(NOTE: THIS IS THE PRIMARY PURPOSE FOR CONDUCTING RESEARCH STUDIES IN CALCASIEU PARISH SCHOOLS
Information gained from the study will provide stakeholders in the Calcasieu Parish Schools data to make informed decisions about the implementation and modification of the technology professional development program called Louisiana INTECH.
How many local public schools will be involved in the study? All middle schools in the Calcasieu Parish Public School System will be involved in the study.

How will the schools be selected? The schools will be selected based upon the teachers who are Louisiana INTECH trained in grades 6-8.

How many public school students will be involved in this study? All middle schools in the Calcasieu Parish Public School System will be involved in the study.

How will the students be selected? Students of Louisiana INTECH trained teachers and students of non-Louisiana INTECH train teachers participating in the study.

In what kind/s of activities will students be involved? None. Only test score data will be analyzed.

How much displacement time of students will the study require? None. Only test score data will be analyzed.

How many public school teachers/administrators/other staff will be involved in this study? Potentially all teachers in grades 6-8 will be included in the study, but only test score data will be analyzed.

In what kinds of activities will teachers or staff be expected to participate? None. Only test score data will be analyzed.

How will the teachers or staff be selected? Potentially all teacher data in grades 6-8 could be included.

How much displacement time per teacher will the study require? None. Only test score data will be analyzed.

Will a report of the study be made available to participating faculties? Yes

If so, in what format? The data will be published in my PhD dissertation.

Graduate Student,

Please sign the following agreement:

(1) I agree to abide by all Calcasieu Parish School Board policies and procedures while carrying out my proposed research study.

(2) I will maintain confidentiality of all research subjects at all times.

(3) I agree not to publish or disseminate in any form any part of the research findings to any person, agency, or institution other than the above-named university and Calcasieu Parish School Board without written approval of the Calcasieu Parish School Board Superintendent or his authorized designee.

(4) I further agree that two progress reports will be submitted to the Calcasieu Parish School during the time my study is being pursued, and a complete copy of the research study will be submitted once the study is finished. All reports will be submitted to the Administrative Director of Assessment, Research, and Special Services, Calcasieu Parish School Board.

Diane R Mason
Signature of Graduate Student

7/18/2006
Date

Jannine M. Causey
Approval Signature of Major Professor
for Proposed Study

For use by Calcasieu Parish School Board personnel only:

Date Request Received: _____

Calcasieu Parish School Board Research Project No. _____

Graduate Study Researcher _____

Title of Research Study _____

_____

Request approved ✓

Request not approved _____

Reason/s:

_____

_____

Barbara L Bankens
Signature of Administrator

July 31, 2006
Date

Appendix D

Survey Letter

Date: May 10, 2007

Dear Middle School Administrator:

I am a doctoral candidate conducting my dissertation study under the direction of Dr. Tammie Causey-Konate', an Associate Professor in the Department of Educational, Leadership, Counseling, and Foundations at the University of New Orleans.
The title of my dissertation is *Louisiana INTECH Professional Development: Middle School Administrator Perceptions of Change as Related to Student Achievement*
The focus of my dissertation is twofold. I am investigating administrator perceptions of Louisiana INTECH as an impetus for change, and I am examining the model's effect on 6th and 7th grade students' mathematics, reading, and English Language Arts achievement.

Please assist me by responding to the survey questions attached to this document. The survey entitled, *Perceptions of Louisiana INTECH Professional Development***,** is a requirement for my dissertation. It provides an overview of the Louisiana INTECH program and a scenario from which to base your responses. The questions are non-controversial and the instrument is not coded in anyway to determine your identity. You are under no obligation to complete this questionnaire. However, I hope you will complete the survey and return it to the designated envelope by the closure of the principals' meeting.

When the research is completed, a copy of the dissertation will be provided to the district research and assessment office. Each of you will be able to review the results by contacting the Administrative Director of Research, Assessment, and Accountability and the Administrative Director of Middle Schools. I will also prepare an executive summary that I will share with each of you upon request. Please allow approximately four months for completion of the data analysis.

Thank you in advance for your assistance in responding to the survey document. If you have any questions regarding the research, please feel to contact me by email: diane.mason@cpsb.org. I look forward to completing this study and sharing the results with you and your colleagues.

Sincerely,

Diane R. Mason
K-12 Educational Administration Doctoral Candidate
Department of Educational Leadership, Counseling and Foundations
College of Education and Human Development
University of New Orleans
348 Bicentennial Education Center
2000 Lakeshore Drive
New Orleans, LA 70148
dmason@uno.edu

Appendix E

Perceptions of Louisiana INTECH Professional Development Survey

Perceptions of Louisiana INTECH Professional Development Survey

(Dunham, et al., 1989; Klecker & Loadman, 1999)

Please read each item below and answer by placing an X in the box next to the response that best describes you.

1. Gender ☐ Female ☐ Male

2. Administrative Role

☐ Principal ☐ Asst. Principal ☐ Other

3. Highest degree earned

☐ BA/BS ☐ Master's ☐ Master's Plus 30

☐ Specialist ☐ Doctorate

4. Years of experience as an <u>educator</u>

☐ 0-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ 21- 26 Years ☐ 26 + Years

5. Years of experience as an <u>administrator</u>

☐ 0-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ 21- 26 Years ☐ 26 + Years

6. Years of experience as an <u>administrator in the present school.</u>

☐ 0-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ 21- 26 Years ☐ 26 + Years

7. Number of <u>teachers</u> in your present school

☐ 0-25 ☐ 26-50 ☐ 51-75 ☐ 76-100

☐ 101-125 ☐ 126+

8. Number of <u>INTECH certified teachers</u> in your school

☐ 0-25 ☐ 26-50 ☐ 51-75 ☐ 76-100

☐ 101-125 ☐ 126+

Survey Overview:

Each teacher in the Calcasieu Parish School System has had the option to participate in Louisiana INTECH training. The purpose for this survey is to gather data regarding middle school administrator perceptions of Louisiana INTECH as an impetus for school change. Please read the following summary information about Louisiana INTECH technology professional development and respond to the survey items.

Louisiana INTECH Summary:

Louisiana INTECH certification is earned by teachers who have completed Louisiana INTECH training. The training is an intense, content-rich, hands-on, 56-hour staff development program designed to provide teachers with concrete examples of effective technology-based strategies that support and enhance a standards based curriculum. The purpose is not only to enhance teacher technology skills and integration aimed at improving student achievement, but also to provide a catalyst for fundamental change in overall teaching and learning processes.

During INTECH training, teachers work in teams to learn basic technology skills while focusing on project-based activities and higher order thinking skills that support the Louisiana Content Standards, benchmarks and Grade Level Expectations. Teachers are required to critically examine their own instructional practices to determine how technology can play a role in enhancing the teaching and learning process. Additionally, they are expected to implement technology projects and activities in their classrooms developed during the training program.

Survey:

Based on your knowledge of Louisiana INTECH professional development and your perceptions of INTECH certified teachers use of technology integration strategies in your school, please respond to the following statements regarding Louisiana INTECH's impetus for change. Circle the number that represents the best description of your perceptions.

		Strongly Disagree	***Disagree***	***Agree***	***Strongly Agree***
1.	I look forward to changes in my school.	1	2	3	4
2.	Changes usually benefit my school.	1	2	3	4
3.	I usually resist change.	1	2	3	4
4.	I don't like change.	1	2	3	4
5.	Most school members would benefit from change.	1	2	3	4
6.	I am inclined to try new ideas.	1	2	3	4
7.	Change frustrates me.	1	2	3	4
8.	Changes would help me perform better at work.	1	2	3	4

Survey:

Based on your knowledge of Louisiana INTECH professional development and your perceptions of INTECH certified teachers use of technology integration strategies in your school, please respond to the following statements regarding Louisiana INTECH's impetus for change. Circle the number that represents the best description of your perceptions.

	Strongly Disagree	***Disagree***	***Agree***	***Strongly Agree***
9. I would support the change.	1	2	3	4
10. Changes tend to stimulate me.	1	2	3	4
11. Other people would think that I support the changes.	1	2	3	4
12. I often suggest new approaches to things in my school.	1	2	3	4
13. Most changes are irritating.	1	2	3	4
14. The changes would help improve unsatisfactory situations in my school.	1	2	3	4
15. I would do whatever possible to support the changes.	1	2	3	4
16. I find most change to be pleasing.	1	2	3	4
17. I would benefit from the changes.	1	2	3	4
18. I usually hesitate to try new ideas.	1	2	3	4

Vita

Diane R. Mason was born in Hampton, Iowa on July 3, 1955 to Ray Daniel and Mary Ann Denger. She attended public school grades Kindergarten through twelfth in rural Dows, Iowa. Mrs. Mason completed her Bachelor of Science degree in Elementary Education with a concentration in Learning Disabilities from Iowa State University in Ames, Iowa. After moving to Louisiana, Mrs. Mason completed her Masters Degree in Administration and Supervision from McNeese State University in Lake Charles, Louisiana with certification in Parish or City School Supervisor of Instruction. During Mrs. Mason's 30 postgraduate hours at McNeese State, she attained certifications in Elementary School Principalship, K-12 Principalship, Supervisor of Student Teaching, Kindergarten, and Computer Literacy.

Mrs. Mason has served as a public school teacher and administrator in elementary and middle schools in Lake Charles, Louisiana for 27 years. During her career she has been recognized with the 1990 Louisiana Association for Computer Using Educators' Elementary Teacher of the Year Award; 1991 Calcasieu Parish Elementary Teacher of the Year Award; 1991 National Foundation for the Improvement of Education Christa McAuliffe Fellow Award; 1991 Louisiana House and Senate Recognition for Outstanding Teaching Award; 1991 Governor's Award of Excellence in Teaching; and 1995 Cooperating Teacher of the Year Award. Also, Mrs. Mason has published three articles, "Global Classmates" in *ISTE Online SIG* (1990), "Project LA-KONNECT" in the *National School Board Association Journal* (1992), and "Project LA-KONNECT" in *Technology and Learning* (1993).

Mrs. Mason is married to Larry A. Mason. She has two adult children, Meredith and Brandon Mason.